



PERIYAR UNIVERSITY

SALEM - 636 011, TAMIL NADU

NAAC A Grade – STATE UNIVERSITY- NIRF RANK 83

Professional Ethics

Subject Code: 19MPZ01

PERIYAR UNIVERSITY, SALEM – 636 011
DEPARTMENT OF ZOOLOGY
M.Phil / Ph.D DEGREE COURSE WORK
(For those admitted in 2018-2019 and later)

SEMESTER – I

THEORY PAPER – I

RESEARCH METHODOLOGY

Contact hours per week: 05

Contact hours per semester: 75

4 CREDITS

Course Objectives:

To enable the students

- to strive their mind towards research.
- to make the students to understand the concept of advanced level instrumentations.
- to understand the significance of high end statistical tools to justify their research outcome.

Course Outcomes:

- Students receive pre-research training in zoological science.
- Learn the principle and applications of high end instrumentations.
- The excellence in statistical tool handling makes them to fit for world class research.

UNIT I: PREPARATION OF THESIS/ DISSERTATION: Basic concepts of research: Method of writing Dissertation: Preparation of Abstract, Collecting information for Introduction and definition of the research problems- Collection of data for Historical resume, Development and standardization of materials and methods with specific objectives of research problem, Interpretation of data and results. Method and strategy of discussing your results. Tactics of Summarize the results.

(15 hours)

Unit-II: RESEARCH IS A NEVER-ENDING PROCESS. Defining and formulation of research problem- literature collection using internet and journals- way of interpretation of references cited in the Thesis/ dissertation. Development of research proposal- Origin of proposal Construction of Research hypothesis- and their types: null and alternate hypothesis and testing of hypothesis- theory, principles, law and concepts. Data collection technique. Selection of problem- stages in execution of research; preparation of Manuscript for journals. **Ethics in Research-** writing papers and proposals -impact of plagiarism.

(15 hours)

UNIT III: DESCRIPTIVE STATISTICS: Collection of data, Variables and observations, empirical distribution, bar chart, stems and leaf, histogram. Mean, Median, Mode formula and applications; Dispersion: range, variance, standard variance, standard deviation, inter-quartile range; Shape: modality, skewness. Probability: probability distributions- Bernoulli, binomial, Poisson, normal. Hypothesis – Formulation – Testing of Hypothesis – Normal, Binomial Poisson, t-test, χ^2 and F distribution, Multiple Correlation- simple Linear regression, Linear additive model- Anova.

(15 hours)

UNIT IV: COMPARISON OF MEANS AND MULTIVARIATE ANALYSIS: Testing significance: confidence interval- sample mean. Use of statistical tables & levels of significance. ANOVA and MANOVA. Tukey's, Dunnett's, SNK. correlation and regression analysis; Chi-square test, students' t-test. Multivariate analysis: basic principles and application. Use of correlation and regression, regression and correlation coefficients. Multivariate Analysis: Basic principles and applications of Multiple regression analysis, Principal Component Analysis (PCA), Discriminant Function Analysis (DFA), Cluster Analysis.

(15 hours)

UNIT V: BIOINSTRUMENTATIONS: Principle, structural components of instrument, method and applications of pH meter, UV-Visible spectrophotometer, IR spectrophotometer, NMR and Types, X-ray diffraction, Mass Spectrophotometer, MALDI, SELDI and MS-MS, GC-MS, HPLC, GLC and Different types of Microscopes used in Biological Sciences. Institutional Animal Ethics and its significance as per CPCSEA Guidelines.

(15 hours)

Correlation of Programme objectives with course outcomes

COURSE OUTCOME	PO1	PO2	PO3	PO4	PO5
• Students receive pre-research training in zoological science.		✓		✓	✓
• Learn the principle and applications of high end instrumentations.	✓		✓		
• The excellence in statistical tool handling makes them to fit for world class research.	✓	✓	✓	✓	✓

Unit wise programme specific qualification attributes

Unit	Unit Title	Intended Learning Chapters	Hours of Instruction
RESEARCH METHODOLOGY			
I	PREPARATION OF THESIS/ DISSERTATION	K1, K2, K4, K5	15
II	RESEARCH IS A NEVER-ENDING PROCESS	K1, K4, K5	15
III	DESCRIPTIVE STATISTICS	K1, K2, K3, K4	15
IV	COMPARISON OF MEANS AND MULTIVARIATE ANALYSIS	K2, K3, K4, K5, K6	15
V	BIOINSTRUMENTATIONS	K3, K4, K5, K6	15

REFERENCE BOOKS:

1. Davis, GB and CA Parker. 1997. Writing the doctoral dissertation. Barrons Educational series, 2nd Edition.
2. Kannan, S. M. Krishnan, R.Thirumurugan and S.Achiraman. 2012. Methods in Molecular Biology – From Cell to Molecules. First Edition, UVN- Press. India
3. Duncary P. 2003. Authoring a Ph.D thesis: How to plan, draft, write and finish a doctoral dissertation. Palgrave Macmillan.
4. Snedecor GW and WG Cochran. 1978. Statistical methods. Oxford and IBH publishing Co Pvt. Ltd.
5. Daniel WW. 2006. Biostatistics: A Foundation for Analysis in the Health Sciences (7thedn). JohnWiley & Sons, New York.
6. Zar, Jerrold H. 2008. Biostatistical Analysis (3rdedn.). Pearson Education Inc., New Delhi.

Paper-I: RESEARCH METHODOLOGY - 18RPSY01

OBJECTIVES:

- To orient students to the different stages of research
- To give insight into the various research methods
- To identify and apply appropriate research tools
- To acquire the skill of reporting the research
- To employ various statistical techniques including software for psychological research

UNIT I: RESEARCH- MEANING, NATURE AND CONCEPTS

Science is a way of thinking – Common method of acquiring Knowledge – Emerging modern Science – the Science of Psychology. Objectives – Types – Significance of Psychological Research Methods – Research Process – Criteria for good Research – Sources of research problems. Sources of question – Refining Question or Research – Types of variables in Research – Validity and Threats to Validity – Research ethics – Ethical guide for human research – Ethical principles in Research with Animals. Sampling: Meaning, Nature and Types - Sampling distribution – Sampling error.

UNIT II: RESEARCH DESIGNS

Meaning and Purpose of Research design – Criteria of Research Design – Basic Principles of Experimental Design - Some important types of research design – Between and within group design – Comparison of with in group design – Pre experimental design – true experimental design – Quasi experimental design – Ex – post Facto design. Laboratory Experiment – Field experiments – Survey Research. Procedures of Single subject Experiment research – Basic Design – Strategies in Data Collection – Evaluating Data – Advantages and disadvantages.

UNIT III: UNIVARIANT AND MULTIVARIANT ANALYSIS

Multiple regression and correlation - logistic regression - factor analysis - cluster analysis - discriminant function analysis - path analysis – MANOVA - Canonical correlation – Multidimensional scaling.

UNIT IV: THE PROCESS OF QUALITATIVE RESEARCH

Historical back ground of qualitative research- Different traditions in qualitative research: Grounded theory, phenomenological tradition, ethnographic, auto ethnography tradition and Narrative approach. Contemporary issues and debates in the philosophy of qualitative inquiry.

Conceptualization of problem in qualitative research, the logic of qualitative research process: induction and abduction, Conceptual Mapping, Sampling in qualitative research, Practice of theoretical sampling. Issues of depth and theoretical saturation of data, Negative cases in data, Designing qualitative research

UNIT V: DATA COLLECTION AND ANALYSIS IN QUALITATIVE RESEARCH

Data collection methods in different traditions: Participant observation, interviewing, focus groups, life history and oral history, documents, diaries, photographs, films and videos, conversation, texts and case studies.

Data analysis: Qualitative Content analysis. Thematic analysis: Analytical induction model, thematic network model. Phenomenological analysis: Traditions in interpretative phenomenological analysis. Narrative analysis: Thematic, structural and performative narrative analysis. Discourse and conversational analysis.

TEXT BOOKS

- Coolican, H. (2017). *Research Methods and Statistics in Psychology*. New York: Psychology Press.
- Creswell, J. W., & Creswell, J. D. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. London: Sage Publications.

REFERENCES

- Bryman, A (Ed.) (2007). *Sage Benchmarks in Social Science Research Methods*. Vol. I, Vol. II, Vol. III, and Vol. IV. New Delhi: Sage Publications.
- Graziand A.M & Raulin M.L (1989). *Research Methods – A Process of Inquiry*. New York: Karper & Row Publishers.
- Kerlinger, F. N. (1966): *Foundations of Behavioural Research*. (Third Edition). Bangalore: Prism Books Pvt. Ltd.
- Kothari, C. R. (1998): *Research Methodology – Methods & Technique* (22nd Reprint) Wishwa Prakashan - New Delhi.
- Shaughnessy J.J., & Zecheister, E.B. (1997). *Research Method in Psychology*. (4th Edition). New York Mc. Graw Hill. Inc.
- Singh A.K (1997). *Testes Measurement and Research Methods in Behavioral Science*. Patna: Bharathi Bhavan.

Course Outcome:

On the successful completion of the course, students will be able to.

CO No	Co Statement	Knowledge level
CO1	Understand the concepts of the research	K2
CO2	Interpret, design and conduct basic psychological research and apply appropriate research design	K4, K6, K3
CO3	Gain knowledge and apply appropriate research tools to analyze the results of the data	K4, K3
CO4	Insight into qualitative research methods	K2
CO5	Gain knowledge in analysis of data using quantitative techniques	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	S
CO3	S	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

18COMC15	Corporate Governance and Business Ethics	Category	L	T	P	Credit
		Core		---		4

Preamble

- To offer fundamental knowledge on corporate governance, business ethics and corporate social responsibility practices.
- To provide various theoretical and conceptual background about corporate governance and business ethics in the globalized era by case studies.
- To familiarize the corporate governance, business ethics and corporate social responsibility practices to be followed practically by corporate sectors.

Course Outcome

On the successful completion of the course, students will be able to prepare and present information about corporate governance, business ethics and corporate social responsibility practices to be followed by corporate sector.

CO Number	CO Statement	Knowledge Level
CO1	To know the fundamentals of corporate governance and business ethics	K1
CO2	To Study about Corporate Governance Models and its activities	K2,K3
CO3	To acquire the knowledge about corporate crisis in India and global	K4
CO4	To Study about Business Ethics and its functions	K5
CO5	To study about Corporate Social Responsibility activities	K6

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	M	M	S	S	S
CO3	S	S	M	M	S
CO4	M	M	M	M	M
CO5	M	M	M	M	M

S-Strong M-Medium L-Low

CORPORATE GOVERNANCE AND BUSINESS ETHICS – 18COMC15

Unit-I: To know the fundamentals of corporate governance and business ethics.

Corporate Governance concept – Importance – business ethics- ethical values – issues, need of corporate governance code transparency and disclosure- global issues of government – regularity framework – corporate scams – committees in India and abroad.

Unit-II: To Study about Corporate Governance Models and its activities

Meaning theories, Models and Benefits of Corporate Governance, Politics and Governance, Board committees and their functions, insider trading, rating agencies, green governance/e-governance clause 49 of listing agreement, corporate governance in public sector undertakings, corporate funding and political parties, class action, whistle blowing, shareholders activism.

Unit-III: To acquire the knowledge about corporate crisis in India and global

BCCI (UK). Maxwell communication (UK), Enron (USA) World.Com (USA), Andersen Worldwide (USA), Vivendi (France), Harshad Mehta Scam, Satyam Computer services Ltd. And Kingfisher Airlines, Common Governance Problems Noticed in various Corporate Failures, Codes and Standard on Corporate governance, initiatives in India.

Unit-IV: To Study about Business Ethics and its functions

Morality and Ethics, Business Values and Ethics, Various Approaches to Business Ethics, Ethics Theories, Ethical Governance, Corporate Ethics, CSR – Extension of Business Ethics, Benefits Adopting Ethics in Business, Ethics Programme, Code of Ethics, Ethics Committee.

Unit-V: To study about Corporate Social Responsibility activities

Corporate Philanthropy, Meaning of CSR, CSR and CR, CSR and Corporate Sustainability, CSR and business ethics, CSR and Corporate Governance, Environmental aspect of CSR, CSR provision under the companies Act, 2013, CSR Committees, CSR Models, Drivers of CSR, Codes and Standards on CSR, Global Reporting Initiatives, ISO 26000.

(Note: Question Papers Consists of 100% theory)

Suggested Readings:

1. Kumar, Anil (2012), Corporate Governance, Theory and Practice, International Book House, New Delhi.
2. A.C, Fernando (ed) (2009), Corporate ethics, Governance and Social Responsibility, Pearson.
3. Monks, R.A.G., and N.Minnow (2001), Corporate Governance, John Wiley & Sons, UK.
4. Naciri, A.(ed) (2008), Corporate Governance around the World, Routledge, New York.
5. Tricker, Bob.(2009), Corporate Governance Principles, Policies and Practice, Oxford University Press NewYork.
6. Vallbhaneni, S.R. (2008), Corporate Management, Governance and Ethics Business Practices, John Wiley & Sons, New Jersey.

**ELECTIVE PAPER – 5: INTELLECTUAL PROPERTY RIGHTS (IPR),
BIO-SAFETY AND BIOETHICS (18MBCE05)**

Course Objectives

This part of the curriculum helps students to have an ability to understand and conduct research to meet desired needs within the legal, social, ethical, safety & sustainability aspects in biology and the biocontainment.

Course Outcome

- Students can know rules on how to protect patents, copyrights, trademarks, and other forms of IPRs have become a standard component of international trade agreements.
- Students may become patent attorney, who has the specialized qualifications necessary for representing clients in obtaining patents and acting in all matters
- Gain knowledge in procedures relating to patent law and practice, such as filing an opposition.
- To understand the importance of biosafety and to expose them to various biosafety committees and its importance
- To inculcate the ethical implications in hospitals, clinical laboratories and research.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		(K1, K2)	(K3, K4 & K5)	
I	Introduction to Intellectual Property	IPR - Definition - Types of IP: Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Plant varieties, Trade Secrets, Geographical Indications, IP as a factor in R&D; IPs of relevance to Microbiology / Biotechnology and few Case		12

		Studies.WTO - Definition - Functions - Forms of IPR Protection.		
II	Agreements and Treaties	History of GATT & TRIPS Agreement; Madrid Agreement; Hague Agreement; WIPO Treaties; Budapest Treaty; PCT; Indian Patent Act 1970 & recent amendments. Paris Convention.		12
III	Basics of Patents and Concept of Prior Art	Introduction to Patents; Concept related to patents novelty, non- obviousness, utility, anticipation, etc.	Types of patent applications: Ordinary, Patent Co- operation treaty (PCT), Conventional, Divisional and Patent of Addition; Specifications: Provisional and complete; Forms and fees Invention in context of “prior art”; Patent databases; Searching International patent databases; Country- wise patent searches (USPTO, esp@cenet (EPO), Patents scope (WIPO), IPO, EPO, etc.). National & Patent Cooperation	12

			treaty(PCT) filing procedure; Time frame and cost; Status of the patent applications filed; Revocation of patent, Precautions while patenting – disclosure/non-disclosure; Financial assistance for patenting - introduction to existing schemes Patent licensing and agreement Patent infringement-meaning, scope, litigation, case studies – Neem, Turmeric and Pasmati rice , Commercialization and Licensing.	
IV	Biosafety	Introduction: Historical Background; Introduction to Biological Safety Cabinets; Primary Containment for Biohazards; Biosafety Levels; Biosafety Levels of Specific Microorganisms; Biosafety guidelines and regulations (International); Biosafety guidelines – National ; Definition of	Institutional Biosafety Committee, RCGM, GEAC etc. for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication; Biosafety in relation to transgenic research and applications. Biopiracy	12

		GMOs & LMOs;		
V	Bioethics	Definition - Ethical implications of cloning: Reproductive cloning, therapeutic cloning	Ethical, legal and socioeconomic aspects of gene therapy, germ line, somatic, embryonic and adult stem cell research. Animal ethics - Norms in India - Licensing of animal house - Ethical clearance norms for conducting studies on human subjects. Ethical implications of human genome project. Bioethics committees – IAEC, CPCSEA, OECD, etc.	12

Text Book:

1. Senthil Kumar Sadhasivam and Mohammed, Jaabir. 2008. IPR, Biosafety and Biotechnology Management. Jasen Publications, India.
2. Singh K. Intellectual Property Rights on Biotechnology, BCIL, and Newdelhi-1993.
3. Shaleesha A. Stanley, Bioethics, Wisdom educational service-2010

References

1. BAREACT, Indian Patent Act 1970 Acts & Rules, Universal Law Publishing Co.Pvt. Ltd., 2007.
2. Kankanala C., Genetic Patent Law & Strategy, 1st Edition, ManupatraInformation Solution Pvt. Ltd., 2007.
3. Gurumani, N. Research Methodology,; For Biological Sciences . MJP Publishers,Chennai 2006.
4. Jose B. Cibelli, Robert P. Lanza, Keith H. S. Campbell, Michael D.West. 2002.Principles of Cloning, Academic Press, SanDiego, Gurdon.

Web References:

1. <http://www.w3.org/IPR/>
2. <http://www.wipo.int/portal/index.html.en>
3. http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html
4. www.patentoffice.nic.in
5. www.iprlawindia.org/
6. <http://www.cbd.int/biosafety/background.shtml>

PERIYARUNIVERSITY, SALEM

Department of Zoology

M.Sc. Zoology Course - SEMESTER-III

(This syllabus is applicable to the students who are admitted on or after 2020-2021 academic year onwards)

ADVANCES IN ZOOLOGY

Objectives:

To strive the minds of our stake holders to

- ❖ gain knowledge on tools and techniques adapted to produce transgenic animals.
- ❖ cater the in-depth knowledge on valuable animal products and their applications.

Outcome:

- ❖ Altogether, this subject will bring our students to develop transgenic animals and that could be more useful to the scientific community to solve various animal related problems.

UNIT I

Recent Advances in Animal Biotechnology: Tools and techniques in gene manipulation - antisense RNA technology, DNA and protein chip – Protein engineering – Gene knock out-RNAi and Gene silencing - Application of genetic engineering in medical, agriculture, animal husbandry – Transgenesis Bioethics and IPR.

UNIT II

Current Scenario of Nanomedicine: Nanoparticle as drug carriers- Nanoparticles as gene carrier- Nanoparticle as RNAi carriers. Development of nanomedicine to target cancer. Commercialized nanocarriers for cancer treatment. Impact of nano in cancer biology. Tumor immunology, immunodiagnostics and disease targeting with monoclonal antibodies.

UNIT III

Behavioural Genetics: Beyond Mendel Laws, Biological Clock and its genetic regulation. Pathways between genes and behaviour, Epigenesis, Genetic and Environmental influences of behaviour. Proteome of Circadian rhythm in Mammals.

UNIT IV

Immunity in Health Care: Cell fusion methods. Hybridoma technology and its applications. Stem cell research; haemopoietic stem cells, embryonic stem cells in health care. Cell culture products. Production of interferons, interleukins and vaccines through mammalian cell cultures.

UNIT V

Molecular Entomology: Insect Molecular Physiology an Over view- Insect Pest Management, Role of Storage proteins in Insect Development (Embryo and Metamorphosis)- Vitellogenin in and receptor interaction in insect - Nanoparticles in Insect Pest Management. Pros and cons of *Bacillus thuringiensis* in Pest Management.

CORE - XII

ENVIRONMENTAL LAW AND POLICIES

Paper Code	19UPEVS4C12	Horus	L	T	P	Credit
Marks	100		4	1	-	4

Course Objectives

The purpose of this course is to introduce the students to the vast field of Laws and Policies both at the national and international level relating to environment.

Course Outcomes

- CO1** Understand environmental legislation and policies of national and international regime.
- CO2** Have an insight into major acts and rules applicable for pollution control and natural resource conservation.
- CO3** To develop the skills needed for interpreting laws, policies and judicial decisions about the environment.
- CO4** Know regulations applicable to industries and other organizations with significant environmental aspects.
- CO5** Apply the legislation concepts for solving the local environmental problems.
- CO6** Get knowledge of the legal system operating in India.
- CO7** Be in a position to prepare compliance reports for getting environmental clearance
- CO8** Prepare the environmental management system for an organization.

Mappings of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1				*		*		
CO2				*				
CO3						*		*
CO4				*		*		
CO5						*		
CO6							*	
CO7				*				*
CO8						*		*

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Environmental Protection	Indian Constitution – Structure – Provisions for environmental protection – Indian environmental law – Framework and Implementation - Role of International Environmental Agencies -UNEP, GEF, UNFCCC and IPCC(K1, K2)	5
II	Environmental Laws in India	Indian Wildlife (Protection) Act, 1972; Forest Conservation Act 1980; Indian Forests Act (Revised) 1982; Water (Prevention and Control of Pollution) Act, 1975; Air (Prevention and Control of Pollution) Act 1981,	10

		1987 and Rule 1982; Environment (Protection) Act, 1986 and Rules 1986; ; National Environment Appellate Authority Act, 1997; Biodiversity Act 2002; National Green Tribunal Act 2010 (K1, K2)	
III	Guidelines and Rules for Environmental Protection in India	Bio-Medical Waste (Management & Handling) Rules,1998; Recycled Plastics Manufacture and Usage Rules, 1999; Noise Pollution (Regulation and Control) Rules, 2000; Municipal Solid Waste (Management and Handling Rules) 2000; The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules,2008; Wetland Rules 2009; Coastal Regulation Zones (CRZ) Rules 2011; E-waste Management and Handling Rules 2011; Plastics Manufacture, Sale and Usage Rules, 2011. (K1, K2)	10
IV	International Environmental Treaties and Conventions	Stockholm Conference on Human Environment,1972; Ramsar Convention on Wetlands, 197; Montreal Protocol, 1987; Basel Convention (1989,1992); Earth Summit at Rio de Janeiro,1992; Kyoto Protocol, 1997; Earth Summit at Johannesburg, 2002; , Copenhagen Summit 2009 and 2019. Paris Agreement, 2016.SDG - 2030 (K1, K2)	10
V	Major Initiatives/Policies from MoEF	National Policies for Environmental Protection in India: National River Conservation Plan (NRCP), National Ganga River Basin Authority (NGRBA), Ganga Action Plan Phase I and II, Green India Mission – Environmental Clearances: National Environmental Assessment and Monitoring Authority (NEAMA) (K4)	10

References

Text Books

1. Environmental Law in India (2000) P. Leelakrishnan Butterworths India Publishers
2. Textbook on Environmental Law (2010) N. Maheshwara Swamy, Asia Law House Publishers

Reference Books

1. Gurudeep Singh (2005) Environmental Law in India, McMillan, New Delhi.
2. ShyamDiwan and Armin Rosencrany (2001) Environmental Law and Policy in India, Oxford University Press, New Delhi.
3. Singh G (1995) Environmental Law: International & National Perspectives.
4. Tamil Nadu Pollution Control Board (1999) Pollution Control Legislation Vol. I and II, Chennai.

Journals and Documents

1. cpcb.nic.in/
2. www.tnpcb.gov.in/
3. www.thesummitbali.com/
4. envfor.nic.in/legis/legis.html
5. edugreen.teri.res.in/explore/laws.htm
6. envfor.nic.in/legis/crz/crznew.html
7. rti.gov.in/
9. www.ngosindia.com/resources/pil.php

EXTRA DEPARTMENTAL SUPPORTIVE COURSE (EDS)

MBTEDA 207: BASIC BIOTECHNOLOGY

Credits : 3

Hours : 3/Wk

Course objectives:

This course specially designed for the students to understand the basic knowledge about basic concept and scope of biotechnology. To understand about cells of single and multicellular organisms, Mendelian laws and sex determination of plant and animals. Learn about central dogma of the cells and rDNA technology and their application. Basic understanding of plant and animal cell culture, transgenic plant and animals and bioethics and safety. Application of biotechnology in agriculture and biosafety and conservation. This paper will help those in student who are willing to take up biotechnology for higher studies for project and careers.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Basic of Biotechnology	Introduction and scope of biotechnology. Prokaryotic and eukaryotic cells.	Mendelian principles of genetics. Sex determination in animals	9
II	Central Dogma of Life	Structure of DNA and RNA. Central dogma: DNA – RNA – Protein	rDNA technology: Applications: Insulin Production	9
III	Tissue Culture and Transgenics	Biotechnological tools: Plant and animal tissue culture.	Stem cells-Embryonic and adult Transgenic plants and animals. Development of recombinant vaccines	9
IV	Application of Biotechnology	Applications of Biotechnology in Agriculture-GM crops	Industry: Biofuel and Biopolymer, Bioremediation (oil spills) and its application	9
V	Regulatory Biotechnology	Biodiversity and conservation. Bioethics and biosafety.	Intellectual property right (IPR) – Copyright, Geographical Indication Trademarks and patents	9

18UPESC1C05 - Energy Economics & Policies

L	T	P	C
4	1	0	4

OBJECTIVE

- ✓ To explain the energy conservation Laws using a different laws
- ✓ To understand Indian energy scenario in different aspects
- ✓ To understand world energy scenario with different aspects
- ✓ To understand Indian energy policy systems through in different aspects.
- ✓ To understand world energy policy systems through in different aspects.

UNIT- I ENERGY CONSERVATION

Energy Conservation Act-2001 and its features - Electricity Act – 2003 and its features - Framework of Central Electricity Authority (CEA), Central & States Electricity Regulatory Commissions (CERC & ERCs)-Role of MoP(Ministry of Power)-BEE (Bureau of Energy Efficiency).

UNIT-II INDIAN ENERGY SCENARIO

Energy resources & Consumption-Commercial and noncommercial forms of energy- Fossil fuels- Renewable sources in India- Sector wise energy Consumption - Impact of energy on economy – Need for use of new and renewable energy sources-present status and future of nuclear and renewable energy-Energy Policy Issues related Fossil Fuels-Renewable Energy-Power sector reforms-restructuring of energy supply sector-energy strategy for future

UNIT-III GLOBAL ENERGY SCENARIO

Role of energy in economic development and social transformation - Energy and GDP - GNP and its dynamics - Energy sources, overall Energy demand and availability - Energy consumption in various sectors and its changing pattern - Depletion of energy sources and impact economics on international relations.

UNIT-IV INDIAN ENERGY POLICY

Global Energy Issues-National & State Level Energy Issues-National & State Energy Policy-Industrial Energy Policy- Energy Security-Energy Vision-Energy Pricing and Impact of Global Variations-Energy Productivity (National & Sector wise productivity).

UNIT-V GLOBAL ENERGY POLICY

International Energy Policies of G-8 Countries - G-20 Countries - OPEC Countries - EU Countries - International Energy Treaties (Rio, Montreal and Kyoto) - INDO-US Nuclear Deal- Future Energy Options-Sustainable Development-Energy Crisis-Role of International Energy Agency.

OUTCOMES

Students will have

- An exposure energy conservation with different policies and laws
- Understand the Indian Policy Issues
- Describe the key policies that will facilitate the transition and explain the economics of how the policies will introduce incentives that will support the transition
- Describe and explain the effects of TAE resources and technologies on economic growth and economic development including transition effects and those associated with moving the economy along the sustainable path
- Identify the key economic development consequences of the development of local indigenous alternative energy resources

TEXT BOOKS

1. P. Meier and M. Munasinghe: Energy Policy Analysis & Modeling, Cambridge University Press, (1993).
2. Charles E. Brown, World Energy Resources, Springer 2002.
3. Resources, Charles E. Brown, 'International Energy Outlook' - EIA annual Publication.

REFERENCE BOOKS

1. Principles of Energy Conversion: A.W. Culp (McGraw Hill International edition) BEE Reference book: no. 1/2/3/4
2. S Rao, Energy Technology, Khanna Publishers

Mapping of course outcomes with program outcomes

Course Outcome/ Program Specific outcome	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	-	H	-	-	L
CO2	H	-	M	-	-	M
CO3	L	-	L	-	-	H
CO4	M	-	M	-	-	L
CO5	L	-	L	-	-	M

Paper-I

18URLISC01: RESEARCH METHODOLOGY

Objectives:

- Understand objectivity, ethical and different approaches to Research trends in Library and Information Science,
- Identify and select the research problems,
- Understand the different tools and techniques for data collection and sampling methods,
- To learn the applications of statistical packages for data analysis,
- Prepare and write research proposals and reports.

Unit – I

Research: Meaning, Need, Purpose, process; Types of Research: Fundamental and Applied Research, Qualitative and Quantitative Research, Logic and Scientific Research; Process of Research; Area of research in Library and Information Science; Research Ethics – Plagiarism.

Unit – II

Research Design: Identification, Selection and Formulation of a Research Problem, Characteristics of the research problem, sources of information; Hypothesis: Definition and types, testing hypothesis; Literature Search and Review of Literature; Research Methods: Scientific, Historical, Descriptive, Survey, Observation, Experimental, Case-Study, Delphi and Interview method.

Unit – III

Data Collection and Presentation: Questionnaire, Interview, Observation, Library records, Reports - advantages and disadvantages; Sampling: Types of sampling-random, and purposive sampling, systematic sampling, cluster, multiphase sampling, sampling errors; Data presentation: Tabulation and generalization. Graphical presentation of data.

Unit – IV

Data Analysis: Editing, Coding, and De-Coding, Tabulation; Application of Statistical Packages: Measures of central tendency, Z-test, T-test, Correlation, Regression linear and Non-linear, Chi-Square Test, ANOVA; Graphical presentation of Data.

Unit – V

Report Writing: Characteristics and organization of report; Style Manuals: Modern Language Association (MLA) – American Psychological Association (APA) -Chicago Style Manual: Plagiarism.

Learning Outcomes:

- Acquired knowledge about various types of research relevant to LIS,
- Gained knowledge about various types of research methods,
- Understood the ways and means of data collection techniques,
- Familiarized with the applications of tools for analysis and interpreting the data,
- Gained knowledge about writing style manuals and plagiarism.

Recommended Readings:

1. **Kothari, C. R.** Research Methodology – Methods & Techniques. New Age International, New Delhi, 3rd edi, 2014.
2. **Krishnaswami, O.R.** *Methodology of Research in Social Sciences*, Himalaya Pub.House-New Delhi, 2013.
3. **Santhosh Gupta**, Research Methodology, and Statistical Techniques. Deep and Deep, New Delhi, 2002.
4. **Jude Carroll, Kate Williams**, Referencing and Understanding Plagiarism, Palgrave MacMillan.
5. **Lynn Silipigni Connaway and Marie L. Radford**. Basic Research Methods for Librarian, 5th Edition, Libraries Unlimited.

Web Resources:

1. http://my.jessup.edu/writingcenter/wp-content/uploads/sites/16/2014/06/Style-Guide-Comparison-Chart_Updated-9-27-16.pdf
2. https://onlinecourses.nptel.ac.in/noc18_ge12/preview

X-RAY CRYSTALLOGRAPHY

COURSE CODE: 18PGPHYE04

HOURS

MAXIMUM MARKS: 100

L	T	P	C
3	1	0	4

COURSE OBJECTIVES:

- To study the production of X-rays, crystals and its symmetry and their properties.
- To understand the X-ray intensity data collection techniques.
- To know the Data reduction, structure factor and Fourier syntheses.
- To understand the Phase problem when solving the complete structure.
- To know the refinement, error and derived results.

COURSE OUTCOME: After completion of the course the students will be able to

CO1	Understand the basic concepts of crystals and their properties.
CO2	Apply principles of data collections various intensity methods.
CO3	Interepretation of intensity data to correlate structure factor and Fourier syntheses.
CO4	Find the crystal structure of an unknown material.
CO5	Identification of molecular geometry and errors.

Mapping of course outcomes with programme outcomes:

Course Outcome	PO1	PO2	PO3	PO4	PO5
CO1	H	M	H	L	M
CO2	L	M	M	L	M
CO3	H	L	M	L	M
CO4	L	M	H	L	M
CO5	L	M	H	L	M

Syllabus

Unit	Unit Title	Intended Learning Chapters (Programme specific qualification attribute K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	X-rays	X-rays sources – conventional generators-construction and geometry-sealed tube-rotating anode generators-choice of radiation-Synchrotron radiation – X-ray optics: filters-monochromators-collimators-mirrors- safety. Diffraction of X-rays:Lattice-Lattice planes-Miller indices-X-ray diffraction reciprocal lattice-relation between direct and reciprocal space-Bragg's law in reciprocal lattice-sphere of reflection – limiting sphere. Symmetry of crystals:Crystal systems and symmetry – unit cell – space lattices- nonprimitive lattices – point groups-space groups-screw axes-glide planes-equivalent positions-matrix representation of symmetry-intensity weighted reciprocal lattice – analysis of space group symbols. Crystals and their properties: Crystallization – growing crystals – choosing a crystal –mosaic structure-absorption- crystal mounting-alignment – measurement of crystal properties.	15
II	Data collection techniques for single crystals	Laue method-single crystal diffraction cameras: rotation and oscillation method – Ewald construction – Weissenberg method – Precession method. Single crystal diffractometers and data collection strategy: Instrument geometry-crystal in a diffracting position-determination of unit cell-orientation matrix-Intensity Data collection-Unique data-equivalent reflections – selection of data-Intensity measurement methods: Film methods-counter methods: Point detector-Area detectors-CCD's-Image plates-Low temperature single crystal diffractometry.	15
III	Data Reduction	Integration of intensity-Lorenz and Polarization corrections – absorption-deterioration or radiation damage-scaling – Interpretation of Intensity data. Structure factors and Fourier syntheses: Structure factor – Friedel's Law – exponential and vector form – generalized structure factor – Fourier synthesis –Fast Fourier transform – Anomalous scattering and its effect- Calculation of structure factors and Fourier syntheses.	15
IV	Phase Problem	Methods of solving Phase Problem: Direct methods – Patterson methods – Heavy atom methods – molecular replacement- search methods – completing the structure.	15
V	Refinement of crystal structures	Weighting – Refinement by Fourier syntheses – Locating Hydrogen atoms- identification of atom types – Least squares – goodness of fit- Least square and matrices-correlation coefficients-Relationship between Fourier and Least squares – Practical consideration in least squares methods.	15

		Errors and Derived results :Random and systematic errors–derived results – molecular geometry – absolute configuration–thermal motion.	
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Tutorial

Lattice-Crystal planes-Miller indices-symmetry and space groups-Bragg's Law-Calculation of structure factors.

Books for Study and Reference

1. X-ray Structure Determination –G.H. Stout and L.H.Jensen, John Wiley Publications, Second Edition, 1989.
2. Fundamentals of Crystallography -C. Giacovazzo, Oxford Press, Second Edition, 2011.
3. Structure Determination by X-ray Crystallography - Ladd and Palmer, Plenum Publishing Corporation, Second Edition, 2013.
4. X-ray Crystallography -Woolfson, Cambridge University Press Publications. Second Edition, 1997.
5. Elements of X-ray Crystallography - Leonid V. Azaroff, , McGraw Hill Publications, 1968.
6. Crystal Structure analysis for Chemist and Biologist–J.P. Glusker, M. Lewis and M. Rossi, VCH Publishers Inc, 1994.
7. Crystal, X-ray and Proteins–D. Sherwood, and J. Cooper, Oxford University Press, 2010.
8. An Introduction to Crystallography –F.C. Phillips, John Wiley Publications, 1971.
9. International table for Crystallography.

Semester 4: JMC E04 –Media Laws and Contemporary Issues [Theory] 4 credits [End Sem-75 + CIA-25]

Curriculum/Course Objective (CO):

1.	To introduce students about the basic structure of the Indian constitution
2.	To familiarize students on the various laws governing media
3.	To teach students about the provisions of some important press laws
4.	To enable students to have an understanding of ethical issues involved in the practice of journalism
5.	To give a clear vision to the students about the various journalistic practices in the process of news and information gathering

UNIT-1

Weeks/Instructional Hours - 12

Origin and evolution of Indian constitution, Preamble, Basic Structure & salient features of Indian constitution, Fundamental rights and duties, Directive principles of state policy, Four pillars of Indian democracy.

UNIT-2

Weeks/Instructional Hours - 12

Indian Telegraph Act 1885, Press and Registration of Books Act 1867, Prasar Bharati Act 1990, Working Journalists Act 1955, Cinematography Act 1952, Cable T.V. Networks (regulation) Act 1995, IT Act 2000, Press Commission I & II.

UNIT-3

Weeks/Instructional Hours - 12

Copyright Act 1957, Contempt of Courts Act 1971, Defamation: Libel and Slander, Press Council of India Act 1978, Official Secrets Act 1923, Indecent Representation (prohibition) Act, 1986, Drugs and Magic Remedies (objectionable) Act 1954.

UNIT-4

Weeks/Instructional Hours - 12

Values and ethics of Journalism, Conflict of interest, Ethical issues: notions and debates, Resolving Ethical Dilemmas: Different Methods, Self-Regulation Vs Legal regulation Media & Human Rights Issues.

UNIT-5

Weeks/Instructional Hours - 12

Right to privacy, Sting Journalism, Yellow Journalism, Paid news, Media net pressures (political, market, legal and professional) Journalists' code of conduct, Self-regulation, Ombudsman, Pros and cons of Media activism.

Reference Books

D.D. Basu., Introduction to the Constitution of India, Lexis Nexis First Edition. 2014.

Paranjy Guha Thakurta, Media Ethics : Truth Fairness and Objectivity, OUP India, First Edition, 2011.

Devesh Kishore & G. S. Gard, Media Law: Its Ethics and Ethos,

Haran and Publications Pvt Ltd. 2016.

Juhi P. Pathak, Introduction to Media Laws and Ethics, Shipra Publications, 2014.

The mapping of course outcomes with programme outcomes is tabulated as follows

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	L	L	L	L					
CO 2			M	M	M	M	M		
CO 3				M	M	M	M		
CO 4				S	S	S	S	S	
CO 5				S	S	S	S	S	S

1. S-Strong M-Medium L-Low

Course Outcomes (COs):On successful completion of the course, the students will be able to:

		K1	K2	K3	K4	K5
CO1	To introduce students about the basic structure of the Indian constitution	√	√	√		
CO2	To familiarize students on the various laws governing media	√		√		
CO3	To teach students about the provisions of some important press laws		√	√	√	
CO4	To enable students to have an understanding of ethical issues involved in the practice of journalism		√	√	√	
CO5	To give a clear vision to the students about the various journalistic practices in the process of news and information gathering		√	√		√

TOOLS FOR ASSESSMENT

CIA Test – I	CIA Test – 2	Assignment	Seminar	Attendance	Total
5 marks	5 marks	5 marks	5 marks	5 marks	25 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signature			

SCHOOL COUNSELLING (18PSE03)

Course Objectives:

- To orient students about the importance of School Counselling
- To make them understand and develop professional identity in India School
- To make them understand the Models of School Counselling
- To make them understand the various areas of School Counselling
- To make them aware of and deal with Suicidal thoughts, Depression, and Life Meaning

UNIT I: FUNDAMENTALS IN SCHOOL COUNSELLING

School Counselling: Development of School Counselling-Scope- Counselor's role within school setting.

Professional and Ethical Boundaries in School Counselling: Confidentiality and the Law-Codes of Confidentiality with Pupil Clients in School- Child Protection and Codes of Confidentiality-Professional Identity of School Counselors in India

UNIT II: MODELS OF SCHOOL COUNSELLING

Adler's Theories in School Counselling- Rogers's Person- (Child)-Centered School Counselling- Behaviorism- Ellis's Rational Emotive Behavior Therapy in School Counselling- Beck's Cognitive Behavioral Therapy in School Counselling. Glasser's Reality Therapy Supported by Choice Theory in School Counselling- Group Counselling.

Brief Counselling Models: Evidence based counselling- Brief therapy- Egan's Three-Stage Model- Motivational Interviewing. Solution-Focused Brief Counselling- Narrative Therapy- Coaching Skills-Strengths Based Counselling in the Schools- Virtual Counselling-Positive Psychology and School-Based Interventions.

UNIT III: IDENTITY CRISIS, PARENTAL SEPARATION AND LOSS

Identity Crisis among Adolescents: Erikson's theory and Marcia's theory.

Parental Separation and Stepparent Conflict: Counselling at the Beginning of Parental Separation- Counselling after Separation- Counselling on Living with Step Parents.

Loss and Bereavement: The Context of Bereavement for Young People- Effect of Bereavement on Development- Bereavement Counselling.

UNIT IV: BULLYING AND OTHER ISSUES

Bullying School: Counselling Bullies- Counselling the Groups- Counselling Victims of Physical Abuse- Counselling Victims of Verbal Abuse.

Anger, Aggression and Violence in Schools: Violence and Aggression as a Social Problem- Counselling Violent and Aggressive Pupils.

Sexual Inclination and Conduct: Heterosexual Inclination and Conduct- Counselling for Heterosexual Young People- Counselling for Homosexual Young People. *Smoking,*

Drugs and Alcohol Misuse: Drugs in the Society- Counselling Smokers- Counselling for Drug and Alcohol Problems.

UNIT V: DEPRESSION, LIFE MEANING AND SPIRITUAL EMPTINESS

Low Self-Esteem, Depression and Suicidal Thoughts: Counselling for Self-Esteem- Counselling Depressed Young People- Counselling people with Suicidal Thoughts- Counselling the Sexually Abused.

Life Meaning and Spiritual Emptiness: Spirituality in the Western Life Style- Spiritual Development- Spiritual Counselling and Problems of Congruence- Integrative Style of Spirituality-Centered Counselling.

TEXT BOOK

Lines, D. (2011). *Brief counselling in schools: Working with young people from 11 to 18*. Sage.

REFERENCE BOOKS

Baginsky, W. (2004). School counselling in England, Wales and Northern Ireland: a review. *London: National Society for the Prevention of Cruelty to Children*.

Chandrashekar C.R. (Editor) (2008) Manual for college teachers on students counselling, National Institute of Mental Health & Neuro Sciences, Bangalore.

Kandi, S. (2014). Prevalence of Counselling Needs in Late Adolescent College Students of India. *Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü Dergisi*, 4(2).

Miller, D. N., Nickerson, A. B., & Jimerson, S. R. (2009). Positive psychology and school-based interventions. *Handbook of positive psychology in schools*, 293-304.

Ramakrishnan, V. K., & Jalajakumari, V. (2013). Significance of imparting guidance and counselling programmes for adolescent students. *Asia Pacific Journal of Research*, 2(9), 102-112.

Robert J. Wright. (2012). *Introduction to School Counselling*. Sage Publications

Venkatesan, S., & Shyam, H. R. (2015). Professional identity of school counselors in India. *Journal of the Indian Academy of Applied Psychology*, 41(1), 25.

On the successful completion of the course, students will be able to:

Semester 3 - School Counselling							
		K1	K2	K3	K4	K5	K6
CO1	understand the roles and challenges in school setting as counsellors		✓				
CO2	understand the codes of law related to confidentiality and child protection		✓	✓			
CO3	implement the models of counselling based on the students need assessment			✓			
CO4	develop the relevant practical knowledge, skill and attitude in offering counselling						✓
CO5	able to evaluate the origin of problems in the counselling process				✓		
CO6	develop need appropriate modules in prevention of bullying, violence, aggression, sexual and drug issues						✓
CO7	develop skills in assisting children in conflict resolution				✓		✓

COUNSELLING PSYCHOLOGY

Course Objectives:

- To orient students about the importance of Guidance and Counseling
- To understand the nature of counseling situation
- To understand the various areas of Counselling
- To become aware of Ethical and Legal issues in Counselling

UNIT I: GUIDANCE AND COUNSELLING AN INTRODUCTION

Meaning of Guidance – Basic principles and assumptions underlying guidance –Definitions of counseling – Factors contributing to the emergence of counselling - Characteristics of Counsellor – The identity of Counselling – History of Therapeutic Counselling: The ancient Philosopher – The first Psychiatrists – Influences from Psychology – The Guidance era. The counseling era – The era of the therapeutic counseling – Licensing and regulation in Counselling - Guidance and counselling in Indian context.

UNIT II: SETTINGS FOR COUNSELLING

Different roles of Counselors – A set of generic skills – A set of common goals – Developmental and remedial orientation – Team work –Qualities of Counselling relationships – Perspectives on helping relationships.

Counselling process: Creating a relationship in the initial interview: Establishing rules – Planning hope – Assuring confidentiality- Assessing expectations – Collecting information – Identifying problems – Beginning intervention – First session agenda review – Reciprocal influence.

UNIT III: COUNSELLING APPLICATIONS

Group Counselling: Survey of groups, Encounter groups – Guidance Groups – Counselling groups – Therapy groups – Self-help and support groups. Some considerations in the use of group modalities – Counteracting potential limitations – Advantages of group work.

Career counselling: Functions of work – Roles of Counselling- Holland's Theory of career development. Career Education: Abilities – interests – values – Career Decision Making – Trends and Issues in Career Counselling: Changes in the work place – Work and Leisure – Use of Technology – Counselling in Industry.

UNIT IV: MARITAL, FAMILY, SEX AND ADDICTION COUNSELLING

Family Counselling: Theories of Family Counselling – Sex Counselling: Clinical assessment interview – Physical examination and medical history – Exploration of relationship – Sensate focus exercise – Specialized techniques – Evaluation.

Addictions Counselling: Symptoms of addiction: Drug use and abuse – Drug culture – Types of drugs – Effects of drug abuse – Adolescent drug use – Prevention – Abuse in special populations – the Elderly – The disabled – Principles for counselling the Chemically dependent.

UNIT V: PROFESSIONAL PRACTICE

Counselling Diverse Population: Multiculturalism – Influence of Biases – Identity issues – Preferred clients – counselling and gender – Counselling ethnic minorities – Counselling the aged – The counselor and HIV – Counselling clients who are physically challenged.

Ethical and Legal Issues: Professional Codes- Our divided loyalties – Areas of ethical difficulty – Dual relationship and sexual improprieties – Misjudgment and failures – Deception and informed consent – Confidentiality and privileged communication – Recent trends – Making ethical decisions – Legal issues in Counselling – Advice for the passionately committed counselling student.

TEXT BOOKS

Charles J. Gelso., Elizabeth N. Williams., & Bruce R. Fretz. (2014). *Counseling Psychology* (3rd Edn.). Washington, DC: APA Publications.

Kottler, J.A. and Brown, R.W. (2000). *Introduction to Therapeutic Counselling*. New York: Brooks / Cole.

REFERENCE BOOKS

John Sommers - Flanagan., & Rita Sommers - Flanagan. (2015). *Counseling and Psychotherapy Theories in Context and Practice: Skills, Strategies, and Techniques*. New Jersey: John Wiley & Sons, 22-Jun-2015

Kathryn, G. and David, G. (2008). *Relationship Counselling for Children, Young People and Families*. New Delhi: Sage Publications.

Kinra. (2010). *Guidance and Counselling*. New Delhi: Pearson Learning Inc.

McLeod, J. (2009). *Counselling Skills*. New Delhi: Rawat Books Ltd.

Payne, M. (2010). *Couple Counselling*. New Delhi: Sage Publications.

On the successful completion of the course, students will be able to:

Semester 2 - Counselling Psychology							
		K1	K2	K3	K4	K5	K6
CO1	understand the nuances of guiding principles and factors influencing the outcome		✓		✓		
CO2	understand the need for counselling the client				✓		
CO3	demonstrate the knowledge, skills and ability required in the counselling process			✓			
CO4	follow ethical principles in offering counselling			✓			
CO5	demonstrate the art of counselling in various areas of marital, family, sex and addiction counselling in the gender and cultural context		✓	✓			✓
CO6	maintain professionally appropriate communication and conduct across different settings		✓				✓
CO7	demonstrate concern for the welfare of others				✓		
CO8	understanding of legal issues pertinent to counselling				✓		

ADVANCED SOCIAL PSYCHOLOGY

OBJECTIVES:

- To help students to develop an understanding about one's-self, how people think about, influence and relate to one another
- To orient them to the dynamics of attraction, love and aggression, and application of the principles of social psychology in different fields.

UNIT I: INTRODUCTION

Definition – Nature - Boundaries – Research Methods: Systematic observation, Correlation, Experimental method. Social Cognition: Heuristics, Schemas, social thought, affect and errors on social cognition.

UNIT II: SOCIAL PERCEPTION AND SOCIAL IDENTITY

Social Perception: Non-verbal communication, attribution, impression formation and impression management. Aspects of Social Identity: The Self presentation, self-knowledge and self-esteem.

UNIT III: ATTITUDES, ATTRACTION AND PROSOCIAL BEHAVIOUR.

Attitudes: Formation, influence, guiding behavior, persuasion, resistance and cognitive dissonance. Attraction: internal and external sources, similarity and mutual liking and close relationships as foundations of social life. Prosocial Behavior: Motives, bystander effect and factors that increase or decrease it and emotions

UNIT IV: STEREOTYPE, PREJUDICE, DISCRIMINATION AND AGGRESSION

Causes, effects and cures of Stereotyping, Prejudice and Discrimination. Aggression: Perspectives, Causes, Emotions, Bullying and Techniques to prevent and control.

UNIT V: GROUPS, SOCIAL INFLUENCE AND APPLICATIONS

Groups: reasons for joining and exiting, effect of others presence and coordination, Fairness, Decision making and leadership. Social influence: Conformity, Compliance and Obedience. Applications: Social adversity, personal health, legal system and personal happiness.

TEXT BOOK

Baron, Robert A., and Branscombe, Nyla R. (2016). *Social Psychology* (13th edition), Noida, Pearson India Education Services Pvt. Ltd.

REFERENCE BOOKS

Baron, Robert A., and Byrne, D. (2001). *Social Psychology* (8th edition) Reprint New Delhi: Prentice-Hall of India Pvt Ltd.

Crisp, R.J., and Turner, R.N. (2007). *Essential Social Psychology*. New Delhi: Sage Publications.

Myers, D.G. (2002). *Social Psychology* (7th international edition). New York: McGraw Hill Companies.

PSYCHOTHERAPEUTICS

Course Objectives:

- To understand the various approaches in psychotherapy
- To gain insight into the theoretical foundations of psychotherapy
- To train students to apply various techniques in real life situations

UNIT I: INTRODUCTION TO THERAPIES, TRAINING AND SUPERVISION OF THERAPISTS

Psychotherapy: Meaning, Definition and Nature - Importance of Theories - Problems faced by the beginners. Dimensions of Therapy: Preparation- Therapeutic Relationship - Therapeutic contents- Goals of therapy - Steps in therapeutic process - Therapeutic interactions. Training of Therapists: Objectives of training - Motivating factors in therapists - Selection of therapists for training. Cardinal elements in training: Theoretical learning - Supervised practice -Personal therapy - Evaluation - Supportive therapy.

UNIT II: FREUDIAN, KLEINIAN AND JUNGIAN APPROACHES

Theoretical assumptions: The person – Conceptualization of psychological disturbance and health – Perpetuation – Change. Practice: Goals – Selection criteria – Qualities of therapists – Therapeutic relationship – Strategies and techniques – Change process – Limitations.

UNIT III: GESTALT THERAPY, COGNITIVE THERAPY AND TRANSACTIONAL ANALYSIS

Theoretical assumptions: The person – Conceptualization of psychological disturbance and health – Perpetuation – Change. Practice: Goals – Selection criteria – Qualities of therapists – Therapeutic relationship – Strategies and techniques – Change process – Limitations.

UNIT IV: ADLERIAN APPROACH, PERSON CENTRED THERAPY AND EXISTENTIAL THERAPIES

Theoretical assumptions: The person – Conceptualization of psychological disturbance and health – Perpetuation – Change. Practice: Goals – Selection criteria – Qualities of therapists – Therapeutic relationship – Strategies and techniques – Change process – Limitations.

UNIT V: BEHAVIOR AND RATIONAL EMOTIVE BEHAVIOUR THERAPIES

Theoretical assumptions: The person – Conceptualization of psychological disturbance and health – Perpetuation – Change. Practice: Goals – Selection criteria – Qualities of therapists – Therapeutic relationship – Strategies and techniques – Change process – Limitations.

TEXT BOOK

Dryden, W., & Reeves, A. (2013). *The Handbook of Individual Therapy (6th Edn.)*. New Delhi: Sage Publications.

REFERENCE BOOKS

Jack Martin., Jeff Sugarman., & Kathleen L. Slaney (Eds.). (2015). *Handbook of Theoretical and Philosophical Psychology: Methods, Approaches, and New Directions for Social Sciences*. New York: John Wiley & Sons, Ltd.

Wills, F. (2008). *Skills in Cognitive Behavior Counselling and Psychotherapy*. New Delhi: Sage Publications.

Capuzzi. (2010). *Counselling and Psychotherapy (4th Edn.)*. New Delhi: Pearson Education Inc.

On the successful completion of the course, students will be able to:

Semester 3 – Psychotherapeutics							
		K1	K2	K3	K4	K5	K6
CO1	demonstrate the importance of theories in therapies			✓			
CO2	understand the theoretical background of therapies		✓				
CO3	analyse various steps in therapeutic process				✓		
CO4	evaluate various strategies and techniques specific to classical theories					✓	
CO5	differentiate & escalate the differences in Gestalt theories				✓	✓	
CO6	understand the narration of the individual in person-centered theories		✓				
CO7	apply rationality & emotions as tool in therapeutic process			✓			

On the successful completion of the course, students will be able to:

Semester 3 – Psychotherapeutics										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	demonstrate the importance of theories in therapies		✓	✓	✓					
CO2	understand the theoretical background of therapies			✓	✓					✓
CO3	analyse various steps in therapeutic process	✓	✓	✓		✓		✓		
CO4	evaluate various strategies and techniques specific to classical theories		✓		✓					
CO5	differentiate & escalate the differences in Gestalt theories		✓				✓		✓	
CO6	understand the narration of the individual in person-centered theories	✓	✓			✓				
CO7	apply rationality & emotions as tool in therapeutic process	✓	✓			✓		✓		

Course Name	Innovation and Startup Practical	Programme Name	M.Sc. Food Science, Technology and Nutrition
Course Code	18FSTNC18	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	IV

COURSE OUTCOMES

On completion of the course, the students will be able to												
CO1	differentiate research and innovation											
CO2	execute the steps in idea generation, idea to deployment and startup development stages											
CO3	interpret the features of national innovation and start-up policy 2019 for students and faculty											
CO4	implement design thinking process, systematic literature review, business model canvas, nutrition care process model, evidence based practice, practice based evidence, knowledge transfer model and theory of change model in innovation and commercialisation											
Mapping of COs with POs, PSOs												
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3	PSO4
CO1	-	-	-	1	1	-	-	2	1	1	1	-
CO2	-	-	-	2	-	-	1	2	1	3	1	-
CO3	-	-	-	1	-	2	3	2	1	3	1	3
CO4	-	-	-	3	-	1	2	2	1	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Research vs Innovation	To enable the students to integrate research in innovation	0.5+2+0.5 = 3
Innovation Strategy and Startup Process	To educate the learners on steps in innovation and start-up development stages	1+5+3 = 9
National Startup Policy	To outlay the features of national startup policy 2019 for students and faculty	1+4+1 = 6
Process and Models for Food Innovation and Startup	To exemplify the application of various process and models in food innovation and startup	10+20+6 = 36
Total Hours of Instruction		54 (18x3)

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/ Experi- ment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module 1: Research Vs Innovation					
1.	What is Research and Innovation?	CO1	K4, F	Conduct a quiz on research vs innovation	K6, S1
2.	Steps in research process vs innovation process	CO1	K3, MC	Identify the factors that make the company innovative	K5, S5
Module II: Innovation Strategy and Startup Process					
3.	Idea Generation for food and nutriprenurship	CO2	K6, MC	Create a challenge book	K6, S5
4.	Idea to Deployment – Product, Process and Service	CO2	K3, P	Modulate food and nutriprenurship ideas to deployment	K3, S1
5.	Startup Development Stages	CO2	K3, P	Generate a model for food and nutriprenurship startup	K6, S5
Module III: National Startup Policy					
6.	Features of National Startup Policy 2019 for Students and Faculty	CO3	K2, F	Appraise the features in National Startup Policy 2019	K3, S3
Module IV: Process and Models for Food Innovation and Startup					
7.	Systematic Literature Review Process	CO4	K3, C	Sketch the systematic literature review process for a food item	K3, S1
8.	Design Thinking Process	CO4	K3, C	Schematize the steps in design thinking process to solve a pain point in the food industry	K3, S5
9.	Business Model Canvas	CO4	K3, C	Pitch on a business model canvas for a product, process and service	K3, S5
10.	Nutrition Care Process Model	CO4	K3, P	Generate a process for nutrition and dietetic practice for an individual	K6, S5
11.	Evidence Based Practice	CO4	K3, P	Create an evidence based nutrition and dietetic practice	K6, S5
12.	Practice Based Evidence	CO4	K3, P	Infer an evidence based diet therapy on practice for a disease condition	K5, S3

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

13.	Knowledge Transfer Model	CO4	K4, P	Formulate a model to transfer knowledge to the community	K6, S4
14.	Theory of Change Model	CO4	K4, P	Exemplify the nutriprenurship through theory of change model	K4, S3

REFERENCES

TEXTBOOKS	
1	Charis Galanakis (Ed.), (2016), Innovation Strategies in the Food Industry, Academic Press, First Edition.
2	Grunert, Klaus Gunter, Traill, Bruce (1997), Products and Process Innovation in the Food Industry, Springer
3	MHRD, (2019), National Innovation and Startup Policy 2019 for Students and Faculty: A Guiding Framework for Higher Education Institutions
4	Esther Myers and Yiva Orreval, (2020), Using the Nutrition Care Process, TBA, USA.
REFERENCE BOOKS	
1	Francesca Zampollo (2018), Food Design Thinking: The Complete Methodology, onlineschooloffooddesign. org.
2	Paul Glasziou and Chris Del Mar (2007), Evidence based Practice Workbook, Second Edition, Blackwell Publishing.
3	Dietitians of Canada (2006-2011), Practice based Evidence : PEN Writers' Guide, pennutrition.com.
4	Kigali, Rwanda (2014), Theory of Change, Abdul Latif Jameel, Poverty Action Lab, Translating Research into Action.
JOURNALS AND DOCUMENTS	
1	Bernadette Mazurek Melnyk, Ellen Fineout-Overholt, Susan B. Stillwell, Kathleen M. Williamson, (2010), Evidence-based Practice: Step by Step, ajn@wolterskluwer.com.
2	John Mayne (2015), Useful Theory of Change Models, Canadian Journal of Program Evaluation, doi: 10.3138/cjpe.230
3	Esther F Myers, Naomi Trostler, V.Varsha and Hillary Voet (2017), Insights from the Diabetes in India Nutrition Guidelines Study: Adopting Innovations using Knowledge Transfer Model, Topics in Clinical Nutrition, Wolters Kluwer Health Inc., Vol.32, No.1: 69-86.
4	Dominic Glover and Nigel Poole (2019), Principles of Innovation to Build Nutrition Sensitive Food Systems in South Asia, Food Policy, Elsevier, 82: 62-73.

Course Name	Nutritional Policies and Programmes	Programme Name	M.Sc. Food Science Technology and Nutrition
Course Code	18FSTNE06	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	III

COURSE OUTCOMES:

On completion of the course, the students will be able to												
CO1:	Generalize the nutritional policies and Schemes available in india											
CO2:	Associate the principles of nutrition programmes and educational level of nutrition programme.											
CO3:	Classify various organization and Services provided.											
CO4:	Find out the merits and demerits of the each organization sector											
CO5:	To Provide the voluntaries Service among the community											
Mapping of COs with POs, PSOs												
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	2	1	1	3	3	2	3
CO2	3	1	1	1	1	2	2	2	3	2	2	3
CO3	3	1	1	1	1	2	2	2	3	2	2	3
CO4	3	1	1	1	1	2	1	2	1	2	3	3
CO5	3	2	1	2	1	3	2	3	2	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Nutrition Policies and Schemes	To impart nutrition policies and schemes	10+3+1=14
Nutrition Programmes	To understand the nutrition programmes	10+3+1=14
National Organization	To elucidate the national organizations and it structure	10+3+1=14
International Organization	To elaborate the international organizations and it structure	10+3+1=14
International Voluntary Services	To illustrate the international voluntary service and its current scenario	10+3+3=16
Total Hours of Instruction		72 (18x4)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN:

Unit/Chapter	Intended learning practices	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
UNIT 1: Nutrition Policies and Schemes					
1.	History of Nutritional Policies and Programmes	CO1	K1,F	Identify the of Nutritional Policies and Programmes in India	K1,S2
2.	Millennium Development Goals (MDG)	CO1	K2,C	Tabulate the eight different millennium development goals	K3,S2
3.	Nutritional Policies in India (National Nutrition Goals, National Nutrition policy, National Food Security Mission, National Food Security Bill, Public Distribution System, National plan of Action on Nutrition).	CO1	K2,C	Identify the different kinds of nutritional policies and compare each other	K3,S1
4.	Nutrition Schemes in India (Ministry of Agriculture, GraminBhandranYojana, Ministry of Women and Child Development, SABALA or Rajiv Ghandhi Scheme for Empowerment of Adolescent girls, Ministry of Tribal Affairs, Village Grain Bank Scheme, Ministry of Rural Development, Annapurna Scheme, Ministry of Consumer Affairs (SC/ST/OBC Hostels)).	CO1	K1,F	Identify the nutrition schemes available in India and compare each other	K3,S1
5.	Nutrition in India(Targeting the first 1000 days of child's life, Scheme for Supply of food grains to welfare institutions, AkshayaPatra and private sector participation in mid-day meals,	CO1	K2,C	Sketch out the mid-day meal programme, Akshayapatra, SampoornaGrameenRozgarYojana, SaravaShikshaAbhiyan, RashtriyakrishikshaVikasYojana	K3,S2

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	SampoornaGrameenRozgarYojana, SaravaShikshaAbhiyan, RashtriyakrishiVikasYojana)				
UNIT II: Nutrition Programmes					
6.	Ministry of Rural Development	CO2	K2,F	Identify and explain the schemes/ programmes in ministry of rural development	K3,S1
7.	Applied Nutrition Programme	CO2	K2,C	Sketch out the applied nutrition programme	K3,S2
8.	Ministry of social welfare (ICDS-Integrated child development scheme, Balwadi Nutrition Programme, Special Nutrition Programme).	CO2	K1,P	List out the social welfare programmes and explain in detail	K4,S1
9.	Ministry of Health and Family welfare (National Nutritional Anemia Prophylaxis programme, National prophylaxis programme for prevention of Blindness due to Vitamin A Deficiency, National Iodine Deficiency Disorder Control Programme)	CO2	K2,C	Sketch out the national nutritional programmes	K3,S2
10.	Ministry of Education(Mid-day meal programme, programmes for communicable and non-communicable diseases, Wheat based supplementary nutrition programmes).	CO2	K2,C	Elaborate the ministry of education programmes such as Mid-day meal programme, programmes for communicable and non-communicable diseases, Wheat based supplementary nutrition programmes	K6,S1
11.	World Food Programme Projects(CARE assisted Nutrition Programmes, Tamil Nadu Integrated Nutrition Projects, UNICEF Assistance For Women and Children, Emergency Feeding Programme).	CO2	K2,C	Criticize the current scenario of world food programme project	K1,S2
12.	National Programme for Nutrition Support to primary Education,	CO3	K2,C	Sketch out the overall responsibility of national nutritional programmes that support primary education	K4,S2
13.	National Food for work Programme.	CO3	K2,C	Appraise the national food for work programme	K5,S2
UNIT III: National Organization					
14.	ICMR	CO3	K2,C	Sketch out the national organization and explain the current scenario	K3,S4
15.	NIN	CO3	K2,C		
16.	NNMB	CO3	K2,C		
17.	CFTRI	CO3	K2,C		
18.	DFRL	CO3	K2,C		
19.	ICAR	CO3	K2,C		
20.	NIPCCD	CO3	K2,C		
21.	NSI	CO3	K2,C		
22.	NFI and IDA	CO3	K2,C		
UNIT IV: International Organization					
23.	FAO	CO4	K2,C	Sketch out the international organization and explain the current scenario	K3,S2
24.	WHO	CO4	K2,C		
25.	UNICEF	CO4	K2,C		
26.	UNESCO	CO4	K2,C		
27.	UNDP	CO4	K4,C		
28.	World Bank Data	CO4	K4,C		
UNIT V: International Voluntary Services					
29.	CARE	CO5	K2,C	Criticize the forms and structure of International Voluntary Services	K5,S1
30.	CRS	CO5	K2,C		
31.	IDRC	CO5	K2,C		
32.	Micronutrient Intitative(MI)	CO5	K4C		

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

GENETIC ENGINEERING

COURSE CODE : 18BCHC08

MARKS : 100

COURSE

OBJECTIVES : To familiarize the students with the basic concepts in genetic engineering; to acquaint the students to versatile tools and techniques employed in genetic engineering and recombinant DNA technology; and to appraise them about applications of genetic engineering.

Hours	L	T	P	C
	3	1	0	4

COURSE OUTCOMES (CO)

CO1	The student will have knowledge of tools and strategies used in genetic engineering.
CO2	Understanding the application of genetic engineering techniques in basic and applied research.
CO3	To provide the ethical values and nurturing applicability of conserved genetic traits
CO4	To impact knowledge latest updation and application of genetic engineering
CO5	To motivate and create interest to uptake genetic engineering for research

SYLLABUS

Unit	Unit title	Intended learning chapters (K1,K2)	Knowledge domain	Hours of instruction
I.	Restriction endonucleases, cloning vectors, and ligation	Basic steps in gene cloning. Type II Restriction endonucleases- nomenclature and types of cleavage. Cloning vectors: plasmids (pBR322 and pUC), phage vectors (λ), cosmids, phagemids, BACs and YACs. Methods of ligation of insert and vector DNA molecules: cohesive end method, homopolymeric tailing, blunt-end ligation, linkers and adapters.	K1 & K2	18
II.	Gene transfer methods - cloning & screening strategies	Gene transfer methods: calcium phosphate coprecipitation, electroporation, lipofection, viruses, microinjection. Choice of host organisms for cloning. Construction of genomic and cDNA libraries . Cloning strategies- genomic cloning, cDNA cloning. Differences between genomic and cDNA libraries. Screening of recombinants: marker inactivation (antibiotic	K2,K3	16

		resistance, blue-white selection), colony hybridization, immunoscreening, screening for protein activity.		
III.	Expression systems	Factors affecting expression of cloned genes. Expression of eukaryotic genes in bacteria-expression vector, promoters, industrial protein production. Fusion proteins, strategies to enhance protein stability, secretion and metabolic load. Expression in eukaryotic cells: Expression in yeast- yeast vectors, GAL system. Baculovirus and Mammalian expression systems (brief account). Tagged proteins and secretion signals. Reporter genes- types and uses.	K1&K2	16
IV.	Gene Manipulation Techniques	Extraction and purification of nucleic acids. Probes: radioactive and nonradioactive. Blotting techniques: Southern, northern, and western. Principle and applications of DNA fingerprinting, DNA footprinting in situ hybridization, PCR, RT-PCR, real-time qPCR. DNA Sequencing: Automated sequencing. Next-generation sequencing. Site-directed mutagenesis (SDM): cassette and oligonucleotide-directed mutagenesis. PCR-based methods. Protein engineering by directed evolution and DNA shuffling. Hazards and safety aspects of genetic engineering.	K1,K3,K4 &K5	16
V.	Gene targeting & Metabolite Engineering	Transformation, co-transformation, selectable markers, reporter genes. Transgenic animals - methods of production gene knock out in transgenic mice. Transgenic animals as models of human disease. Application of transgenic mice, animal bioreactors (Pharm animals).Antisense RNA technique, Herbicide resistance. Methods of gene transfer in plants- <i>Agrobacterium</i> -mediated transformation and particle gun method. Transgenic plant technology-development and applications.	K1 & K2	16

REFERENCE:

Text Books

1. Brown,T.A. 2010. Gene cloning and DNA analysis: An introduction, 6th Edition, Wiley-Blackwell Publishers.
2. Primrose,S.B. and Twyman,R. 2006. Principles of Gene Manipulation and Genomics, 7th Edition, Oxford University Press.
3. Glick,B.R. and Pasternak,J.J. 2009. Molecular Biotechnology - Principles and Applications of Recombinant DNA, 4th Edition, ASM Publishers.

Reference Books

1. Strachan,T. and Read,A.P. 2003. Human Molecular Genetics, 3rd Edition, Garland Science Publishers.
2. Watson,J.D. *et al.*, 2007. Recombinant DNA-Genes and Genomes: A short course, 3rd Edition, Cold Spring Harbor Laboratory Press.
3. Winnacker,E.L. 1987. From Genes to clones, 1st Edition, Wiley-Blackwell Publishers.
4. Nicholl,D.S.T. 2008. An introduction to Genetic Engineering. 3rd Edition, Cambridge University Press

MAPPING

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	M	M	M	M	L	M	L
CO2	H	M	M	M	M	M	M	L
CO3	H	M	M	M	M	L	M	L
CO4	H	M	M	M	M	M	M	L
CO5	H	M	M	M	M	L	M	L

H-High; M-Medium; L-Low

ELECTIVE PAPER

MBTEC 304: ENVIRONMENTAL BIOTECHNOLOGY

Credits: 4

Hours: 4/Wk

Course objectives:

Students will understand the various fields of the Environmental biotechnology, i.e. Ecosystems, Biodiversity, Threats and policy. Sources for environmental pollution and its remedial measures, Toxic chemicals and their impact on environment and human health, Role of microbes in remediation of environmental pollutants, applications of bio-products in society.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Ecosystem Diversity	Components, types, structure and function. Biodiversity: Types, values, threats, hotspots, IUCN redlisted flora and fauna and their conservation. Environmental impact assessment (EIA), Environmental Policy and Ethics.	Global warming, greenhouse effect and climate change.	12
II	Air Pollution and its management	Major air pollutions and their sources. Air pollution and disasters. Effects of air pollution on human, plant, animal and environment.	Formation of fog, photochemical smog and acid rain. Monitoring of air pollution. Control on release of particulate matter using different control devices.	12
III	Water Pollution and its management	Major water pollutions and their sources. water pollution and disasters. Effects of water pollution on human, plant, animal and environment.	Treatment methods and controlled release of effluents.	12
IV	Soil pollution and its management	Concepts of soil pollution, soil acidity, saline soil alkaline soil. Causes of soil salinity.	Physical, chemical and biological methods of soil reclamation. Chemical and metallic pollution of agriculture soil. Control of soil pollution.	12
V	Waste Management	Concept of solid waste, Types of solid waste (Industrial, Domestic, Agricultural, Municipal) Effect of solid waste on health and environment.	Waste management strategies for organic, biomedical, plastic and hazardous wastes.	12

Recommended Books

- ☞ Sharma. P.D. 2017. Environmental Biology. 13th Edn. Rastogi Publishers.
- ☞ Chatterjee A.K. 2011 3th Edn. Introduction to Environmental Biotechnology. Printice- Hall, India.
- ☞ Bharat Raj Singh and Onkar Singh. 2012. Study of impacts of global warming on climate change: Rise in Sea level and disaster frequency. DOI: 10.5772/50464.

MBT 204: RECOMBINANT DNA (RDNA) TECHNOLOGY

Credits: 5

Hours: 5/Wk

Course objectives:

The aim of this course is to acquaint the students to versatile tools and techniques employed in recombinant DNA technology. A sound knowledge on methodological repertoire allows students to innovatively apply these in basic and applied fields of biological research. This course conceptualize properties and applications of versatile DNA modifying enzymes, cloning strategies, vector types, host genotype specificities for selection and screening of recombinants and/or recombinant clones. Students will also be introduced to prominent nucleic acid labeling techniques. Introduction to various types of vectors viz. cloning, transformation, expression; and also vectors for genomic and cDNA library will be provided. This course will serve to illustrate creative use of modern tools and techniques for manipulation and analysis of genomic sequences and to expose students to use recombinant DNA technology in biotechnological research. The course will also help to train students in strategizing research methodologies employing genetic engineering techniques.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Introduction to rDNA Technology	History and recent developments in rDNA technology, Enzymes used in rDNA technology	Restriction enzymes, DNA Ligases, DNA polymerase, Ribonucleases, Reverse transcriptase, Alkaline phosphatase, T4 Polynucleotidekinase, Terminal deoxynucleotidyl transferase, Nucleases-S1Nuclease and DNAase	10
II	Cloning Vectors	Cloning Vectors- Plasmids and its types	Bacteriophages-Lambda and M13 vectors, Phagemids, Shuttle vectors- YACs, YEps, BACs. Expression vectors- pBR322, pTZ. Animal viruses-SV40, Baculo and their use as vectors	15
III	Gene Cloning Strategies	Gene cloning strategies: DNA cloning. Use of adapters & linkers. Construction of genomic DNA and cDNA libraries. Preparation of radiolabelled and nonradiolabelled DNA & RNA probes	Screening and selection of recombinant clones- Colony Hybridization techniques. lacZ complementation (Blue-white selection), Immuno-screening.	20
IV	rDNA Techniques	PCR applications. DNA footprinting, Chromosome walking.	Medical and forensic applications of rDNA technology- DNA Profiling, Diagnosis of inherited disorders and infectious diseases by PCR. Gene therapy for ADA and cystic fibrosis. CRISPR-Cas9 gene editing technology	15
V	Applications of rDNA	Synthesis and purification of recombinant proteins from cloned genes. Hazards and safety regulations in r DNA Technology	Production of enzymes. Therapeutic products for use in human health care- insulin, growth hormones, Hepatitis B vaccine	15

Recommended Books

- 🌀 S. B. Primrose and R. M. Twyman, John Wiley & Sons. Principles of Gene Manipulation and Genomics 7th Edn. Oxford Publisher (2009). USA
- 🌀 Julia Lodge, Pete Lund and Steve Minchin, Gene Cloning Taylor and Francis (2006). NY
- 🌀 Desmond S.T. Nicholl, An introduction to Genetic Engineering 3th Edn 2008. Cambridge University Press. Scotland
- 🌀 T. A. Brown, Gene Cloning and DNA Analysis. An Introduction (2016) 7th Edn Blackwell Scientific Publications. India
- 🌀 Michal Janitz, Next-Generation Genome Sequencing (2011) Wiley-Blackwell Publications. Germany
- 🌀 Sambrook, J., Russell, D.W., Molecular cloning: A Laboratory Manual 3th Edn. (2001) Cold Spring Harbor, New York.
- 🌀 Moo-Young, Robinson Howell Comprehensive Biotechnology 4th Edn. Elsevier Science (Vol.1-4) (2008)
- 🌀 Monika Jain Recombinant DNA Techniques: A Text book (2014) Narosa, India
- 🌀 Sure carson, Dominique Robertson. Manipulation and Expression of Recombinant DNA (2005) California USA

Web sources

- 🌀 <https://www.ncbi.nlm.nih.gov/>
- 🌀 <https://www.khanacademy.org/>
- 🌀 <https://trove.nla.gov.au/work/11788984>
- 🌀 <https://www.ncbi.nlm.nih.gov/>
- 🌀 <https://www.khanacademy.org/>

Course learning outcome:

Upon successfully completing this course the students could be able to

- Outline the fundamental steps in a genetic engineering procedure.
- Describe the mechanism of action and the use of restriction enzymes in biotechnology research and recombinant protein production.
- Explain the usefulness of plasmid preparations, how they are performed, and how the concentration and purity of plasmid samples can be determined.
- Discuss cloning strategies and techniques used to probe DNA for specific genes of interest.
- Conceptualize PCR technique in medical and forensic science.
- Summarize various applications of rDNA technology in human health care and safety regulations.

18COMC05	Business Communication Skills	Category	L	T	P	Credit
		Core		---		4

Preamble

The Students can improve their knowledge on business communication through understanding of experimental way of business communication learning.

Course Outcome

The students can understand the application of business communication in an effective manner.

CO Number	CO Statement	Knowledge Level
CO1	To know how the communication is more significance to improve the business practices	K1,K2
CO2	To understand how the effective communication improve the managerial skill	K3
CO3	To identify the role of effective communication on improvement of listening and expressing	K3,K4 and K5
CO4	To learn how to write effective business letters	K3
CO5	To acquire knowledge of the role of various media's which improve the effective communication	K3,K4,K5 and K6

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

S-Strong M-Medium L-Low

BUSINESS COMMUNICATION SKILLS – 18COMC05

Unit – I : To Know the Foundation of Communication

Communication foundation: communication model relevance and types of managerial communication – communication barriers ethical communication professionalism in communication – team communication, meetings, listening, nonverbal communication.

Unit – II: To Find the Managerial Skills and the Types of Communication

Introduction to managerial skills: communication process, barriers to communication – importance of communication in workplace. Types and channels of communication: classification of communication channels – principles of nonverbal communication – types of business communication, communication network in organization.

Unit – III: To Understand the Concept of Listening and Selection/Placement Interviews

Importance of listening in the workplace: introduction, what is listening? Barriers to listening, strategies for effective listening, listening in a business context group discussion. Selection or placement interviews z discipline interviews z appraisal interviews exit interviews.

Unit – IV: To Know the Forms of Letter in Business Communication

Business communication skills: business letters – routine letters – bad news and persuasion letters – sales letters- collection letters – job application letters. Developing oral business communication skills – reading skills for effective business communication SQ3R techniques of reading.

Unit – V: To Understand the Forms of Business Communication

Other forms of external business communication: introduction, communication with media – news releases, communication about the organization through advertising. Internal and external business – communication. Writing business reports. Types of business reports, format for business reports, steps in report preparation. Public speaking and negotiations.

(Note: Question Papers Consists of 50% theory and 50% Practical (Separate Theory and Practical Examinations))

Suggested Readings:

1. Mary Ellen Guffey, Business Communication: Process and Product, 5e, south western Thomson publishing, Mason, OH, 2005.
2. Namita Gopal, Business Communication, new age international publishers, E New Delhi, 2009.
3. Raymond V Lesikar, John D Pettit, and Mary E Flatly. 2009. Lesikar's basic Business Communication. 11th ed. Tata McGraw – Hill, New Delhi.
4. Penrose and Rasberry, Business communication for managers: An advanced approach, 5e, south – western college pub, 2007.
5. AshaKual, Business communication, prentice hall of India, New Delhi, 2007.

Practical

1. Drafting of Business Letter
2. Leadership Skills
3. Communication Skills
4. Problem Solving Skills

18COMC14	Innovation & Entrepreneurship	Category	L	T	P	Credit
		Core		---		4

Preamble

To students can realize the innovations which are associated with entrepreneurship

Course Outcome

The students understand their potential and in a position to decide which type of Entrepreneur they would like to become.

CO Number	CO Statement	
CO1	To understand the various functions of entrepreneurship	K1,K2
CO2	To identify the new ideas to be an entrepreneurs	K1,K2,K3,K4,K5
CO3	To study entrepreneurs market condition and preparation of financial statement	K1,K2,K3,K4,K5
CO4	To evaluate the role of financial institution in development of entrepreneurs	K1,K2,K3,K4,K5
CO5	To study the significance of management of enterprise and its functions	K1,K2,K3,K4,K5

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong M-Medium L-Low

INNOVATION AND ENTREPRENEURSHIP – 18COMC14

Unit-I: To Study about Entrepreneurship and its various functions.

Introduction: Concept, Definitions and Role; process; Factors impacting emergence of entrepreneurship; Managerial versus entrepreneurial Decision Making; Entrepreneur v/s Investors; Entrepreneurial attributes and characteristics; Entrepreneurs versus inventors; Entrepreneurial Culture; Women Entrepreneurs; Social Entrepreneurship; Classification and Types of Entrepreneurs; EDP Programmes; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs.

Unit-II: To learn business idea generation and identify business opportunities.

Creating Entrepreneurial Venture: Generating Business idea- Sources, methods ideas, Creativity; Challenges; Business planning process, Drawing business plan; leadership- Challenges, Legal issues – forming business entity, considerations and Criteria, requirements for formation of a Private/Public Limited Company, Intellectual Property Protection- Patents Trademarks and Copyrights – importance for startups, Legal Acts Governing Business in India.

Unit-III: To study about uses of financial statement and functions of marketing. Functional plans: Marketing plan– for the new venture, environmental analysis, steps in preparing marketing plan, marketing mix, contingency planning; Organizational plan – designing organization structure and Systems; Financial plan – pro forma income statements, pro forma cash budget, funds Flow and Cash flow statements; Pro forma balance sheet; Break Even Analysis; Ratio Analysis.

Unit-IV: To acquire the knowledge about financial institutions and its activities.

Entrepreneurial Finance: Debt or equity financing, Sources of Finance- Commercial banks, private placements, venture capital, financial institutions supporting entrepreneurs; Lease Financing; Funding opportunities for Startups in India.

Unit-V: To study about management of enterprise and its functions.

Enterprise Management: Managing growth and sustenance- growth norms; Factors for growth; Time management, Negotiations, Joint ventures, Mergers & acquisitions.

(Note: Question Papers Consists of 100% theory)

Suggested Readings:

1. Kumar, Arya, Entrepreneurship: Creating and Leading an Entrepreneurial Organization, Pearson, India.
 2. Hishrich., Peters, Entrepreneurship: Starting, Developing and Managing a New Enterprise, Irwin
 3. Taneja, Entrepreneurship, Galgotia Publishers.
 4. Barringer, Brace R., and R. Duane Ireland, Entrepreneurship, Pearson Prentice Hall, New Jersey (USA)
 5. Hisrich, Robert D., Michael Peters and Dean Shepherd, Entrepreneurship, Tata McGraw Hill, New Delhi
 6. Lall, Madhurima, and ShikhaSahai, Entrepreneurship, Excel Books, New Delhi
 7. Charantimath, Poornima, Entrepreneurship Development and Small Business Enterprises, Pearson Education, New Delhi
 8. Natarajan., K and E. Gordon, Entrepreneurship Development, Himalya Publication, India.
 9. Vasant, Desai, Small- Scale Industries and Entrepreneurship, Himalya Publication, India.
 10. Kuratko, D.F., and T. V. Rao, Entrepreneurship: A South-Asian Perspective, Cengage Learning
- Note: Latest edition of the readings may be used.

Course Code & Title	CORE: V1 - 18MEDC06 - PERSPECTIVES IN TEACHER EDUCATION		
Class	M. Ed	Semester	II
Cognitive Level	K-1: K-2;, K-3;,K-4 K-5		
Course Objectives	1. To make them to aware of innovations in teacher education 2. To acquaint them on the practice teaching. 3. To acquaint them on with the problems and issues in teacher education. 4. To know about the emerging areas of research in teacher education. 5. To acquaint the students with recent trends in teacher education.		

UNIT	Content	No. of Hours
I	Innovations in Teacher Education: Innovations in curriculum development – Innovation in evaluation process – Approaches to teaching competency based teacher education – Integrated approach – Student centered - Teacher Centered - System Approach of Teacher Education- Barriers of innovations in Teacher Education.	20 Hours
II	Practices in Teaching: Concept, principle and objectives of practice teaching - Teacher preparation programme at primary, secondary and collegiate Levels – Evaluation of practice teaching system, preparation of professional personnel- Internship.	20 Hours
III	Problems and Issues in Teacher Education: Selection of teacher trainees and relation issues–Assessing teacher effectiveness, Demand and supply of qualified teachers. Identification of teachers’ behaviour – Bridging gaps between school and training college - Content competency of teachers – Para teacher.	20 Hours
IV	Research in Teacher Education: Need of research in teacher education – Action research for quality improvement. Areas of	20 Hours

	research: Teaching effectiveness, Criteria of admission, modification of teacher behavior and school effectiveness, preparing teacher for special schools and inclusive schools.	
V	Recent Trends in Teacher Education: Competency based teacher education – Instructional technology - Pedagogy of education – Development of teaching competence – NCF (2009), Varma Committee report (2012) – NCTE new regulations (2014)-Responsibilities of the teachers- Teaching as a professional renewal of teachers: In-service programme, orientation programme, refresher course, seminars, workshops –Integrating Technology in Teacher Education.	20 Hours
References	Text Books: • Bansal, A. (2004). <i>Teacher education: Principle, theory & practice</i>. Jaipur: Sublime Publications. • Duggal, S. (2005). <i>Educating the Teachers</i>. New Delhi: Atlantic Publishers & Distributors. • Garry, F.H. (2005). <i>The missing links in teacher education design</i>. Netherland: Springer. • Mangla, S. (2002). <i>Teacher Education – Trends and strategies</i>. New Delhi: Sage Publishers. • Mete, J., & Mondal, A. (2013). <i>Teacher education</i>. New Delhi: A.P.H. Publishing Corporation. References: • Mohanty, J. (2003). <i>Teacher education</i>. New Delhi: Deep & Deep Publication Pvt. Ltd. • Panda, B.N., & Tewari, A.D. (2009). <i>Teacher education</i>. New Delhi: A.P.H. Publishing Corporation. • Rao, D. (2003). <i>Teacher in a changing world</i>. New Delhi. • Rao, R. (2004). <i>Methods of teacher training</i>. New Delhi: Discovery Publishing House. • Rao, V.K. (2007). <i>Understanding teaching and learning</i>. New Delhi: Commonwealth Publishers. • Sharma, S.P. (2003). <i>Teacher education</i>. New Delhi: Kanishka Publications (Pvt) Ltd. • Singh, U.K & Sundershan, K.N. (2003). <i>Teacher education</i>. New Delhi: Discovery Publishing House. • Singh, Y.K. (2013). <i>Teacher education</i>. New Delhi: A.P.H. Publishing Corporation. • Venkataiach, N. (2011). <i>Teacher education</i>. New Delhi: A.P.H.	

	Publishing Corp.
Course Outcomes	The student after studying these chapters will be able to
CO	1. Remember the Innovations in curriculum development and evaluation process.
CO	2. Illustrate the knowledge of the basic concept, principle and objectives of practice teaching.
CO	3. Express the knowledge of demand and supply of qualified teachers and Para teacher.
CO	4. Analysis critically the need of research in teacher education and action research for quality improvement
CO	5. Describe about different committee reports and the uses of technology in teacher education

SECOND SEMESTER –CORE-VII

	Publishers. Shrivastava, S. K. (2005). <i>Comparative education</i>. New Delhi, India: Anmol Publishers.
Course Outcomes	After completion of the course, the students can able to: 1) Outline the basic concepts, methods and approaches of Comparative Education. 2) Compare the educational structure of India with that of developed countries such as United States of America, United Kingdom etc. 3) Criticize the teacher education system of developed and developing countries with special reference to United States of America, United Kingdom, India etc. 4) Solve the problems prevailing in India such as poverty, unemployment, illiteracy etc. through educational intervention programmes. 5) Assess the role of international organizations such as UNO, UNESCO, UNICEF etc. in improving the educational condition of India.

FOURTH SEMESTER – SPECIALIZATION COURSE –V

Course Code & Title	(Core: X) 18MEDE05 - PEDAGOGY OF TEACHING		
Class	M. Ed	Semester	IV
Cognitive Level	K-1: K-2:K-3: K-4: K-5		

Course Objectives	1. Help the teachers in understanding the nature of classroom communication. 2. Develop capacities of teachers to understand the various approaches in teaching and learning. 3. Empower them to prepare and use of appropriate teaching learning materials. 4. Expose them on concept of curriculum 5. Understand the concept of taxonomy of teaching.
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UNIT	Content	No. of Hours
I	Classroom Communication: Pedagogy: meaning, concept and scope – Learning environment: meaning and concept - Indicators of quality teaching - Teaching and learning as interactive process - Major issues in classroom learning - Teaching for quality learning –Teacher as facilitator of learning.	20 Hours
II	Teaching and Learning Approaches: Principles of teaching - Teacher-centered, learner-centered, Subject-centered, Activity based project and cooperative learning approaches - Curricular and other curricular activities - Constructivist approach to learning.	20 Hours
III	Teaching-Learning Materials (TLM): Meaning, concept and importance of TLM in classroom transaction - Collection, preparation, storing and use of TLM - Library management and use of library books as learning resources - Learning beyond textbooks – Other sources of learning.	20 Hours
IV	Curriculum Engagement: Meaning and nature of curriculum - Differentiating curriculum and syllabus and their significance in teaching - Construction of curriculum – Role of teachers in developing, transacting and researching curriculum.	20 Hours
V	Taxonomy of Teaching: Taxonomy of teaching: Blooms and Anderson - Unit Plan and lesson plan - Constructivist perspectives in lesson planning - Concept mapping -	20 Hours

	Preparation of lesson plan - Digital lesson plan.	
References	Text Books: • Andrew Pollard (2006). <i>Reflective Teaching (2nd ed.)</i>, New York : Continuum Corporation. • Avijit Pathak, (2002) <i>Social Implications of Schooling: Knowledge, Pedagogy and</i> ↵ ↵ • Arora, G.L (1988). <i>Curriculum and Quality in Education</i>, New Delhi: NCERT ↵ ↵ • Hughes A.G and Hughes E. H (2008). <i>Learning and Teaching</i>, New Delhi: Surjeet Publications. ↵ ↵ • Harish Bansl (2012). <i>Teacher Training Concepts</i>, New Delhi: APH Publishing Corporation. ↵ References: • Holt, John (1990). <i>Learning All the Time</i>. New York : Addison-Wesley Publishing Corporation • Johnson, D.W. and R.T. Johanson (1999). <i>Learning Together and Alone: Cooperative</i> • <i>Competitive and Individualistic learning</i>. (5th ed.). Boston : Allyn & Bacom • Krishnamacharyulu .V (2011). <i>Science Education</i>, New Delhi: Neelkamal publications. • Monika Davar (2012). <i>Teaching of Science</i>, New Delhi; PHI Learning Private Ltd. • Mehratra.K. (2005). <i>Effective Methods of Teaching</i>, Jaipur; ABD Publishers. • Nick Blanchard and James .W. Thacker (2007). <i>Effective Training System Strategies and</i> • <i>Practices(2nd Ed.)</i>, New Delhi: Dorling Kindersley India Pvt. Ltd. • Promila Sharma (2014). <i>Principles of Curriculum</i>, New Delhi: APH Publishing Corporation. • Srinivastava D.S.and Sarita Kumari (2012). <i>Curriculum and Instruction</i>, New Delhi: ISHA Books Corporation.	
Course Outcomes	The student after studying these chapters will be able to CO 1. Explain the classroom communication and major issues in classroom learning. CO 2. Express the knowledge of activity based project and cooperative learning approaches. CO 3. Gain the skill of TLM in classroom transaction and learning beyond textbooks. CO 4. Identify the impact and implications of curriculum and syllabus and their significance in teaching	

CO	5. Gain the knowledge about the unit plan and lesson plan and concept mapping preparation of lesson plan - digital lesson plan.
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FOURTH SEMESTER – SPECIALIZATION COURSE –V

Course Code & Title	(Specialization Course: III) (ELECTIVE – 06) - 18MEDE06 Instructional Technology		
Class	M.Ed (2yrs) Education	Semester	IV
Cognitive Level	K1 - K6		

CORE I
BRITISH LITERATURE I
(From the Age of Chaucer to the Age of Milton)

Course Objectives:

- To expose students to early English Literature and transition from middle English to the Elizabethan ethos.
- To expose students to classical English poetry.
- To introduce students to representative texts by major writers of the period.

Course Outcomes:

On successful completion of the course, the students will be able to

- CO1 - understand the different genres of the period.- K1 and K2
- CO2 - differentiate the development of poetry from Middle English to the Elizabethan Age - K4
- CO3 - explore the socio-cultural and historical developments during the Elizabethan era.- K5
- CO4 - learn the linguistic changes that took place during this period.-K1 and K2
- CO5 - develop literary and critical thinking.-K5

UNIT I

Introduction to the age of Chaucer to the age of Milton

Unit II Poetry I

Detailed

John Milton : Paradise Lost Book IV

Non Detailed

Geoffrey Chaucer : The Prologue to the Canterbury Tales

Unit III Poetry II

Detailed

Edmund Spenser : Prothalamion

John Donne : A Hymn to God the Father

Non Detailed

Andrew Marvel	:	To his Coy Mistress
Sir Philip Sidney	:	The Nightingale
Henry Vaughan	:	The Retreat

Unit IV Prose

Detailed

Francis Bacon	:	1. Of Revenge
		2. Of Adversity
		3. Of Ambition

Non Detailed

Sir Philip Sidney	:	An Apology for Poetry (1 st 16 paragraphs)
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Unit V Drama

Detailed

Christopher Marlowe	:	The Jew of Malta
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Non Detailed

Ben Jonson	:	The Alchemist
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Books Prescribed:

1. Hudson, William Henry. *An Outline History of English Literature*. Atlantic Publishers, 1999.
2. Green, David. Ed. *The Winged Word*. Macmillan India Limited, 2009.

References:

1. Rickett, Arthur Compton. *A History of English Literature*. Universal Book Stall, 1990.
2. Legouis, and Cazamian. *A History of English Literature* (Latest Ed.). Macmillan, 1985.
3. Blamires, Harry. *A Short History of English Literature* (Latest Ed.). English Language Book Society and Methuen and Co Ltd., 1979.
4. Birch, Dinah (Ed.). *The Oxford Companion to English Literature* (7th Ed.). Oxford University Press, 2009.
5. Long, William J. *English Literature: Its History and its Significance for the Life of the English Speaking World* (Enlarged Ed.). A.I.T.B.S. Publishers, India, 2007.

Web Sources:

- 1.<http://www.josbd.com/the-salient-features-of-the-age-of-chaucer-or-the-late-14th-century/>
- 2.<http://www.online-literature.com/henry-augustin-beers/from-chaucer-to-tennyson/4/>
- 3.<https://www.litcharts.com/our-story-from-sparknotes-to-litcharts>
- 4.https://www.researchgate.net/publication/320596355_FRANCIS_BACON_DEPICTS_UTILITARIANISM_IN_HIS_ESSAYS
- 5.https://www.academia.edu/38723128/The_Elizabethan_Idea_of_the_Jew_in_Marlowes_The_Jew_of_Malta_and_Shakespeares_The_Merchant_of_Venice
- 6.<http://theisticserendipity.blogspot.com/2011/11/critical-appreciation-of-prothalamion.html>
- 7.<https://crossref-it.info/textguide/metaphysical-poets-selected-poems/4/215>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	S
CO2	S	S	S	M	M
CO3	S	S	M	M	M
CO4	S	M	S	M	S
CO5	S	M	M	S	S

S-Strong M-Medium

**CORE IV
AMERICAN LITERATURE**

Course Objectives:

- To explore the uniqueness of American literature at an advanced level.
- To analyse the American concept of freedom, liberty, life and the American point of view.

Course Outcomes:

On successful completion of the course, the students will be able to

- CO1- acquire knowledge about the origin and development of American Literature through centuries - K1
- CO2- understand the shift in literary notion from time to time and the distinctive creativity of the respective era - K2
- CO3- analyse the diverse concepts, themes and approaches within American Literature – K4
- CO4- grasp the ideologies and skills of significant writers through their works – K3
- CO5- enhance soft skills through American literature – K3

Unit I

Background Study – Origin and Development of American Literature

Unit II Poetry

Detailed

Ralph Waldo Emerson	:	Each and All
Walt Whitman	:	O Captain! My Captain!
Emily Dickenson	:	A Bird Came Down the Walk
Robert Frost	:	Birches
Edgar Allan Poe	:	Annabel Lee

Non Detailed

Ezra Pound	:	An Immortality
Hart Crane	:	At Melville's Tomb
William Carlos William	:	This is just to Say

Unit III Prose

Detailed

Ralph Waldo Emerson : Self-Reliance

Non Detailed

Thomas Wolfe : The God's Lonely Man

Unit IV Drama

Detailed

Edward Albee : Who is Afraid of Virginia Woolf?

Non Detailed

Arthur Miller : All my Sons

Unit V Fiction

Ernest Hemingway : For Whom the Bell Tolls

Mark Twain : The Adventures of Tom Sawyer

Thomas Pynchon : The Crying of Lot 49

Books Prescribed:

1. Fisher, William J, K B. Vaid, H. Willard Reninger, and Relph Samuelson. *American Literature of the Nineteenth Century: an Anthology*. Eurasia publ. House (pvt.) Ltd., New Delhi, 1984.
2. Oliver, Egbert S. *American Literature, 1890-1965: An Anthology*. New Delhi, 1994.

References:

1. Hart, James D. *The Oxford Companion to American Literature, by James D. Hart*. New York, Oxford University Press, 1900.
2. Cowie, Alexander. *The Rise of the American Novel*. New York: American Book Co, 1948.
3. VanSpanckeren, Kathryn. *Outline of American Literature*. Washington, DC: US Dep. of State, Bureau of International Information Programs, 2007.

Web Sources:

<http://people.unica.it/fiorenzoiuliano/files/2016/04/A-Brief-History-of-American-Literature-Wiley-Blackwell-2011.pdf>

<http://www.online-literature.com/periods/transcendentalism.php>

http://www.longwood.edu/staff/lynchr1/English%20203/american_romanticism.htm

<https://www.litcharts.com/lit/self-reliance/summary>

<https://www.sparknotes.com/lit/afraidofwoolf/characters/#>

https://www.academia.edu/21525142/All_My_Sons_Analysis

<https://neoenglish.wordpress.com/2010/10/09/critical-appreciation-of-for-whom-the-bell-tolls/>

Mapping with Programme Outcomes:

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	M	S	S
CO3	S	S	M	S	M
CO4	M	S	S	S	S
CO5	M	S	M	S	S

S- Strong

M-Medium

**CORE IX
SHAKESPEARE II**

Course Objectives:

- To enable students to analyse and appreciate the creative genius of Shakespeare.
- To train them to understand the universality of his writings suitable for all times.
- To critically analyse his plays applying modern literary critical theories.

Course Outcomes:

On successful completion of the course, the students will be able to

CO1- understand and appreciate the genius of Shakespeare – K2

CO2- gain knowledge about the intellectual and creative capacity of various characters – K1

CO3- know the significant critical concepts in the works of Shakespeare – K2

CO4- interpret Shakespearean theaters, techniques and characterization – K3

CO5- analyse personalities based on the behavioural traits and soft skills of the characters – K4

Unit I

Detailed

Macbeth

Unit II

Detailed

Antony and Cleopatra

Unit III

Non Detailed

Cymbeline

Unit IV

Non Detailed

Criticism on Macbeth

William Hazlitt : Macbeth, from Characters of Shakespeare's Plays

Thomas de Quincy : On the Knocking at the Gate in Macbeth

Wilson Knight : Macbeth and the Metaphysic of Evil

Unit V

General Study

Shakespeare's Stage, Theatre, Audience, Fools and Clowns, Villains, Women

References:

1. Bradley, A C. *Shakespearean Tragedy*. New Delhi: Atlantic, 2010.
2. Johnson, Samuel. *Preface to Shakespeare*. BLURB, 2019.
3. Mason, Harold A. *Shakespeare's Tragedies of Love: An Examination of the Possibility of Common Readings of 'Romeo and Juliet', 'Othello', 'King Lear' & 'Antony and Cleopatra'*. London: Chatto & Windus, 1970.
4. Knight, George W. *The Wheel of Fire: Interpretations of Shakespearian Tragedy with Three New Essays*. London: Routledge, 1989.

Web Sources:

https://www.academia.edu/33396817/What_Is_Shakespearean_Tragedy
<https://www.sparknotes.com/nofear/shakespeare/macbeth>
<https://www.sparknotes.com/nofear/shakespeare/antony-and-cleopatra/>
https://wikivisually.com/wiki/Timeline_of_Shakespeare_criticism
<https://thedramateacher.com/elizabethan-theatre-conventions/>
https://www.researchgate.net/publication/323427548_Jestersin_Shakespeare's_Plays

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	M	S
CO3	M	S	M	S	S
CO4	S	S	M	S	M
CO5	M	S	S	S	S

S - Strong M - Medium

CORE XI RESEARCH METHODOLOGY

Course Objectives:

- To familiarise the student with the nature, dimensions and methods of research.
- To empower the student with the knowledge and skills needed to undertake a research project, to present a conference paper and to publish a scholarly article.

Course Outcomes:

On successful completion of the course, the students will be able to

- CO 1 - arrive at thesis statement without ambiguity- K1 and K2
- CO 2 - apply research mechanics without committing errors - K3
- CO 3 - exercise academic integrity in a systematic manner and avoid plagiarism - K3 and K4
- CO 4 - imbibe the significance of primary and secondary sources - K5
- CO 5 - learn the art of making references and widen the ability to research - K6

Unit I

What is Research – Definition and Explanation of the Terms – Research, Hypothesis, Thesis or Thesis Statement – Conducting Research – Compiling Working Bibliography

Unit II

Review of Literature – Approaches to Research – Elements of Qualitative Studies – Elements of Quantitative Studies

Unit III

Plagiarism, Mechanics of Writing: Spelling, Punctuation, Italics, Names of Persons, Numbers, Abbreviations, Titles of Sources, Quotations

Unit IV

General Format – Chapter and Page Format

Unit V

Documentation: Core Elements, Works Cited, In-Text Citation, Citations in Forms Other than Print, Harvard and APA System

Books Prescribed:

1. Gibaldi, Joseph. *MLA Handbook*. 8th ed., The Modern Language Association of America. 2016.
2. Anderson, Jonathan, and Millicent Poole. *Assignment and Thesis Writing*. 4th ed., Wiley India, 2001.

References:

1. Gibaldi, Joseph. *MLA Handbook for Writers of Research Papers*. 7th ed., Affiliated East-West Press Pvt Ltd. 2009.
2. Seth, Kalpana. *Research Methodology in English*. Murari Lal and Sons, 2010.
3. Swales, John M. *Research Genres: Explorations and Applications*. Cambridge University Press, 2005.
4. Rose, Jean. *The Mature Student's Guide to Writing*. Palgrave, 2001.
5. Mounsey, Chris. *Essays and Dissertations*. Oxford University Press, 2010.
6. Hoffmann, Ann. *Research for Writers*. A and C Black Limited, 2004.
7. ManserMartin H. *Guide to Style: An Essential Guide to the Basics of Writing Style*. Viva Books, 2010.

Web Sources:

1. <http://bcjms.bhattercollege.ac.in/online-research-methodology-using-the-internet-and-the-web-for-research-and-publication/>
2. <https://www.google.co.in/amp/s/www.questionpro.com/blog/execute-online-research/>
3. <https://www.slideshare.net/mobile/manukumarkm/source-of-data-in-research>
4. <https://onlinelibrary.wiley.com/doi/full/10.1002/9781118901731.iecrm0174>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	M	M	S	S	S
CO3	M	M	M	S	S
CO4	S	S	M	S	S
CO5	M	M	S	S	M

S - Strong M - Medium

CORE XII MEDIA COMMUNICATION

Course Objectives:

- To introduce the students to think critically and learn the nuances of media.
- To widen career options to postgraduate student in English, especially in the knowledge processing industry for writers, editors, structural designers etc.
- To train students to become reviewers, critics, editors thus opening up other career options.

Course Outcomes:

On successful completion of the course, the students will be able to

- CO1 - Identify the links between mass media, social media, and socio-cultural transformation in the 21st Century world. - K1&K2
- CO2 - Compare the diverse uses and the cultural effects of the interactive media content production. - K3&K4
- CO3 - Examine critically the role of social media tools in the construction of personal and group identities and identifications. - K5
- CO4 - Discuss about the social effects of the rising popularity and widespread use of smart phones and other digital communication devices in the last decade. - K6
- CO5 - Examine the interactions between material culture and the digital revolution as well as the impact of digitization on materiality of life.- K5&K6

Unit I Communication

Communication and its importance-Effects of Communication- Elements in the process of communication (input, sender, channel, noise, receiver, output)-Types of communication: intrapersonal, interpersonal group and mass communication- Noise in communication and the importance of perception.

Unit II Understanding Media

Role of media in our life- Media and mass media- Nature of mass communication- Functions of mass media(Surveillance, Interpretation, linkage entertainment, purveyor of ideologies)-Types of mass media- Theories of mass communication-Basic theories

Unit III Reporting

Quote reporting- Sports reporting, Science and technology reporting, Weather reporting, Investigative reporting

Unit IV Mechanics of Editing

What is editing- The editing department- Editorial loop-Style guides and check lists(MLA)- Proof reading, traditional methods, alternative methods: proof reading vs copyediting-Editing practice

Unit V Advertising (Concepts, Scope, Functions)

Role of advertising in marketing-Evaluation of advertising-Functions of advertising-Types of advertisements-Ethics in advertising-Current issues in advertising- Representations of women in advertisements, children in advertising

Book Prescribed:

Kumar Keval J. *Mass Communication in India*. Jaico Publishing House, 1994. Print.

References:

1. Parthasarathy Rangaswami. *Basic Journalism*. Laxmi Publications, 2000.
2. Hilliard Robert L. *Writing for Television and News Media*. Stamford, CT: Cengage Learning, 2015.
3. BN Ahuja. *Theory and Practice of Journalism*. Surjeet Publications, 2007.
4. Joshi, Uma. *Textbook of Mass Communication and Media*. Anmol Publications, 2002.

Web Sources:

1. <https://www.toppr.com/guides/business-studies/directing/communication/>
2. <https://www.native-english.ru/topics/mass-media-in-our-life>
3. <https://www.owlgen.com/question/discuss-different-types-of-reporting-in-journalism>
4. <https://rayaccess.com/the-importance-of-editing/>
5. <https://business-finance.blurtit.com/196985/what-is-the-role-of-advertising-in-marketing>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	M	S	M	S
CO3	S	M	S	M	M
CO4	S	M	S	M	S
CO5	M	S	M	S	M

S - Strong M - Medium

CORE COURSE – IV

ENVIRONMENTAL BIOCHEMISTRY AND TOXICOLOGY

Paper Code	19UPEVS1C04	Horus	L	T	P	Credit
Marks	100		3	1	-	4

Course Objectives:

The purpose of this course is to focus on understanding the role of pollutants, xenobiotics in the natural environment and to understand the basics of environmental toxicology, cell biology and biochemistry and to characterize the adverse effects of chemical substances on the ecosystem and humans.

Course Outcomes

- CO1** Acquire broad knowledge of the field of environmental toxicology and biochemistry
- CO2** Understand the basic principles, target organ toxicity and the toxicity of a select group of chemical compounds.
- CO3** Synthesize and apply concepts from multiple sub-disciplines in environmental cell biology, biochemistry and toxicology.
- CO4** Use technical and analytical skills to quantify the level xenobiotics in environmental compartments.
- CO5** Understand the effects of xenobiotics in on human health.
- CO6** Understand relationships between chemical/drug exposure and their effects on physiological systems.
- CO7** Acquire skill is toxicological bioassays.
- CO8** Design strategies for study of dose-response relationships

Mapping of course outcomes with programme outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		*						
CO2		*						
CO3			*					
CO4			*					
CO5					*			
CO6				*				
CO7						*		
CO8								*

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Basic Cell Biology	Prokaryotic and Eukaryotic cell structure and intracellular organelles – Cell wall, membranes, nucleolus, endosomes, peroxisomes, mitochondria,	10

		endoplasmic reticulum, plant vacuoles, plastids, microbodies and chloroplast. Cell growth and division- Meiosis and Mitosis, genotypes and phenotypes (K1, K2)	
II	Cellular Processes	Cellular permeability, diffusion, osmosis, absorption of water, transpiration, photosynthesis, Respiration, translocation of solutes, Photoperiodism and vernalisation, plant movements, Dormancy, senescence. Animal Phylogeny. (K1, K2)	10
III	Basics of Toxicology	Introduction to toxicology, scope and types - Classification of toxic agents. Routes of exposure, duration and frequency of exposure, Dose response relationship - LC ₅₀ LD ₅₀ , Margin of safety levels. Environmental Risk – Definition, Risk Characterization - Hazard Identification, Exposure Assessment Methods, Risk Assessment – National and International guidelines. Environmental Risk – Mitigation measures. (K3, K4, K5)	10
IV	Toxicity Testing and Bioassay	Toxicity testing –laboratory animals, toxicity testing in animals, toxicological field studies, Concepts of Bioassay, Types and characteristics - Field based microbial bioassay, Test models and classification - Immunotoxicity, histotoxicity and cell toxicity. (K5, K6)	7
V	Xenobiotics	Toxicity testing –laboratory animals, toxicity testing in animals, toxicological field studies, Concepts of Bioassay, Types and characteristics - Field based microbial bioassay, Test models and classification - Immunotoxicity, histotoxicity and cell toxicity. (K4, K5)	7

References

Text Books

1. Alberts B, Bray D, Hopkin K *et al.* (2009) Essential Cell Biology, 3rd edition,
2. Alberts B, Johmson A, Lewis J, Raff M, Roberts K and Walter P (2002) Molecular Biology of the Cell, Garland Science, New York.

Reference Books

1. Buchanan BB, Gruissem W and Jones RL (2002) Biochemistry and Molecular Biology of Plants, ASPB, USA.
2. Cooper GM and Hausman RE (2013) The Cell: A Molecular Approach, 6th edition, Sinauer Associates, Sunderland, MA, USA.
3. David L. Nelson, Michael M. Cox (2004) Lehninger Principles of Biochemistry (1970) by Albert L. Lehninger Published April 23rd 2004 by W. H. Freeman (first published).
4. Gerald Karp (2002) Cell and Molecular Biology: Concepts and Experiments, 7th edition.
5. Klaassen, Curtis D; Casarett, Louis J; Doull, John, (2013). Casarett and Doull's toxicology : the basic science of poisons (8th Edition)Mc Graw Hill Publishers.
6. Ted A. Loomis, A. Wallace Hayes. Loomis's Essentials of Toxicology (1996) . 4th Edition, Academic Press Publishers
7. Sharma PD, Rastogi and Lamporary (1994) Environmental Biology and Toxicology, Rajpal and Sons Publishing, New Delhi.
8. Ted A Simon. Environmental Risk Assessment: A Toxicological Approach (2014). CRC Press publications.

Semester 2: JMC C04 – Advertising and Corporate Communication [Theory] 4 credits [End Sem-75 + CIA-25]

Curriculum/Course Objective (CO):

1.	To help students gain a fair knowledge about various process and concepts of advertising.
2.	To inculcate the knowledge of principles with basic skills to understand its need in various media contexts and advertising agency management.
3.	To enable students gain insight into the evolution of corporate communication.
4.	To explain its expanded role in organizational and marketing communication.
5.	Students would be able to explore the knowledge of advertising and improve their marketing skills and its implementation in appropriate media.

UNIT-1

Weeks/Instructional Hours - 12

Definition, nature and scope of advertising; marketing, economic and societal role of advertising; functions of advertising; Advertising environment - advertiser, advertising agency and media; Advertising agency – structure and functions; types of agencies- in- house, independent, full service and specialized; latest trends in Indian advertising.

UNIT-II

Weeks/Instructional Hours - 12

Classification of advertising based on target audience, geographic area, media and purpose; Internet advertising and promos; Brand positioning- brand name, brand personality, brand equity and brand management.

UNIT-III

Weeks/Instructional Hours - 12

Integrated Marketing Communications-Publicity, Propaganda and Public relations; definition and relevance of PR, Public Relations in public and private sectors; Public Relations and Corporate Communications; Advertising and public relations ethics and regulations. Advertising bodies in India and their roles.

UNIT-IV

Weeks/Instructional Hours - 12

Components of print advertisement – visuals- types of visuals, advertising copy - headlines, signature, slogans & logos. Visualization and execution of advertisements - client brief, account planning, advertising strategy, creative strategy, creative process and execution; Media research, planning, budgeting and media buying.

UNIT-V

Weeks/Instructional Hours - 12

Visual thinking exercises to create Print and electronic media ads; Creation of PR, CSR and corporate communication campaigns;

Reference Books:

S.H.H Kazmi, Satish K Batra, Advertising and sales promotion”, Excel Book, New Delhi, 2000

J.Vilanilam, G.K. Varghese, Advertising Basics”, Response books, New Delhi, 2001

Sean Brierley, “The Advertising and Hand book”, 2nd Edition New York, 2000

McGraw Hill, “Principles of advertising and IMC”, 2nd Edition New York, 2000

John MCDonough, “Encyclopedia of Advertising”, Vol. I, 2000.

The mapping of course outcomes with programme outcomes is tabulated as follows

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	L	L	L	L	L	L			
CO 2		M	M	M	M	M			
CO 3				M	M		M		
CO 4							S	S	S
CO 5						S	S	S	S

S-Strong M-Medium L-Low

Course Outcomes (COs):On successful completion of the course, the students will be able to:

		K1	K2	K3	K4	K5
CO1	CONSTRUCT creative and innovative media planning strategies in	✓	✓			
CO2	TRACE the evolution of Corporate Communication and its expanded role in organizational and marketing communication.	✓	✓		✓	
CO3	DETERMINE consumer behavior in terms of perception, attitude and learning towards decision making in product purchases.	✓		✓		✓
CO4	EXAMINE the concepts and principles of Advertising	✓		✓	✓	
CO5	DEVISE the Corporate communication plan and articulate the		✓			✓

TOOLS FOR ASSESSMENT

CIA Test – I	CIA Test – 2	Assignment	Seminar	Attendance	Total
5 marks	5 marks	5 marks	5 marks	5 marks	25 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signature			

Semester 2: JMC C05 – Media, Society and Culture [Theory] 4 credits [End Sem-75 + CIA-25]

Curriculum/Course Objective (CO):

1.	To help students gain an understanding of the historical development of Mass Communication theories and its link with historically important social, political and technological events/issues in the field of communication.
2.	To inculcate students about the relationship between media and society.
3.	To enable students gain insight about the race and cultural in the society
4.	To explain about the media consumers and the effects of media on the consumers
5.	To help students gain an understanding of media analysis using various approaches towards the consumers.

UNIT-1

Weeks/Instructional Hours - 12

Introduction to Media Studies

Introduction to the Media- Understanding the Mass Media, Characteristics of Mass Media, Effects of Mass Media on Individual, Society and Culture - Basic issues, Power of Mass Media.

UNIT-II

Weeks/Instructional Hours - 12

Media and Society

Language and Social construction of reality, Mediation and Representation - texts, subtexts, Meanings and Audiences, Rules in Society Culture, and Media - Public images and private practices.

UNIT-III

Weeks/Instructional Hours - 12

Media and Culture

Ideology and Culture, Emotions and Culture, Language and Culture, Race and Culture, Social class and Culture, Habits and Popular Culture, Indigenous and Popular Culture.

UNIT-IV

Weeks/Instructional Hours - 12

Media Audiences

Media And audience: Direct effects, Limited effects, Uses and Gratification, Mass Audience, Mass Society, Audience and the technological change, segmentation, polarization, TV and dominant Culture.

UNIT-V

Weeks/Instructional Hours - 12

Media Analysis

Approaches to Media Analysis - Marxist, Semiotics, Sociology and Psychoanalysis, Media and Realism, Media Myths, Hero worship, Discourse, Media imperialism and cultural imperialism, hegemony.

Reference Books:

1. Roger Silverstone, Why Study Media, Sage Publications, 1999
2. James Potter, Media Literacy, Sage Publications, 1998
3. Asa Arthur Berger, Media Analysis Techniques, Sage Publications, 1998
4. Judith Wilkinson, A guide to basic print production Book 2 Designing and producing artwork
5. The British Council in association with Intermediate Technology Publications 1985.
6. S.Marimuthu. Pugazh.M, ,DTP For Print Production Practical, Department of Printing Technology, Arasan Ganesan Polytechnic College, Sivakasi
7. By Joseph Marin and Julie Shaffer, The PDF Print Production Guide, GATFPRESS, Pittsburgh 2003.
8. Bittu Kumar, Desktop Publishing: Practical Guide To Publish Anything on Your Desktop Cloudtail India 2013
9. Chuck Gehman, Print Production Workflow: A Practical Guide Paperback – 2003

10. Louise Woods, Practical Print Making: The Complete Guide to the Latest Techniques, Tools, and Materials 1996
11. Helmut Kipphan, Handbook of Print Media: Technologies and Production Methods , Springer 2001
12. David Bann, The All New Print Production Handbook 2007
13. Gavin Ambrose and Paul Harris, The Production Manual: A Graphic Design Handbook 2008
14. Steven Heller, Gail Anderson, The Graphic Design Idea Book: Inspiration from 50 Masters 2016
15. Gavin Ambrose , Paul Harris, The Fundamentals of Typography 2nd Edition 2011

The mapping of course outcomes with programme outcomes is tabulated as follows

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9
CO 1	L	L	L	L					
CO 2		M	M	M					
CO 3				M	M	M	M		
CO 4							S	S	
CO 5						S	S	S	S

S-Strong M-Medium L-Low

Course Outcomes (COs) On successful completion of the course, the students will be able to:

		K1	K2	K3	K4	K5
CO1	EXPLAIN the role of media in a changing global culture.	✓	✓		✓	
CO2	DETERMINE communication strategies in integrating media literacy and cultural framework of the society	✓	✓	✓		
CO3	REPORT various approaches to Media Analysis to	✓	✓		✓	
CO4	CORRELATE the interplay between Media and Ideology	✓		✓	✓	
CO5	EXPLAIN the effects of Mass Media on Society by		✓		✓	✓

TOOLS FOR ASSESSMENT

CIA Test – I	CIA Test – 2	Assignment	Seminar	Attendance	Total
5 marks	5 marks	5 marks	5 marks	5 marks	25 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signature			

18MBA06 – RESEARCH METHODOLOGY FOR SOCIAL SCIENCES

Course Objectives:

1. To learn basics research methods in social science
2. To familiarize the students on research methodology, data collection and report preparation
3. To use research concepts in management research

Learning Objectives:

Upon successful completion of the requirements for this course, students can:

1. Explain the meaning of Research, Objectives and Types. Also can differentiate Research and Research Methodology. Further can understand Research Process and Relevance of Research for Decision Making in various Functional Areas of Management.
2. Able to understand how to write research problem, constructing Hypothesis, finding an apt research design and concepts of sampling.
3. Demonstrate a critical understanding of construction of relevant questionnaire by using Scaling, also can able to explain the concepts of data and using different methods of collecting it.
4. Learn and understand how to choose the relevant Statistical tools and analyse the data by practical mode.
5. Learn how to organizing flaw free (Plagiarism) research report and its presentation.
6. At the end of the course discussion, the course instructor will validate the learning synergy by ask them to conduct a group roject.

Unit	Unit Title	Intended Learning Chapters (K1- Knowledge Level) (K2- Understanding Level)	At the end of the first semester, students studying Concepts of Management and Communication will be able.....
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1	Basics of Research	Basics of Research: Research Meaning, Scope and Objectives – Types of Research – Research Vs. Research Methodology – Research Process - Relevance of Research for Decision Making in various Functional Areas of Management.	To understand the different types of research. To takeout the key problematic Functional Areas of Management.
2	Research Problem, Hypothesis, Research Design, Sampling Design.	Problem Definition– Techniques, Hypothesis, Types - Formulation of Research Hypothesis - Choosing the Appropriate Research Design – Sampling Design – Techniques –Steps - Sample Size Determination - Precautions – Errors.	To explain how to trace and narrate research problem. To become knowledgeable in framing hypothesis and fixing relevant Research Design and sampling.
3	Measurement and Scaling Techniques	Measurement and Scaling Techniques - Data Collection - Primary Data and Secondary Data – Methods of Collection – Questionnaire Design – Essentials of a Good Questionnaire – Pre Testing of Questionnaire – Pilot Study – Merits and Demerits of Questionnaire – Use of Schedules – Structured and Unstructured Interviews – Observation Method, Use of Secondary data in research.	To explain how to construct a relevant Questionnaire by using scaling techniques. To explain why Pilot Study is must. To understand the different methods of data collection.
4	Processing and Analysis of Data	Processing and Analysis of Data: Editing – Types of Editing – Guidelines for Editing - Coding – Classifications – Tabulation – Need, Nature and Guidelines – Ungrouped and Grouped Frequency Tables, Charts and Diagrams – Use of Computer Packages for Data Analysis – Application of Statistical Tests and Interpretation of Test of Results.	To explain the purpose of different Statistical Tests. Can perform the data processing. To explain the need and purpose of using Frequency Tables, Charts and Diagrams. To understand the Interpretation of Test of Results
5	Presentation of Research Results	Presentation of Research Results - Organizing a Research Report - The Significance Report – Steps in Writing Report - The Integral Parts of a Report –Types of Reports – Precautions for Writing Research Reports, Plagiarism Check – Need, Importance.	To understand the overall structure and its steps of a research report. To analyse do's and dont's in research writing. To explain why Plagiarism Check needs.

Syllabus Units &Expected Outcome

Reference:

Text Book:

1. Kothari.C.R., Gaurav Garg - Research Methodology – Methods and Techniques 4th Edition, 2018.

Reference Books:

1. Cooper – Business Research Methods Tata McGraw Hill Education 9th Edition 2006.
2. Donald Cooper, Pamela Schnider – Business Research Methods, McGraw Hill Higher Education, 12th Edition 2013.
3. William J.Goode P.K.Hatt – Methods in Social Research McGraw Hill Inc,1952.

Journals and Documents

1. Journal of Mixed Methods Research (JMMR)
2. International Journal of Research Methodology.
3. International Journal of Research in Social Science.
4. Research Methods for Managers (3rd edn). London:”Sage.
5. Previous years Projects, dissertations and Thesis
6. Education Resources Information Center
7. British Education Index.

Template for Course Syllabus

Course Code & Title	Paper III: Social Research Methodology (Core: 3) (Code No: 18SOCC03)		
Class	M.A. (2yr.) Sociology	Semester	I
Cognitive Level	K-1: ✓ K-2: ✓ K-5: ✓		
Course Objectives	Unit: 1 1.1 To retrieve the meaning and definitions of social research 1.2 To compare and contrast the different type of social research 1.3 To substantiate the need of the formulation of research problem in social research 1.4 To identify and interpret the major steps in social research 1.5 To interpret and summaries the need of research design Unit: 2.1 2.1 To compare and contrast census with sampling method in social research 2.2 To discuss the principles and strategies of sample selection 2.3 To illustrate probability and non-probability sampling. 2.4 To clarify and paraphrase sampling error and the problem of sample size 2.5 To design and implement proper statistical method 2.6 To infer the result of the analysis using statistic Unit: 3 3.1 To interpret the importance of different method and tools of data collection 3.2 To identify and substantiate the proper methods and tools for each particular studies. Unit: 4 4.1 To retrieve and clarify the uses of different scales for data collection in social research 4.2 To compare and contract different scales of data collection Unit: 5 5.1 To identify the proper statistic which is to be used in a social research? 5.2 To evaluate the meaning and function of statistic in social research 5.3 To implement the data processing properly in order to infer the findings of social research.		
UNIT	Content		No. of Hours

I	Research: Meaning and Definitions of Research, Types of Social Research: Pure, Applied, Action and Policy. Formulation of Research Problem in Social Research. Fact and Theory-Relationships; Hypothesis; Types and Sources. Major Steps in Social Research; Research Design: Exploratory & Formularize, Descriptive and Diagnostic and Experimental.	12 Hours
II	Sampling: Meaning; Census and Sampling Method; Probability and Non-probability Sampling Methods. Estimating Sampling Error, Problem of Sample Size.	12 Hours
III	Methods and Tools of Data Collection: Methods: Observation, Interview, Case Study, Content Analysis, Narrative, Oral History. Tools: Interview Guide, Interview Schedule, Questionnaire.	12 Hours
IV	Scaling: Meaning, Attitude Scales, Social Distance, Principles and Techniques of Socio-metric Scales. Thurstone, Likert and Guttman Scales. Validity and Reliability.	14 Hours
V	Research Process: Statistics: Meaning, Functions and Importance of Statistics in Social Science. Measure of Central Tendency & Dispersion. Association: Chi-square & T-test. Correlation: Rank Correlation and Karl Pearson Co-efficient of Correlation. Data Processing: Editing, Coding, Classification and Tabulation. Interpretation and Report Writing. Application of Computer Assistance Programs in Analyzing Data. Uses of SPSS	14 Hours
References	Text Books: • Wilkinson, T.S. and Bhandarkar, P.L. 1984. <i>Methods and Techniques of Social Research</i>, Bombay, Himalaya Publishing House. • Goode, William, J and Hatt, P.K. 1952. <i>Methods of Social Research</i>, New Delhi, McGraw-Hill. • Galtung, John. 1967. <i>Theory and Methods of Social Research</i>, London, Allen & Unwin. • Kothari, C.R. 1992. <i>Research Methodology: Methods and Techniques</i>. New Delhi, Wiley Eastern Limited. References: Ahuja, Ram. 2006. <i>Research Method</i>. Jaipur, Rawat Publications. Kothari, C.R. 1992. <i>Research Methodology: Methods and Techniques</i>. New Delhi, Wiley Eastern Limited. Krishnaswami, O.R. 1996. <i>Methodology of Research in Social Sciences</i>. Mumbai, Himalaya Publishing House. Sharma, Ram Nath and Sharma. 1983. <i>Research Methods in Social</i>	

	Sciences. Mumbai, Media Promoters & Publishers Pvt. Ltd. Das, Lal.D.K. 2008. Designs of Social Research. Goode, William, J and Hatt, P.K. 1952. Methods of Social Research, New Delhi, McGraw-Hill. Young, P.V. 1966. Scientific Social Surveys and Research, New Delhi, Prentice Hall. Wilkinson, T.S. and Bhandarkar, P.L. 1984. Methods and Techniques of Social Research, Bombay, Himalaya Publishing House. Galtung, John. 1967. Theory and Methods of Social Research, London, Allen & Unwin. Gupta, S.P. 1991. Statistical Methods. New Delhi, Sultan Chand & Sons Publishers.
Course Outcomes	The student after studying these chapters will CO 1. Compare different research method in social science and identify the most appropriate one to answer the question being asked. CO 2. Utilize the knowledge in applying for action researches. CO 3. Implement the appropriate sampling technique to conduct proper research. CO 4. Critically judge and identify best methods and tools for data collection for a particular study planned CO 5. Use proper statistical method for analysis.

Paper XV: (Core: 7) (Code No:)

Course Code & Title	18SOCC11 & Human Resource Management		
Class	M.A. Sociology	Semester	III
Cognitive Level	K1, K2, K4, K5		
Course Objectives	1. To learn the significance of human factors in work organizations 2. To study the different schools of management 3. To understand the significance of Human Resources Management in work environment. 4. To develop a sense of knowledge on various HRM practices in industrial organizations 5. To comprehend the various facets of HRM like HR Planning, recruitment, selection, and job analysis.		
UNIT	CONTENT	No. of Hours	
I	Human Resources: Meanings, definitions, nature and scope of human sources. Human factor in organizations importance of human resources in originations, Characteristics of Hawthorne studies.	16 Hours	
II	Human Resource Management: Definitions, objectives, goals, scope, principles, importance of Human Resource Management. Structure and Functions of Human Resource Management in industrial organizations.	16 Hours	
III	Human Resource Policies and planning: Meaning, objectives, content of human resource policies: Principles and necessities of human resource policies. Human Resource Planning: Contributory factors to influence the human resource planning.	16 Hours	
IV	Recruitment, selection and placement: Recruitment: Meanings, objectives, types, internal, external sources of recruitment. Process of recruitment- selection processes, criteria, steps and methods, importance of systematic and scientific selection procedures. Placement - Principles and importance of placements.	16 Hours	
V	Job Analysis: Job-Analysis: meanings, tools, techniques, methods and importance of job analysis. Promotions and Transfer: Meaning, goals, principles, policies, criteria, types, salient features of promotion and transfer policies.	16 Hours	
References	1. Armstrong, Mechael Baron, Angela (2006) Handbook of Strategic HRM , Mumbai: Jaico Publishing House. 2. Bhagoliwel, T. N. (1990) Personnel Management and IR , Agra: Sahitya Bhavan Hospital.		

	3. . 4. Bhagoliwel, T. N. (1990) <i>Personnel Management and IR</i>, Agra: Sahitya Bhavan Hospital. 5. Botton, Trevor (2001) <i>An Introduction to Human Resource Management</i>, New Delhi :Infinity Books. 6. Flippo, Edwin B. (1971) <i>Principles of Personnel Management</i> Ed. 4, Tokyo : McGraw Hill Publication. 7. Pattanayak, B. and Verma, Harish C. (1998): <i>Human Resource Management</i>, New Delhi : Wheeler Publication. 8. Rao, P. Subba (1999) <i>Essentials of Human Resource Management & I. R</i>; Mumbai : Himalaya Publications. 9. Saiyadain, Mirza S. (1988) <i>Human Resource Management</i>; New Delhi: Tata McGraw – Hill Publication Com. Ltd. 10. Sehgal, Seema (2006) <i>Handbook on Competency Mapping</i>, New Delhi: Sage Publication. 11. Akhilesh, K. B. and Nagaraj, D. R. Edu. (1990) <i>Human Resource Management</i> 2000, New Delhi : Wiley Eastern Ltd. 12. Aswathappa, K (2001) <i>Human Resource Management, Text & Cases</i>, New Delhi: Tata McGraw- Hill Edition. 13. Batia, S. K. (2006) <i>Human Resource Management</i>, New Delhi: Deep & Deep Publication 14.
Course Outcomes	<i>After completion of the course , the students will able to</i>
CO1	<i>Explain the role of human factors in organizations</i>
CO2	<i>Identify the basic facts about Human Resource Management</i>
CO3	<i>Express the knowledge of Human Resource policies and planning.</i>
CO4	<i>Demonstrate Skills on process of recruitment and selection.</i>
CO5	<i>Interpret tools and techniques of job analysis</i>

Supportive Paper-2

Course Code & Title	18SOCC15- PERSONALITY DEVELOPMENT		
Class	M.A., Sociology	Semester	
Cognitive Level	K1,K2,K3,K4,K5,K6		
Course Objectives	➤ To improve the concept of personality development among the students with its nature, elements and determinants ➤ Projecting the values of self Esteem and positive attitude to build a positive personality ➤ Understand the concept of motivation and introduce the internal/External motivation with the concept of inspiration ➤ Introduce the value of Greetings, Introductions, The Art Of Small Talk and sweet Conversations which creates a successful career and better intrapersonal skill among the students ➤ Understanding the art of creating positive relationships and also the body language projections		

UNIT	Content	No. of Hours
I	What is personality: Elements of personality, Determinants of personality, Personal SWOT analysis.	12 Hours
II	Personality enrichment: Self Esteem, Self concept, Advantages of high self esteem, Characteristics of people with high and low self esteem, Steps to building positive self esteem, Attitude, Factors that determine our attitude., Benefits of a positive attitude and consequences of a negative attitude, Steps to building a positive attitude	12 Hours
III	Motivation - The difference between inspiration and motivation, Motivation redefined, External motivation v/s internal motivation	12 Hours
IV	Success: Defining success - Real or imagined obstacles to success Qualities that make a person successful Reasons for failure - Interpersonal skills, Dealing with seniors, colleagues, juniors, customers, suppliers at the workplace.	14 Hours
V	Positive Relationships - Factors that prevent building and maintaining positive relationships, the difference between ego and pride the difference between selfishness and self interest, Steps for building a positive personality, Body	12 Hours

	language: Understanding body language, Projecting positive body language	
References	1. Arun Agarwal, <i>How to get the job you want</i> -. Published by Vision books, New Delhi 2. Rohit Anand and Sanjeev Bikchandani <i>Get that job</i> -. Published by Harper Collins. 3. Shiv Khera, <i>You can win</i> . MacMillan India Ltd. 4. Dale Carnegie. <i>How to develop self-confidence and influence people by Public speaking</i>	
Course Outcomes	On completion of the course, CO 1. Student will be able to describe and understand the meaning of personality with its elements and determinants. CO 2. Student will be able to understand the purpose of self-esteem and its importance. The students will be able to build good self by their own and also apply the same in their day to day life to bring social changes. CO 3. Student will be able to know the functions of motivations and they will be able to employ these concepts in their academic career and also bring the just society through motivation. CO 4. Students will be able to maximize their quality in terms of handling difficult situations which improve their future professionalism. They will be able to know why the interpersonal skills are needed in their day to day life?. These concepts will be able to support the students who will transform from rural to urban setting for job and will be able to offer job opportunities too. CO 5. Students will be able to apply the positive relationships in their social environments which construct the right impression to them. They will be able to explain the concept of body language and the same will be expressed by them in their social environment which offers good value.	

தாள் - 10 தொல்காப்பியம் பொருளதிகாரம் (முதன்மைப் பாடம்)
குறியீட்டெண்; 18TAM C10

நோக்கம்:

- தொல்காப்பியரின் பொருளதிகாரம் தமிழரின் வாழ்வியலைப் பிரதிபலிக்கும் காலக்கண்ணாடி என்பதை நிறுவுதல். நிலம் மற்றும் ஒழுக்கம் சார்ந்த திணை வாழ்க்கையினை எடுத்துக்காட்டுதல்.
- தமிழரின் அகவாழ்வு அகத்திணை வாயிலாக வெளிப்படுத்துதல். வீரம் செறிந்த புறவாழ்க்கையினை புறத்திணை வழி விளக்குதல் காதல் வாழ்வினை களவு என்றும் திருமண வாழ்வினைக் கற்பு என்றும் பிரித்து வாழ்ந்த ஒழுக்க வழவைப் போதித்தல்.
- எல்லா இயலுக்கும் பொருத்தமான பொருளியலை இடையில் வைத்த நோக்கத்தைக் கூறுதல். செய்யுள் வழக்கு, உலகவழக்கிற்குரிய மெய்ப்பாடுகளை உணர்த்துதல். இலக்கியவகை படைக்கும் நோக்கம் பற்றி செய்யுளியல் வழி புலப்படுத்துதல்.
- அணியிலக்கணத்தை விளக்கவே உவமையியல் படைக்கப்பட்ட தன் நோக்கத்தை விளக்குதல். பழந்தமிழரின் மரபியல் கோட்பாட்டினை மரபு மாறாமல் மரபியல் கொண்டு அறிவித்தல்.

அலகு - 1 அகத்திணையியல், புறத்திணையியல்

அலகு - 2 களவியல், கற்பியல்

அலகு —3 பொருளியல், மெய்ப்பாட்டியல்

அலகு - 4 செய்யுளியல்

அலகு - 5 உவமவியல், மரபியல்

பாடநூல்கள்

தொல்காப்பியம் - பொருளதிகாரம் 3 தொகுதிகள், பாவலர் சா. பாலசுந்தரம், தாமரை வெளியீட்டகம், தஞ்சாவூர்.

தொல்காப்பியம் பொருளதிகாரம், 1975. இளம்பூரணர் உரை, திருநெல்வேலிதென்னிந்திய சைவசித்தாந்த நூற்பதிப்புக்கழகம், சென்னை.

தொல்காப்பியம் - பொருளதிகாரம், 1975. பேராசிரியர் உரை, திருநெல்வேலிதென்னிந்திய சைவசித்தாந்த நூற்பதிப்புக்கழகம், சென்னை.

பார்வைநூல்கள்

சங்கஇலக்கியத்தில் பாடாண்திணை, 1975. நா. செயராமன், மீனாட்சி புத்தகநிலையம், மதுரை.

சங்கஇலக்கியத்தில் புறப்பொருள், 1986. கு.வெ.பாலசுப்பிரமணியன், மீரா பதிப்பகம், புதுக்கோட்டை.

தமிழ்க்காதல், 1962. வ.சுப.மாணிக்கம், பாரிநிலையம், சென்னை.

“திணைக்கோட்பாட்டின் சங்க அடிப்படைகள்”, ஆராய்ச்சி 32, கா. சிவத்தம்பி, (‘ஆ’), நா. வானமாமலை (மோ.ஆ.), பக். 337-352.

தொல்காப்பிய இலக்கியக்கோட்பாடுகள் (கருத்தரங்கக்கட்டுரைகள்), 1998. சே. ஜீன்லாரன்ஸ், கு. பகவதி (பதிப்பாசிரியர்) உலகத்தமிழாராய்ச்சி நிறுவனம், சென்னை.

தொல்காப்பியக் கவிதையியல், 1999. சு. அகத்தியலிங்கம், மணிவாசகர் பதிப்பகம், சென்னை.

தொல்காப்பியம் - பொருட்படலம் புறத்திணையியல், 1942. சு. சோமசுந்தர பாரதியார், மலையகம், பசுமலை.

தொல்காப்பியம் - பொருட்படலம் அகத்திணையியலும் புதிய உரையும், 1942. சு. சோமசுந்தர பாரதியார், மலையகம், பசுமலை.

தொல்காப்பியம் - பொருட்படலம் மெய்ப்பாட்டியல், 1942. சு. சோமசுந்தர பாரதியார், மலையகம், பசுமலை.

விளையும் பயன்கள்

- பண்டைத் தமிழரின் படைப்பாக்க நெறிமுறைகளைப் பொருளதிகார வழிப் பெறுவர். அறவாழ்வியல், போர் வாழ்வியல் பற்றி அறிந்துகொள்வர். நிலம் சார்ந்த வாழ்வியல், மக்களின் ஒழுக்க நெறிகள் பற்றி கற்றிருப்பர்.
- தொல்காப்பியர் நெறி சங்ககால மக்களின் வாழ்வியலைப் பிரதிபலிப்பதை அறிவர். களவு, கற்பு வாழ்க்கையின் முதன்மைத்துவத்தை அறிந்துகொள்வர்.
- விடுப்பட்ட பண்டைத் தமிழரின் வாழ்வியல் கூறுகள் பொருளியல் பாற் உள்ளதை உணர்வர். வடமொழி ரசக்கோட்பாட்டிற்கும் தமிழ் மெய்ப்பாட்டியலுக்கும் உள்ள உறவை ஒப்பிட்டு தமிழரின் உணர்வு மேம்பாடு என்பதை கருதுவர்.
- யாப்பிலக்கணத்தை அறிந்துகொள்வதுவே செய்யுளியலின் நோக்கம் என்பதை உணர்வர். அணியிலக்கணக் கோட்பாடு பண்டைத் தமிழரிடம் இருந்தது என்பது உவமவியல் வழி நிறுவப்பெற்றிருக்கும்.
- வழக்குச் சொற்களையும் மரபுச் சொற்களையும் பழந்தமிழர் பேணி வந்தமையை அறிந்திருப்பர்.
- கவிதை இயற்றும் ஆற்றலும் மேலை நாட்டு இலக்கியத்தோடு ஒப்பிடும் திறனும் கைவரப் பெறுவர்.

*வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.

தமிழ் முதுகலை - மூன்றாம் பருவம்
தாள் - 12 பொதுமொழியியல் (முதன்மைப் பாடம்)
குறியீட்டெண் 18TAM C12

நோக்கம்:

- மொழிகளைத் பகுத்தாய்வதற்குரிய மொழியியலின் பொதுவான அடிப்படை இயல்புகளை மாணவர்களுக்கு உணர்த்துதல்.
- தமிழ் மரபிலக்கணங்களைக் கோட்பாட்டு நோக்கில் அணுக மொழியியல் பயன்படும் பாங்கினை மாணவர்கள் அறியச் செய்தல்.
- சொற்கள் தொடராகி மொழிக்கு வளத்தை தருவதை அறிவித்தல்.
- மொழியியல் வழி தமிழ்மொழியின் மேன்மையை உணரச் செய்தல்.
- மொழி கற்றலையும் கற்பித்தலையும் விளக்குதல்.

அலகு - 1

மொழியியல் அறிமுகம் (மொழி மொழியியல் சமுதாயமும்)

மொழியும் சமுதாயமும், மொழியும் கருத்துப்பரிமாற்றமும், மொழியும் இலக்கியமும், மொழியும் அறிவுத்துறைகளும், மொழியும் மொழியியலும், மொழியியல் அறிமுகம் விளக்கம். மொழியியலின் முப்பெரும்பிரிவுகள்-

1. விளக்கமொழியியல்;(Descriptive Linguistics).
2. வரலாற்றுமொழியியல்; (Historical Linguistics).
3. ஒப்புமைமொழியியல்; (Comparative Linguistics)/

மொழியியலின்பெரும்பிரிவுகள் - 1.கோட்பாட்டுமொழியியல்; (Theoretical Linguistics) 2.பயன்பாட்டுமொழியியல்; (Applied Linguistics), மொழியமைப்பு - அகஅமைப்பு இலக்கணஅமைப்பு (சொல்லியல், தொடரியல்), புறஅமைப்பு (ஒலியியல், ஒலியனியல், பொருண்மையியல்).

அலகு -- 2

ஒலி ஒலியியல் ஒலியனியல் (Phonetics and Phonology)

விளக்கம், ஒலியியல்வகைகள்-1. ஒலிப்பியல் (Articulatory Phonetic). 2.கேட்பொலியியல் (AuditoryPhonetics). 3.ஒலியியலக்கவியல்; (Acoustic Phonetics)/ ஒலியுறுப்புகள், ஒலித்தல், பேச்சொலிவகைகள் -1.தடையொலி (Stop or Plosive). 2.மூக்கொலி (Nasal). 3.உரசொலி(Fricative). 4.மருங்கொலி(Lateral). 5.வருடொலி (Flap). 6.ஆடொலி (Trill). 7. (Vowel). உயிரொலி, மெய்யொலிகள்.

ஒலியியல் எழுத்துமுறை 1. பரந்தநிலை ஒலியெழுத்து முறை (Broad Transcription). 2. நுண்ணிய ஒலியெழுத்து முறை (Narrow Transcription)/

ஒலியனியல் - விளக்கம் ஒலியன்முதன்மைக்கொள்கைகள் வேற்றுநிலை துணைநிலை உறழ்ச்சி துணைக்கொள்கைகள் 1. சமச்சீர் அமைப்பு, 2. சிக்கனக் கொள்கை, 3.ஒலிப்பு ஒப்புமை. ஒலியன் சேர்க்கை - உயிரொலியன் சேர்க்கை, மெய்யொலியன் சேர்க்கை. மாற்றொலியன், ஒலியனைக் கண்டறியும் நெறிமுறை.

அலகு -- 3

உருபனியல் (Morphology)

உருபன் - வரையறை, விளக்கம், கோட்பாடு, உருபு, உருபன், மாற்றுருபன், உருபனைக் கண்டறியும் வழிமுறைகள் - நைடாவின் ஆறு விதிகள், உருபன் வகைகள் விளக்கம் - கட்டுருபன் கட்டிலா

உருபன் முதலியன, உருபுகளின் வகைகள் உருபனியல் முறைகள் -சொல்விரிவு[(Inflection). சொல்லாக்கம்; (Derivation).

உருபொலியனியல் - விளக்கம் வரையறை, உருபொலியனியல் மாற்றம், உருபொலியனியல் விதிகள், அக உருபனியல் மாற்றம் புற உருபனியல் மாற்றம் - 1. மிகுதல் 2. குறைதல் 3. திரிதல்

அலகு -- 4 தொடரியல் (Syntax)

தொடரியல் - விளக்கம், வரையறை, தொடர், வாக்கியம், அடுக்குறவு, தொடரக உறவு, அண்மை உறுப்பு (Immediate Constituent) வகைகள் - இடைவிடா அண்மை உறுப்பு (Continuous IC), இடைவிட்ட அண்மைஉறுப்பு (Discontinuous IC), பல்நிலை அண்மைஉறுப்பு (Multiple IC), இணைந்தியல் அண்மைஉறுப்பு (Simultaneous IC), மயக்கும் அண்மைஉறுப்பு (Ambiguous IC), அண்மை உறுப்புப் பகுப்பாய்வு. மாற்றிலக்கணம் - அக அமைப்பு, புறஅமைப்பு, மாற்றல் விதி, நீக்கல் விதி, சேர்த்தல் விதி, மாற்றிலக்கணப் பொருண்மைப் பகுதி, தொடரியல் பகுதி, ஒலியனியல் பகுதி.

அலகு -- 5 மொழி கற்றல் கற்பித்தல்

வரையறை. முதன்மொழி, இரண்டாம் மொழி, அயன்மொழி கற்பித்தல். மொழிகற்பித்தலின் அடிப்படைத் தேவைகள் - பாடநூல், ஆசிரியர்கையேடு, துணைக்கருவிகள், கற்பிக்கும் முறைகள் கற்கும் முறைகள், கற்றல் கற்பித்தல் அணுகுமுறை, தேர்வு மதிப்பீடு.

மொழிகற்பிக்கும் முறைகள் - 1. போலச்செய்தல் அணுகுமுறை, 2. கேட்டல் எழுதுதல் அறிதல் முறை, 3. ஓரினமொழி கற்பிக்கும் முறை, 4. கருத்துப்புலப்பாட்டு அணுகுமுறை, 5. இருமொழிய அணுகுமுறை, 6. சமுதாய மொழியியல் அணுகுமுறை. மொழி அமைப்பு வேறுபாடுகள், இரண்டாம் மொழி கற்பித்தல் சிக்கல், பண்பாட்டுக்கூறு கற்பித்தல் சிக்கல், மொழித்திறன் வளர்த்தல்.

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விளையும் பயன்கள்

- மொழியில் ஒலிகள் பிறக்கும் முறையை மாணவர்கள் அறிந்திருப்பர்.
- மொழியில் ஒலிகளைப் பகுப்பாய்வு செய்து அம்மொழியின் ஒலியன் அமைப்பை உருவாக்கும் முறையை மாணவர்கள் அறிந்திருப்பர்.
- மொழியில் பயின்று வரும் உருபுகளைக் கண்டறிந்து அம்மொழியின் உருபங்களையும் அவற்றின் மாற்றுருபங்களையும் தொகுக்கும் வழியை அறிந்திருப்பர்.
- மொழி கற்பத்தலில் மொழியியலின் தேவையை மாணவர்கள் பெற்றிருப்பர்.

*வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்

தமிழ்முதுகலை - மூன்றாம் பருவம்
தாள் - 13 அகராதியியல் (விருப்பப் பாடம்)
குறியீட்டெண்; 18TAM E13

நோக்கம்:

- மூலநூல்களின் சொற்பொருளை அறிந்துகொள்ள உதவும் அகராதிகளை அறிந்துகொள்ளச் செய்தல்.
- அகராதிகளைப் பயன்படுத்தக் கூடிய வழிமுறைகளைக் கற்பித்தல்.
- அகராதிகளை உருவாக்கவும் பயன்படுத்தவும் விழிப்பணர்வை ஏற்படுத்தத்தல்.
- அகராதி வரலாறு, வகைகள், மொழியியல் தன்மைகள் மரபுகளை எடுத்து விளக்குதல்.
- அகராதிகளின் சொற் பொருண்மையியல் உறவு, எதிர்ச் சொற்களைக் கண்டறிதல் செய்தல்.
- ஓர் அகராதி உருவாக்கத்திற்குத் தேவையான அடிப்படைத் திட்டமிடல், தரவு மூலங்கள், சொல் தெரிவு, பதிவுத் தெரிவு, மொழி வேறுபாடுகளை உணர்த்துதல்.
- அகராதி உருவாக்கத்தின் இரண்டாம் படிநிலையான பதிவுக் கூறுகள், அச்சுப்படி தயாரித்தல் பற்றி விளக்குதல்.
- புதிய அகராதி படைக்க வழி காட்டுதல்.

அலகு -- 1 அகராதிவரலாறும் அகராதியியலும் மொழியியலும்

அகராதியியலும் அகராதிச் சொற்பொருளியலும், அகராதியியலும் மொழியியலும், அகராதி வரலாறு உலக அகராதி வரலாறு, தமிழ் அகராதி வரலாறு, இலக்கண மரபில் உரிச்சொல்மரபு, நிகண்டுமரபு, ஒருமொழி இருமொழி அகராதி மரபுகள், கலைக்களஞ்சியமரபு, இக்கால அகராதியியல் மரபு.

அலகு -- 2 சொற்பொருண்மையியல்

சொல்லும் பொருளும், சொல் உலகப்பொருள் தொடர்பு, பொருள்கோட்பாடுகள் - பொருள்முக்கோணக்கொள்கை, மூவகைப் பொருட்கூறுகள் - கருத்துப்பொருள், குறிப்புப் பொருள், பயன்பாட் டெல்லை, சொல்லுறவு - தொடரக உறவு, அடுக்குறவு, பொருள்உறவும் சொல் வகைப்பாடும் - பல்பொருட்சொல், ஒப்புருச் சொல், ஒருபொருட்பலசொல், மீச்சொல் உட்பொருட்சொல், சினை முதல் உறவு, எதிர்ச்சொல்.

அலகு -- 3 அகராதி வகைகள்

வகைப்பாட்டுக்காரணங்கள், கலைக்களஞ்சியம், மொழி அகராதிகள் - ஒருமொழி இருமொழி பன்மொழி அகராதிகள், காலஅடிப்படையிலான அகராதிகள் - குறித்தகாலநிலை அகராதி, வரலாற்றகராதி, ஒப்பியல் அகராதி, மீவிளக்கஅகராதி,

தகுமொழிவிளக்க அகராதி, சிறப்பகராதிகள், மின்னனு
அகராதிகள், சொல்வலைகள், புதிய வகைப்பாடுகள்.

அலகு -- 4 அகராதியுருவாக்க அடிப்படைகள்

திட்டமிடல் . தரவுமூலம், ஆதாரநூல்தொகுதி, சொல்லடைவு
உருவாக்கம், சொல் தெரிவுமுறைகள், பதிவுத்தெரிவு,
சொல்வேறுபாடுகள், கட்டுடைவடிவம் கட்டிலாவடிவம், சொல்லடுக்கு,
சொல்விரிவு, ஆக்கச்சொல், பொதுச் சொல்லும் அகராதிக்
சொல்லும், கூட்டுச்சொற்கள் - இயல்புச்சொற்சேர்க்கை
மரபுச்சொற்சேர்க்கை, அகராதிக் கூட்டுச்சொற்கள், மொழி
வேறுபாடுகள் - தனிமனிதப்பேச்சு, வட்டார வழக்கு, தகுமொழி,
இரட்டைவழக்கு.

அலகு -- 5 அகராதியுருவாக்கம்

அகராதியிப்பதிவுக்கூறுகள் - தலைச்சொல்பகுதி, பொருட்பகுதி,
தலைச்சொல், அடிப்படைவடிவம், அடிப்படைவடிவத்தெழிவு,
எழுத்துப்பெயர்ப்பு, உச்சரிப்பு, இலக்கணக்குறிப்பு, சொல்லுமம்.
சொற்பிறப்பு. சொற் பொருள்தருநெறிகள் - ஒருபொருட்பலசொல்,
மீச்சொல், எதிர்ச்சொல், விளக்கச் சொற்பொருள், குறுக்குநோக்கீடு,
வெளிப்படைக் குறுக்குநோக்கீடு, மறைமுகக் குறுக்கு நோக்கீடு,
மேற்கோள் தருநெறி, விளக்கக்குறிப்புகள் - சொற்பொருள்
விளக்கக் குறிப்பு, இலக்கணவிளக்கக் குறிப்பு, கலைக்களஞ்சிய
விளக்கக்குறிப்பு, குறிப்பான்கள், காலக்குறிப்பான், இடக்குறிப்பான்,
தகுதிக்குறிப்பான்.

அச்சுப்படி தயாரித்தல்

பதிவுச்சொல் வரிசைமுறை - அகரவரிசைமுறை, பொருண்மை
வரிசைமுறை, பிறவரிசைமுறைகள், பதிவு வரிசை முறைகள்,
பல்பொருட்சொல், ஒப்புருச்சொல். ஒருபொருட்பலசொல் வரிசை
முறைகள், பதிவுத்தொகுப்பு - தொடர்பதிவு, துணைப்பதிவு,
முன்னுரை, பயன்பாட்டாளர் குறிப்பு, மாதிரிப்பதிவு
பின்னிணைப்புகள்.

பாடநூல்கள்

அகராதியியல், 1995. பெ. மாதையன், தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.

தமிழ் அகராதியியல் வளர்ச்சி வரலாறு, 1985. வ. ஜெயதேவன்,
ஐந்திணைப் பதிப்பகம், சென்னை.

தமிழ் அகராதிக்கலை, 2001. சுந்தரசண்முகனார், மெய்யப்பன்
தமிழாய்வகம், சிதம்பரம்.

பார்வைநூல்கள்

அகராதிக்கலை, 1984. தூ.வே. வீராசாமி, தமிழ்ப்புத்தகாலயம்,
சென்னை.

தமிழ் அகராதியியல், 2002. எச். சித்திரபுத்திரன், அனன்யா, தஞ்சாவூர்.

தமிழ் அகராதியியல், வ.ஜெயதேவன், அன்பு நூலகம், சென்னை.

தமிழ்நிகண்டுகள் ஆய்வு, 2002. மு. சற்குணம், இளவழகன் பதிப்பகம், சென்னை.

தமிழ்நிகண்டுகள் வரலாற்றுப்பார்வை (உருவ உள்ளடக்க ஆய்வு), 2005. பெ. மாதையன், தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்.

பொருண்மையியல், 1989. செ. சண்முகன், அனைத்திந்திய தமிழ்மொழியியற் கழகம், அண்ணாமலைநகர்.

An Introduction to Lexicography, 1982 R. A. Singh, Central Institute of Indian Languages, Mysore.

ColporuL A History of Tamil Dictionaries, 2000. Gregory James, Cre-A, Chennai.

Manual of Lexocography, 1971. L. Zgusta. et. al. Mauton, The Hague.

Tamil Malayalam Lexicography Proceedings of the Seminar, 2000. K. Naachimuthu (Chief Editor), Department of Tamil, University of Kerala, Thiruvananthapuram.

விளையும் பயன்கள்

- பழந்தமிழ் இலக்கண இலக்கியங்களின் சொற் பொருட்கள் புழக்கத்திற்கு வருவதால் தமிழ்ச் சொற்களை மீட்டுவாக்கம் செய்ய இயலும்.
- அகராதிகளை மாணவர்கள் உருவாக்கவும் முறைப்படி பயன்படுத்தவும் விழிப்புணர்வு ஏற்படும்.
- அகராதி வகைகளைத் தெரிந்துகொள்வதால் பிற புதிய அகராதி உருவாக்கத்திற்குத் தயாராவர்.
- பழைய அகராதிகளின் சொற்பொருண்மைகளை அகராதிப் படைப்பில் தரவுமூலச் சேகரிப்பு, சொற்தெரிவு, சூழல் சிக்கலின்றி அமையும்.
- அகராதிகளின் திட்டமிடல், தரவுமூலம் சேகரிப்பு, பதிவுத்தெரிவு, சொற்பொருண்மைகள் பிற்காலத்தில் அகராதி உருவாக்கும் பணிக்கு உதவியாக இருக்கும்.
- திட்டமிடல் முதல் அச்சுப்படி தயாரித்தல் வரை மாணவர்களுக்கு அகராதி பற்றிய புரிதல் ஏற்படும்.

***வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.**

Paper-I

RESEARCH METHODOLOGY

Course code: **18MPBC01**

4 Credits

Course Objectives:

To improve scientific research through scientific writing, understanding the concept of bioinformatics, biostatistics and to have awareness of various government funding agencies and to follow the ethics in research.

Course Outcomes:

After completing this course, the students will be able :

CO1	To Understand the principles of research methods and instruments. Understand the methods of literature collection and publishing research works. Identify research problems and design
CO2	To Use bioinformatics tool for research analysis.
CO3	To use biostatistics as a research analysis tool.
CO4	To know about the various funding agencies for applying fellowships/scholarships
CO5	To understand and follow the bioethics, IPR and patenting

UNIT I

Scientific Research

Overview of scientific research, improvement through research and applications of research. Choosing a topic and formulation of hypothesis. Designing and investigation techniques to be employed, analysis of results. Use of microorganisms, animals, plants and humans in experimentation.

Scientific writing – logical format for writing thesis and papers – abstract, introduction, review of literature, materials and methods, results – illustration by tables and figures, discussion, and bibliography – Harvard and Vancouver systems.

UNIT II

Bioinformatics

The scope of bioinformatics. The internet. The world wide web. File formats. Biological data bases-sequence and structure-NCBI,PDB. Data retrieval – the Entez system. Searching sequence databases – sequence similarity searches, substitution matrices. Database search-FASTA and BLAST. Protein multiple sequence alignments-CLUSTAL.

UNIT III

Biostatistics

Collection and classification of data – diagrammatic and graphic representation of data – measurement of central tendency, Measures of dispersion, Correlation and Regression analysis, Test of significance based on large samples and small samples, Student t test , Chi square test, ANOVA, DMRT, Normal distribution, Use of SPSS software.

UNIT IV

Safety, general guidelines and funding agencies

Biosafety – Introduction. Levels of Biosafety. General guidelines and practices. Guidelines for DNA research activities. General guidelines for research in transgenic plants, Good laboratory practices. Containments – Types, Basic Laboratory and Maximum Containment Laboratory.

Research bodies & funding agencies – UGC, CSIR, ICMR, DST, DBT,ICAR, DAE, DRDO, DOD, Fellowships – Junior, Senior Research Fellowships and Research associates.

UNIT V

Bioethics and Patenting

Declaration of Bologna, Ethics in animal experimentation, CPCSEA guidelines – animal care and technical personnel, environment, animal

husbandry, feed, bedding, water, sanitation and cleanliness, waste disposal, anesthesia and euthanasia.

Composition of (human) Institutional evaluation Ethical Committee (IEC)

– General ethical issues. Specific principles for clinical evaluation of drugs, herbal remedies and human genetics. Ethics in food and drug safety. Environmental release of microorganisms and genetically engineered organisms. Ethical issues in human gene therapy, cloning and embryonic stem cell.

Patenting – definition of patent – different types of intellectual property rights, Case studies of patents (basmati rice, turmeric, neem). Product and process. Patenting multicellular organisms, Patenting and fundamental research.

Reference Books

1. Gupta, S.P. 2011. Statistical Methods, 4th Edition, Sultan Chand & Son Publishers.
2. Lesk, A.M. 2002. Introduction to Bioinformatics, Oxford University Press.
3. Kothari C.R. 2013. Research Methodology : Methods and Techniques, 3rd Edition, New Age Publishers
4. Day, R.A. 1989. How to write and publish a scientific paper. 3rd Edition, Cambridge University Press.
5. CPCSEA Guidelines for Laboratory Animal Facility.
6. Ethical guidelines for Biomedical Research on human subjects. ICMR, New Delhi, 2006.
7. Cooray. P.G. Guide to scientific and technical writing.

MAPPING

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	M	M	H	M	L	H	L
CO2	M	L	H	H	M	H	H	M
CO3	H	M	H	H	H	L	H	L
CO4	H	M	M	H	L	H	H	L
CO5	H	M	L	L	L	M	H	H

H-High; M-Medium; L-Low

Paper-I
ANALYTICAL TECHNIQUES

Course code: 18MPBC02

4 Credits

Course Objectives:

To improve the applications of various instrumentations and techniques in the field of biochemical research.

Course Outcomes:

After completing this course, the students will be able:

CO1	To Understand the principles of spectroscopy and centrifugation
CO2	To handle chromatography and electrophoresis for research analysis.
CO3	To know about the various principles and application of Radiation and Immunotechniques
CO4	To apply molecular biology techniques in the field of Biochemistry
CO5	To Understand the proper applications of either plant or animal cell cultures techniques in their research endeavors

UNIT I

Spectroscopy and Centrifugation

Principle, instrumentation, and applications of UV-visible spectrophotometry, Vibrational spectroscopy, NMR, ESR, Spectrofluorimetry and luminometry. X-ray diffraction. Atomic spectroscopy – principle and applications of atomic flame and flameless spectrophotometry. Uses of LASER for spectroscopy.

Principle, instrumentation and applications of centrifugation. Preparative ultracentrifugation – differential centrifugation, density gradient centrifugation (rate-zonal & isopycnic). Analytical ultracentrifugation – molecular weight determination.

MPBT02: Paper II - Plant and Animal Biotechnology

Credits: 4

Hours: 4/Wk

Course objectives:

This course aims to help the students to gain an advanced level of understanding in the comprehensive components of plant biotechnology. The topics contribute knowledge for food security, sustainable agriculture, Germplasm conservation, secondary metabolites production, Vaccine production and Molecular markers. Perspective on recent advances in animal cell culture and various technical applications including cell line and stem cells. Helps to gain knowledge about IPR, GATT and TRIP.

Unit I

Plant tissue culture: Nutritional requirements, plant growth hormones, genetic variation and chromosome stability. Protoplast isolation, culture and Somatic hybridization. Production of haploid plants. Germplasm conservation. Application of Plant Tissue culture, callus and suspension culture, Protoplast culture: synthetic seed production.

Unit II

Transformation: Agrobacterium mediated, Particle bombardment and Virus mediated. Transgenic plants: Pest and Disease resistance. Recombinant proteins and edible vaccines. Molecular Markers: RAPD, RFLP, AFLP, SNPs. Reporter genes, GUS, resistant markers. Production of secondary metabolites.

Unit III

Cell cultures: primary, secondary, sub culture, pilot and large scale culture. Development of cell line, Separation of viable and non - viable cells, cytotoxicity of cultured cells. Tissue culture techniques. Recombinant subunit and DNA vaccines. Single domain antibody production.

Unit IV

Embryo transfer technology: *In-vitro* fertilization. Transfer of genes: microinjection, electroporation and liposome mediated transformation. Method of producing transgenic animals and applications – gene knockout and knock down. Stem cells – Embryonic and adult. Molecular pharming: Production of pharmaceuticals and biomolecules.

Unit V

Intellectual Property rights (IPR), General agreement on tariff and trade (GATT), Trade related intellectual property (TRIP), Patents for plants, animals, transgenic organisms and DNA sequences. Plant breeder's and farmer's rights. Biosafety and ethical issues.

Recommended Books

- Ralf Pörtner, 2007. Animal Cell Biotechnology: Methods and Protocols (Methods in Biotechnology). 2nd Edition. Humana Press.
- Spier R. and J.Griffiths, 1994. Animal Cell Biotechnology. Academic Press.
- Darling D.C. and S.J. Morgan, 1994. Animal Cells: Culture and Media: Essential Data (Essential Data Series), Wiley-Blackwell Publishers.
- Jennie P. Mather and David Barnes, 1998. Methods in Cell Biology, Volume 57: Animal Cell Culture Methods Academic Press.
- Kalyan Kumar De, 1992. Plant Tissue Culture, New Central Book Agency, Calcutta.
- Robert N. Trigiano, and Dennis J. Gray, 1996. Plant Tissue Culture Concept and Laboratory Exercises, CRC Press, London.
- Srivasta P.S. 1998. Plant Tissue Culture and Molecular Biology, Narosa Publishing House, New Delhi.
- Narayanaswamy, S. 1994. Plant Cell and Tissue Culture, Tata McGraw Hill Publishers.

Course learning outcome:

Upon successfully completing this course, the students could be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles plant tissue culture and its application	K3 – K4
CO2	Design experiments for functional characterization of plant genes and to identify those suitable for creating agronomically important traits. Conceptualize plant transformation, selection of desirable genes for crop improvement and Molecular marker.	K4
CO3	Understand the fundamentals of animal cell culture, and development of	K2 -K4
CO4	To improve artificial embryo transfer and nuclear transfer methods and applications. Stem Cell and production of biopharmaceuticals	K3- K5
CO5	Get updated knowledge about IPR, Patents, Farmer's Rights	K2-K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	S
CO2	S	S	M	S	S
CO3	S	S	M	S	S
CO4	S	M	S	S	M

CO5	M	S	S	M	S
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S- Strong; M-Medium



PERIYAR UNIVERSITY
Salem -636 011, Tamil Nadu
NAAC A Grade – State University – NIRF Rank 83, ARIIA-4
Department of Botany

M.Phil - Course work details

Title of the Paper: RESEARCH METHODOLOGY Course Paper					
Subject code : 13QBOTC01					
Revised syllabus Year of Revision 2018	Revised syllabus Year of Revision 2018 and Modified for OBE in 2019			Unit wise Percentag e of Revision	Over all Percentag e of Revision
Nil	Objectives:				
	Unit	Unit Title	Intended Learning Chapters (Programme specific qualification attributes K1,K2,K3,K4,K5,K6)		
Selection of research topics and data retrieval: Using library, internet, compiling of working bibliography. Principles of experimental designs. Principles of thesis writing - Research Report: Types of reports – contents – styles of reporting – Steps in drafting reports – Editing the final draft – Evaluating the final draft.	I	Selection of Research topic	Selection of research topics and data retrieval: Using library, internet, compiling of working bibliography. Principles of experimental designs. Principles of thesis writing - Research Report: Types of reports – contents – styles of reporting – Steps in drafting reports – Editing the final draft – Evaluating the final draft.	-	

Basics of common phytochemical techniques including their modern trends for qualitative and quantitative analysis of listed compounds: chromatography, spectrophotometry, electrophoresis, centrifugation and tracer techniques.	II	Techniques	Basics of common phytochemical techniques including their modern trends for qualitative and quantitative analysis of listed compounds: chromatography, spectrophotometry, electrophoresis, centrifugation and tracer techniques.	-	-
Sample collection for microbial analysis: surface and subsurface soils, rhizospheric soils, water, air. Handling of samples, preparation for microscopy (liquid cultures, soil samples); confocal laser scanning microscopy, SEM, TEM, STEM, AFM, Flow cytometry, imaging. Estimation of microbial biomass (methods based on C content, DNA content, fumigation). Cultural methods, MPN method.	III	Sample collection and analysis methods	Sample collection for microbial analysis: surface and subsurface soils, rhizospheric soils, water, air. Handling of samples, preparation for microscopy (liquid cultures, soil samples); confocal laser scanning microscopy, SEM, TEM, STEM, AFM, Flow cytometry, imaging. Estimation of microbial biomass (methods based on C content, DNA content, fumigation). Cultural methods, MPN method.	-	
Plant Tissue Culture and Plant Micro techniques: Principles and applications of plant tissue culture, fixatives, methods of fixation, methods of dehydration, embedding, sectioning and staining. Herbarium Methodology: Collection, poisoning, drying and preservation of herbarium specimens, Important National and International herbaria.	IV	Plant Tissue Culture and Plant Micro techniques	Plant Tissue Culture and Plant Micro techniques: Principles and applications of plant tissue culture, fixatives, methods of fixation, methods of dehydration, embedding, sectioning and staining. Herbarium Methodology: Collection, poisoning, drying and preservation of herbarium specimens, Important National and International herbaria.	-	
Collection of data: Steps, modes and precautions in the collection of data, primary Vs secondary data, editing of secondary data; sampling theories. Condensation of data: Measures of central tendency (Mean, Median and Mode) and measure of dispersion (range, mean deviation, standard deviation). Representation of data: graph and diagrams. Analysis of data: Correlation, regression, test of significance (F-test, T- test, Z- test and $\div 2$ test).	V	Data analysis	Collection of data: Steps, modes and precautions in the collection of data, primary Vs secondary data, editing of secondary data; sampling theories. Condensation of data: Measures of central tendency (Mean, Median and Mode) and measure of dispersion (range, mean deviation, standard deviation). Representation of data: graph and diagrams. Analysis of data: Correlation, regression, test of significance (F- test, T- test, Z- test and $\div 2$ test).	-	
Reference • Jeyaraman, J. 1981. Laboratory Manual			Reference • Jeyaraman, J. 1981. Laboratory Manual in Biochemistry.		

in Biochemistry. Wiley Eastern Ltd. Mumbai. • Plummer, D.T. An Introduction to practical biochemistry. Tata MC Graw Hill Co. New York. • Keith Wilson and John Walker. 1995. Practical biochemistry. Univ. of Cambridge., New York. • Chawla, H.S. 2000. Introduction to biotechnology. Oxford and IBH publishing Co., New Delhi. • Johansen, D.A. 1940. Plant Microtechnique. MC Graw Hill Co., New York. • Nagarajan, P. and Senthilkumar, N. 2001. Molecular biology principles and methods a practical approach, Sree Narmatha Printers, Coimbatore. • Sharma, R.K. and S.P.S. Sangha. 2009. Basic Techniques in Biochemistry and Molecular Biology. I.K. International Pvt. Ltd, New Delhi. • Keith Wilson and John Walker.2010. Principles and Techniques of Biochemistry and Molecular biology. Cambridge University Press, New York. • Palanichamy, S. and M. Shunmugavelu. 1997. Research methods in Biological Sciences. Palani Paramount Publications, Palani. • P.R. Yadav and Rajiv tyagi, 2006. Biological Technicques, Discovery Publishing House, New Delhi. • Susan carson, Heather B. Miller and D. Scottwitherow, 2012. Molecular biology techniques, Elesiver. • Bajpai P.K. 2006. Biological			Wiley Eastern Ltd. Mumbai. • Plummer, D.T. An Introduction to practical biochemistry. Tata MC Graw Hill Co. New York. • Keith Wilson and John Walker. 1995. Practical biochemistry. Univ. of Cambridge., New York. • Chawla, H.S. 2000. Introduction to biotechnology. Oxford and IBH publishing Co., New Delhi. • Johansen, D.A. 1940. Plant Microtechnique. MC Graw Hill Co., New York. • Nagarajan, P. and Senthilkumar, N. 2001. Molecular biology principles and methods a practical approach, Sree Narmatha Printers, Coimbatore. • Sharma, R.K. and S.P.S. Sangha. 2009. Basic Techniques in Biochemistry and Molecular Biology. I.K. International Pvt. Ltd, New Delhi. • Keith Wilson and John Walker.2010. Principles and Techniques of Biochemistry and Molecular biology. Cambridge University Press, New York. • Palanichamy, S. and M. Shunmugavelu. 1997. Research methods in Biological Sciences. Palani Paramount Publications, Palani. • P.R. Yadav and Rajiv tyagi, 2006. Biological Technicques, Discovery Publishing House, New Delhi. • Susan carson, Heather B. Miller and D. Scottwitherow, 2012. Molecular biology techniques, Elesiver. • Bajpai P.K. 2006. Biological instrumentation and Methodology. S Chand Publishers, New Delhi. • Annadurai. B. 2011. A textbook of immunology and immunotechnology. S.Chand Publishers, New Delhi. • Ananta Swargiary. 2017. Biological tools and Techniques. Kalyani Publishers, New Delhi. • Sabari Ghosal and Srivastava A. K. 2009. Fundamentals of Biological Techniques and Instrumentation. PHI Learning		
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instrumentation and Methodology. S Chand Publishers, New Delhi. • Annadurai. B. 2011. A textbook of immunology and immunotechnology. S.Chand Publishers, New Delhi. • Ananta Swargiary. 2017. Biological tools and Techniques. Kalyani Publishers, New Delhi. • Sabari Ghosal and Srivastava A. K. 2009. Fundamentals of Biological Techniques and Instrumentation. PHI Learning Private Ltd. New Delhi. • Gurumani. N. 2006. Research Methodology for biological sciences. MJP Publishers, Chennai. • Skoog, Holler and Crouch.2007. Instrumental Analysis. Cengage Learning Pvt.Ltd. New Delhi. • Barzum, J and Graff Henry, 1977. The Modern researcher. • Edekar, V. H., 1982. How to write assignments, Research papers, dissertations, Kanak publ., New Delhi. • Kothari, C.R. 2006. Research Methodology Methods and Techniques • Mahajan. B.K. 1997. Methods in Biostatistics. Jay Pee Brothers Medical Publishers (P) Ltd. New Delhi. • Bernard Rosner. 2010. Fundamentals of Biostatistics. Brooks/cole, Boston, USA. • Agarwal, B.L. 1988. Basic Statistics. New Age International Publishers. New			Private Ltd. New Delhi. • Gurumani. N. 2006. Research Methodology for biological sciences. MJP Publishers, Chennai. • Skoog, Holler and Crouch.2007. Instrumental Analysis. Cengage Learning Pvt.Ltd. New Delhi. • Barzum, J and Graff Henry, 1977. The Modern researcher. • Edekar, V. H., 1982. How to write assignments, Research papers, dissertations, Kanak publ., New Delhi. • Kothari, C.R. 2006. Research Methodology Methods and Techniques • Mahajan. B.K. 1997. Methods in Biostatistics. Jay Pee Brothers Medical Publishers (P) Ltd. New Delhi. • Bernard Rosner. 2010. Fundamentals of Biostatistics. Brooks/cole, Boston, USA. • Agarwal, B.L. 1988. Basic Statistics. New Age International Publishers. New Delhi. • Sahu, P.K. 2013. Research Methodology: A Guide for Researchers in Agricultural Science, Social Science and other related fields. Springer, New Delhi.		
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Delhi.					
Sahu, P.K. 2013. Research Methodology: A Guide for Researchers in Agricultural Science, Social Science and other related fields. Springer, New Delhi.					

Title of the Paper: Advances in Botany					
Course Paper				Subject code : 13QBOTC02	
Revised syllabus Year of Revision 2018	Revised syllabus Year of Revision 2018 and Modified for OBE in 2019			Unit wise Percentag e of Revision	Over all Percentag e of Revision
Nil	Objectives:				
	Unit	Unit Title	Intended Learning Chapters (Programme specific qualification attributes K1,K2,K3,K4,K5,K6)		
Evolutionary trends amongst Algae, Fungi and Bryophytes. Evolutionary trends amongst Pteridophytes, Gymnosperms and Angiosperms.	I	Plants Evolutionary	Evolutionary trends amongst Algae, Fungi and Bryophytes. Evolutionary trends amongst Pteridophytes, Gymnosperms and Angiosperms.	-	-
Genomics: Whole genome sequencing and functional genomics. Proteomics: Protein Engineering – Achievements and prospects. <i>Arabidopsis thaliana</i> and rice genome projects and their importance.	II	Genomics:	Genomics: Whole genome sequencing and functional genomics. Proteomics: Protein Engineering – Achievements and prospects. <i>Arabidopsis thaliana</i> and rice genome projects and their importance.	-	
Anthropogenic impact on Ecosystems and Climate Change; Ozone depletion, Global warming, Carbon budgeting. Biodiversity: Endemism, Variation, Biodiversity Hotspots, Biodiversity Indicators, Biodiversity	III	Ecosystems and Climate Change	Anthropogenic impact on Ecosystems and Climate Change; Ozone depletion, Global warming, Carbon budgeting. Biodiversity: Endemism, Variation, Biodiversity Hotspots, Biodiversity Indicators, Biodiversity Conservation, Invasive Alien Species.	-	

Course Objectives

- i) To understand the importance of writing skills
- ii) To learn the method of documentation
- iii) To learn different types of methods for data analysis
- iv) To understand the importance of computational tools

Unit 1: Technical Writing

Basic Elements: Thesis Elements – Paper Elements – Order of Thesis and Paper Elements – Concluding Remarks – Identification of the Author and His Writing: Author's Name and Affiliation – Joint Authorship of a Paper: Genuine Authorship and Order of Authors. Identification of Writing: Title, Keywords, Synopsis, Preface and Abstract – Typical Examples. Chapters and Sections: Introductory Chapters and Section – Core Chapters and Sections. Text-Support materials: Figures and Tables – Mathematical Expressions and Equations – References – Appendixes and Annexure – Listing of Materials. Numbering of elements: Pagination – Numbering of Chapters, Sections and Subsections – Numbering of figures and Tables – Equation Numbering – Appendix Numbering – Reference Numbering.

Unit 2: Near Set Theory

Introduction – Object Description – Sample Behaviour Description – Nearness of Objects – Near Sets – Near Sets and Verisimilitude – Fundamental Approximation Space – Lower Approximation of a Set – Upper Approximation of a Set – Boundary Region – Nearness Approximation Spaces – Sample Families of Neighbourhoods – Feature Selection Method – Overlap Function – Approach to Near Set Theory – Modification of our Approach to Near Sets – Medical Application.

Unit 3: Rough set Theory

Introduction – Approximation spaces – Decision systems and Decision Trees – Closure operators and Rough sets. Rough set based Feature selection : Introduction – Dependency function based approaches – Rough set based Attribute Reduction (RSAR) – VPRS (Variable Precision Rough sets (VPRS) – Dynamic Reducts – Entropy based reduction (EBR) – Discernibility Matrix based Approaches

Unit 4: Soft set Theory

Soft sets – Operations on Soft sets – Union, Intersection, AND operation – OR operation – Properties on soft set operations – Matrix representation of soft sets – Operations on Soft Matrices – Parameter reduction of Soft sets and its algorithm- Multi-soft sets – Decomposition of Multi-valued Information Systems – Soft Set Approach for Conflict Analysis

Unit 5: Analytical Methods (Omit Theorems and Proof)

Correlation Analysis

Introduction – types of correlation – scatter diagram method – correlation graph method – coefficient of correlation – Spearman's Rank Correlation Coefficient - coefficient of concurrent deviation – correlation coefficient by the method of least square – Error of the coefficient of correlation – coefficient of determination .

Regression Analysis

Introduction – graphic methods for studying regression – algebraic method of studying regression – Regression equation in case of correlation table – standard error of estimate – ratio of estimate.

Text Books

Unit – 1:

B.N. Basu, “Technical Writing”, PHI, Pvt., Ltd., New Delhi, 2007.
(Chapters: 4, 5, 6, 7, 8)

Unit – 2:

1. James F. Peters, “Near Sets: General Theory about Nearness of Objects”, Applied Mathematical Sciences, Vol.1, No. 53, PP 2609-2629, 2007.
2. M.E. Abd El-Monsef, H.M. Abu-Donia, and E.A. Marei, “Special Approach to Near Set Theory”, Hindawi Publishing Corporation, Mathematical Problems in Engineering, Vol. 2011, Article ID 168501, 10 pages, 2011.

Reference Books:

1. Christopher Henry and James F. Peters, “Arthritic Hand-Finger Movement Similarity Measurements: Tolerance Near Set Approach”, Hindawi Publishing Corporation, Computational and Mathematical Methods in Medicine, Vol. 2011, Article ID 569898, 14 Pages, 2011.
2. James F. Peters, “Fuzzy Sets, Near Sets, and Rough Sets for your Computational Intelligence Toolbox”, Foundations of Computational Intelligence Volume 2, Volume 202 Foundations of Computational Intelligence, Springer, PP 3-25, 2009.

Unit – 3:

1. Aboul Ella Hassanien, Zbigniew Suraj, Dominik Slezak and Pawan Lingras, Rough Computing, Theories, Technologies, and Applications, Springer, 2008 (Unit IV - Chapter 9).
2. Dan A. Simovici, Chabane Djeraba, “Mathematical Tools for Data Mining”, Springer, 2008 (Unit IV - Chapter 9).

Unit – 4:

1. Onyeozili, I. A., Gwary T. M, “A Study of the Fundamentals of Soft Set Theory”, International Journal of Scientific & Technology Research Volume 3, Issue 4, April 2014.
2. Edi Sutoyo*, MungadMungad, Suraya Hamid, TututHerawan, “An Efficient Soft Set-Based Approach forConflict Analysis, PLoS ONE,11(2), 2016
3. ZhiKonga, LiqunGaoa, LifuWanga, Steven Li, “The normal parameter reduction of soft sets and its algorithm”, Computers and Mathematics with Applications 56 (2008) 3029-3037.
4. M. Irfan Ali, Feng Feng, Xiaoyan Liu, Won Keun Min, M. Shabir,“On some new operations in soft set theory”,Computers and Mathematics with Applications,57 (2009) 1547-1553.

Unit – 5:

K. R. Gupta, Statistics – Volume 1, Atlantic Publishers and Distributers, 2014.

(Chapters 8 and 9).

Reference Books

1. Daniel T. Larose , Chantal D. Larose, Data mining and Predictive analytics, Second Ed., Wiley Publication, 2015
2. Jason Bell, Machine Learning:Hands-On for Developers and Technical Professionals, Wiley Publication, 2015.
3. Johannes Ledolter, DATA MINING AND BUSINESS ANALYTICS WITH R, Wiley & Sons, 2015.

Scheme of Examination

MPHDECO1	Research Methodology and Statistical Techniques
MPHDECO2	Recent Developments in Economic Theory and Policy
MPHDECO3	Special Paper
S. No	
1	Environmental Economics
2	Public Finance and Policy
3	Agricultural Economics and Rural Development
4	Gender Economics
5	Economics of Irrigation
6	Health Economics
7	Regional Economics
8	Labour Economics
9	Development Economics
	Dissertation Viva-Voce Examinations

MPHDECO1: RESEARCH METHODOLOGY AND STATISTICAL TECHNIQUES

Objective

This paper helps in understanding the economic concepts with the help of statistics. It introduces the research methodology concepts to the students and imparts knowledge in preparing the research reports

Outcome

The students could understand and appreciate the research methodology and could be trained in using statistical techniques for analyzing the data

Unit– I Introduction, Hypotheses and Types of Research

Research- objectives of research- Stages in the Research Process – Scientific Methods of Research: Popper’s falsification principle and situational analysis; Methodology of Scientific Research programmes (Lakatos); Friedman’s instrumentalist methodology; Kuhn’s concept of paradigms; rhetorical analysis in economics (Deirdre McCloskey). Types of Research - Participatory Rural Appraisal and Evaluation Research. Formulation and Verification of Hypotheses - Functions, Criteria sources of hypotheses – Theory and scientific law – Steps in Testing of Hypothesis.

Unit– II Sampling Design and Data Generation

Probability Sampling -Non-Probability sampling - Choice of Sample Size. Primary Data - Questionnaire – Types and Criteria - Secondary Data - Types and Sources – Advantages and Disadvantages - Evaluation of Secondary Data.

UNIT- III Research Design and Thesis Writing

Meaning -Need-Features-Important Concepts of Research Design – Guidelines for Writing Review of Literature -Theory and its Applications – Developing Research Proposal and Mechanics of Thesis Writing.

Unit–IV Processing and Analysis of Data

Quantifying Data - Coding - Classification and Tabulation - Descriptive Statistical Measures – Correlation and Regression - Analysis of Time Series - Association of Attributes (Simple problems) – Analyzing Qualitative Data - Scaling Techniques – Issues in Scaling – Thurston Scaling – Likert Scaling –Multivariate Techniques - Factor Analysis - Path Analysis – Multiple Regressions – Discriminant Function Analysis.

Unit– V Inferential Statistics and Computer Applications

Univariate Inferences - Point and interval estimation –Large sample z – test (Simple problems) - Small Sample tests – t, F and 2 - Assumptions, Properties & Uses (Simple problems) –Introduction to Computer- Computer Applications in Economics –Hardware & Software – File management – Use of computers in research MS-excel, Word – Statistical Package – SPSS.

REFERENCES

1. Davis, Glyn & Pecar, Branko (2010), *Business Statistics – Using Excel*, Oxford University Press, New York.
2. Gupta, Santosh (2005) “**Research Methodology and Statistical Techniques**”, Deep and Deep Publications, New Delhi.
3. Blaug, Mark (2006) “*The Methodology of Economics Cambridge*”, Cambridge University Press.
4. Thakur and Devendra (2008) “**Research Methodology in Social Science**”, Deep and Deep Publications, New Delhi.
5. Wilkinson and Bhandarkar (2003) “**Methodology and Techniques of Social Research, Himalaya Publishing House**”, Bombay.
6. Whigham, David (2008) *Business Data Analysis Using Excel*, Oxford University Press.

MPHDECO2: RECENT DEVELOPMENTS IN ECONOMIC THEORY AND POLICY

Quantifying Data - Coding - Classification and Tabulation - Descriptive Statistical Measures – Correlation and Regression - Analysis of Time Series - Association of Attributes (Simple problems) – Analyzing Qualitative Data - Scaling Techniques – Issues in Scaling – Thurston Scaling – Likert Scaling –Multivariate Techniques - Factor Analysis - Path Analysis – Multiple Regressions – Discriminant Function Analysis.

Unit– V Inferential Statistics and Computer Applications

Univariate Inferences - Point and interval estimation –Large sample z – test (Simple problems) - Small Sample tests – t, F and 2 - Assumptions, Properties & Uses (Simple problems) –Introduction to Computer- Computer Applications in Economics –Hardware & Software – File management – Use of computers in research MS-excel, Word – Statistical Package – SPSS.

REFERENCES

1. Davis, Glyn & Pecar, Branko (2010), *Business Statistics – Using Excel*, Oxford University Press, New York.
2. Gupta, Santosh (2005) “**Research Methodology and Statistical Techniques**”, Deep and Deep Publications, New Delhi.
3. Blaug, Mark (2006) “*The Methodology of Economics Cambridge*”, Cambridge University Press.
4. Thakur and Devendra (2008) “**Research Methodology in Social Science**”, Deep and Deep Publications, New Delhi.
5. Wilkinson and Bhandarkar (2003) “**Methodology and Techniques of Social Research, Himalaya Publishing House**”, Bombay.
6. Whigham, David (2008) *Business Data Analysis Using Excel*, Oxford University Press.

MPHDECO2: RECENT DEVELOPMENTS IN ECONOMIC THEORY AND POLICY

Objective

This paper equips the students to understand the theoretical developments from neoclassical to the modern theories. This makes the students aware of the emerging concepts in economics.

Outcome

The students could know the theoretical concepts in Economics. This makes them to have a clear idea about the advanced skills in economic theory and policy.

Unit- I Neoclassical Theory

Methodological foundations - Assumptions of neoclassical economics – Market and state in neoclassical theory: the fundamental theorems of welfare economics – Arrow-Debreu-McKenzie equilibrium model. The NIE theory of the firm

Unit- II New Institutional Economics (NIE) and Behavioural Economics

New Institutional Economics-Transaction cost theory- Asymmetric information- Economics of property rights: Ostrom's theory –Applications of New Institutional Economics- Bounded rationality- framing and endowment effect – Heuristics, Prospect- Behavioral Economics and the financial sector – Behavioral Economics and public finance

Unit III: Austrian Economics and Public Choice Theory

Austrian methodology and Theory of value – Role of knowledge in the economy (Hayek) – Market failure and state failure in Austrian Theory- Theory of rent seeking – Constitutional design: the fiscal constitution" –Social choice theory: individual choice in political voting and the market process, strategic voting.

Unit- IV Post Keynesian and Behavioural Economic Theory

Post Keynesian critique of neoclassical economics –Distribution theory - Macro dynamics. Bounded rationality, framing and endowment effect, defaults for choice –Prospect theory and heuristics – Behavioral Economics and the financial sector – Behavioral Economics and public finance.

Unit V Economic Development and Growth

Development as expansion of capabilities – New Economic Theory- Multiple equilibrium and Development Policy- The role of geography, institutions and human capital in development- Globalization and Development (Bhagawati, Rolrik and Renert)- Financial sector reforms and economic growth- optimum financialisation

REFERENCES

1. Athreya Kartik, (2012) “**Big Ideas in Macro economics**”,(Cambridge, Massachusetts, MIT Press, chapter 1 and 2.
2. Todd Sandler (2004) “**Economic Concepts for the Social Sciences**”, Cambridge University Press,chapter 8.
- 4 Holt and Steven (2001) “***A New Guide to Post Keynesian Economics Richard Pressman***”, chapters 4, 9 and 10, London,.
- 5 *J.E.Kind (2002) “The Elgar Campanion to Post Keynesian Economics”, Edited Cheltenham,UK: Edward Elgar.*
- 6 *Eamonn Butler (2012) “Public Choice (Institute of Economic Affairs)”, chapters 1,2,10, London.*

Paper-I

RESEARCH METHODOLOGY

Course Objectives:

The purpose of this course is to make the students to get introduced to the methods of doing research on focused areas of the subject, to make them understand the basic principles and instrumentation of all analytical equipments and to equip the students to write and publish research articles.

UNIT I - Scientific Writings

Need for Basic and Applied Research in Environmental Science – Designing, planning and execution of experiments – Laboratory safety - Literature collection and citations – Components of research report – Significance of tables and figures in research article – Preparation of research articles – Preparation of review articles – Research thesis writing – ISSN and ISBN - *Research quality indicators*: SCI Impact factor and ‘h’ index – *Reference Materials*: Google scholar, Scopus, Thomson Reuters, Web of Science and Pubmed - *Research bodies and funding agencies*: MoEF, UGC, DBT, DST, CSIR, ICMR, ICAR, DAE and DRDO

UNIT II - Statistical Analysis Tools

Basic elements and tools of Statistical analysis – Arithmetic, Geometric and Harmonic means, Test of significance - Student’s ‘t’ test, Chi-square test, F test, ANOVA, Duncan’s Multiple Range Test, Correlation and Regression – SPSS statistical software in biological research

UNIT III - Bioinformatic Tools

An overview of Bioinformatics - Computing tools phylogenetics and computational biology. Application of bioinformatics in bioremediation – Biodiversity informatics – Eco-informatics – Genomic databases – Designing of biomolecules – ‘Omic’ approaches with special reference to green environment

UNIT IV - Experimental Separation Techniques

Centrifugation: Basic principles – Density gradient, isopycnic and refrigerated super speed ultra-centrifugation - *Chromatography*: Principle and applications of column chromatography, GC-MS and HPLC - *Electrophoresis*: Principle and applications of Agarose, SDS PAGE, 2D Gel electrophoreses - DNA, RNA extraction methods - Blotting techniques - Cell culture maintenance - Primary cell and NGM culturing techniques - Techniques in gene amplification analysis - DNA cloning techniques.

UNIT V - Sampling Methods and Analytical Instrumentation

Sampling Methods and Standards with special reference to air, water and soil - *Microscopy*: Basic principle and applications (Bright field, Dark field, Fluorescent, Confocal and electron) – *Instrumentation*: Basic principle and applications of UV – VIS Spectrophotometer, Flame photometer, AAS, ICP- MS, NMR Spectrophotometer and XRD, PCR – RT PCR, ELISA - Working mechanism and concepts of Flow cytometry - GM Counter and Soft Laser Screening Densitometer

Learning Outcomes:

After completing this course, the students will be able to:

- Know the principles of research methods and instruments.
- Identify research problems and design their specific research plans to conduct research.
- Understand the methods of literature collection and publishing research works.
- List required instruments for their specific research experiments.
- Handle the instruments and perform the analysis.
- Collect appropriate quantitative and qualitative research data, and analyze.
- Have developed good scientific communication, including writing, oral communication and presentation skills.
- Use biostatistics and bioinformatics as the research analysis tools.

References

1. de la Guardia M and Garrigues S (2012) Handbook of Green Analytical Chemistry, John Wiley & Sons Ltd., UK.
2. Evans D, Gruba P and Zobel J (2011) How to Write a Better Thesis, Melbourne University Publishing Ltd., Australia.
3. Fulekar, MH (2009) Bioinformatics: Applications in Life and Environmental Sciences, Springer, Netherlands.
4. Fuscaldo AA, Erlick BJ and Hindman B (2012) Laboratory Safety – Theory and Practice, Elsevier, UK.
5. Gurumani N (2006) Research Methodology for Biological Sciences (1st Edition). MJP Publishers, A unit of Tamil Nadu Book House, Chennai.
6. Hooda P (2010) Trace Elements in Soils, Blackwell Publishing Limited, UK.
7. Hubbard SJ and Jones AR (2010) Proteome Bioinformatics, Humana Press, USA.
8. Manly (2001) Statistics for Environmental Science and Management, Chapman and Hall / CRC Press, Boca Raton, FL, USA.
9. Murray R (2011) How to Write a Thesis, 3rd edition, Open University Press, UK.
10. Rodriguez-Ezpeleta N, Hackenberg M and Aransay AM (2012) Bioinformatics for High Throughput Sequencing, Springer, New York.
11. Sahu PK (2013) Research Methodology: A Guide for Researchers in Agricultural Science, Social Science and Other Related Fields, Springer, India.
12. Suchmacher M and Geller M (2012) Practical Biostatistics with Microsoft Excel, Academic Press, USA.
13. Sundar Rao PSS and Richard J (2012) Introduction to Biostatistics and Research Methods, 5th edition, PHI Learning Private Limited, New Delhi.
14. Tariq H (2012) Basic Bioinformatics, LAP Lambert Academic Publishing, Germany.
15. Webster R and Lark M (2012) Field Sampling for Environmental Science and Management, Routledge, UK.

Web References

1. <http://envfor.nic.in/>
2. <http://www.ugc.ac.in/>
3. <http://www.dst.gov.in/>
4. <http://www.bgbm.org/BioDivInf/def-e.htm>
5. <http://eol.org/info/234>
6. http://www.dcsmse.gov.in/emerge/website_material_on_IPR.pdf
7. <http://www.ceeraindia.org/documents/ecomarkindia.htm>
8. <http://www.csa.com/discoveryguides/gmfood/overview.php>
9. <http://www.google.com/intl/en/scholar/metrics.html>
10. http://images.webofknowledge.com/WOK45/help/WOS/h_citationrpt.html
11. <http://www.harzing.com/download/hjournals.pdf>
12. <http://www.ecoinfoindia.org/>
13. <http://www.indiaenvironmentportal.org.in/>
14. <http://www.icar.org.in/files/ICAR-ITP-2010/iiss.pdf>
15. http://cpcb.nic.in/Water_Quality_Criteria.php
16. http://cpcb.nic.in/National_Ambient_Air_Quality_Standards.php
17. http://www.anketimvar.net/documents/Statistical_Methods_in_Bioinformatics.pdf

M.Phil. FOOD SCIENCE TECHNOLOGY AND NUTRITION

PART I SYLLABUS

Paper I - Research Methods and Techniques

SUB CODE : 16MPFSN01

HOURS: L +T+P=C

MARKS : 100

4+0+0 = 4

Objectives

1. To gain updated knowledge on research design, data analysis, analytical techniques, publication and copyright related to Food Science and Nutrition discipline.

UNIT I

Research design in Food Science and Technology – Food sampling techniques for analysis and product development, sample preparation for various analysis, standardization and portion control, Extraction and Isolation of specific compounds in food – starch, protein, fat, phytochemicals and Nutraceutical compounds, research design- factorial design, randomised block design, central composite rotatable design, techno-economic feasibility analysis, Rapid Assessment Procedures, modeling and computer simulation studies, *in vitro* and *in vivo* methods of testing bioavailability of nutrients, Acute and chronic toxicity studies.

UNIT-II

Research design in Nutritional Science – Problem identification and idea generation, selection of a problem, hypothesis formulation, research design in descriptive surveys and experimental research, sampling techniques, research tools- Quantitative and Qualitative, Reliability and validity of data gathering / measuring instruments. Nutritional mapping and surveillance. Food security status assessment process.

UNIT-III

Statistics – Descriptive Statistics, testing of hypothesis – parametric and non – parametric tests, Computer aided software in statistical calculation - Ms Excel based, SPSS, Organization and representation of data, Ethics in research.

UNIT-IV

Report writing – types of report, parts of report, preparation of project proposal for funding support. Publication / knowledge dissemination - different forms of scientific writing, ISBN and ISSN numbering, citations, Indexing, Impact factor, IPR and patenting, public appraisal techniques for knowledge dissemination.

UNIT-V

Principles and applications of various analytical techniques – colorimetry, photometry, flourimetry, flame photometer, atomic absorption spectrophotometer, chromatography, electrophoresis, infrared spectrometry, X-Ray diffractometer, microscopes, viscometer, rheometer, texture analyser, densitometer, refractometer, penetrometer, hydrometer, hunter color lab, water activity meter.

Practical Experiences

1. Two-day Workshop on “SPSS Packages in food and Nutritional sciences”
2. Two-day Workshop on Food Science and Nutrition Research methods.
3. Training on utilization of e-resource, journal numbering, citations of an article, indexing, impact factor calculation through central library of Periyar University.
4. Training on advanced analytical techniques.

References

1. Ghai, O.P. and Gupta, P. and Gupta, P. (1999), Essential Preventive Medicine - A Clinical and Applied Approach. Sangam Books Ltd.
2. Hendrick, T.E, Bickman, L. and Rog, D.J. (1993), Applied Research Design – A Practical Guide, California, Sage Publications, Inc.
3. Miles, M.B. and Huberman, A.M. (1994), Qualitative Data Analysis- An Expanded Source Book,

- 2nd Edition, California, Sage Publications. Inc. DOI: 10.1016/S0272-4944(05)80231-2.
4. Hugh Coolican, (2014), *Research Methods and Statistics in Psychology*, sixth edition, Psychology Press, Taylor and Francis Group, New York and London.
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 6. Julie Lovegrove, Sangita Sharma, (2015), *Nutrition research methodologies* [e-version], Edith Cowan University Publications, Australia.
 7. Bernard C. Beins, (2014), *Successful Research Projects : A Step-by-Step Guide* [e-version], Edith Cowan University Publications, Australia.
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 9. Gurumani, N.(2004), *An Introduction to Biostatistics*, 1st edition, MJP publishers, Chennai.
 10. Gupta, S.P (2004), *Statistical Methods*, 33rd revised edition, Sultan Chand & Sons educational Publishers, New Delhi.
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 14. Barbara Bruemmer, Jeffrey Harris, Phil Gleason, Carol J. Boushey, Patricia M. Sheean, Sujata Archer, Linda Van Horn, (2009), *Publishing Nutrition Research: A Review of Epidemiologic Methods*, Journal of the American Dietetic Association, Volume 109, Issue 10, 2009, pp. 1728-1737.
 15. Jeffrey E. Harris, Carol Boushey, Barbara Bruemmer, Sujata L. Archer, (2008), *Publishing Nutrition Research: A Review of Nonparametric Methods, Part 3*, Journal of the American Dietetic Association, Volume 108, Issue 9, 2008, pp. 1488-1496.
 16. Marsha Rhea, Craig Bettles, (2012), *Future Changes Driving Dietetics Workforce Supply and Demand: Future Scan 2012-2022*, Journal of the Academy of Nutrition and Dietetics, Volume 112, Issue 3, Supplement, 2012, pp. S10-S24.

Syllabus for M.Phil., Applied Geology

PAPER – I

18MPAG01 RESEARCH METHODOLOGY

Course Objectives

- To get an idea on review of literature
- To apply to solving scientific written papers and thesis.
- To emphasis computer application in scientific research.
- To understand the different sampling techniques.
- To understand the applications of Remote Sensing in different fields of Geological exploration.

Course Outcome

- To understand concepts of research work.
- To know about conceptual and contemporary methods of research
- To formulate the research hypothesis and methodology.
- To identify the different research problem.
- To evaluate the different working principles of different geological instruments and understand the importance of data analysis tools.

Unit I

Importance and need for Research Ethics and Scientific Research, Formulation of Hypothesis, Identification of Problem – Literature Survey, Reference collection, Use of Libraries and Information Retrieval systems, Internet Browsing – assessing the current status- International Standard book Number (ISBN) - International Standard Serial Number (ISSN) – Discussion in the Workshop, Symposium, Conference and Seminar.

Unit II

Scientific writing – Characteristics. Logical format for writing Papers, Dissertation and Thesis and. Essential features of Title, Abstract, Introduction, Literature Review, Materials and Methods, Result and Discussion and Conclusion. Effective Illustration –Tables, Charts and Figures. Reference style. Presenting Scientific - Type of Teaching Skills - Evaluation of Teaching Skills –Pedagogy Technology.

Unit III

Computer application in scientific research-understanding of MS-Office and its uses in project documentation, presentation and analysis of data, Standardization of Data – Plagiarism in Scientific Writing - Papers-Synopsis writing –Multimedia techniques in paper presentation – Impact Factor – Scopus Index - Science Citation Index – Research Gate - Shodhganga.

Unit IV

Sampling techniques to Geological study- Geochemical analysis –classical and rapid analytical methods-AAAs, ICP-MS-Principles, Instrumentation and Applications-Mineral identification techniques. Water sample collection –

Water analysis –major and trace elements and their extraction procedures-
Application of Geophysical Resistivity survey in Groundwater and Mineral
resource exploration - Size and shape determination of grains in Clastic
rocks – Placer Deposits.

Unit V

Application of Remote sensing in resource mapping –Geophysical techniques
in mineral exploration –Geochemical methods, principles and its application
–Sedimentology facies analysis and its application-Application of
Micropaleontology and Stratigraphy in Petroleum Exploration.

Text / Reference Book

1. Kothari C.R. (1990) - Research methodology, methods and techniques, New Age Lmt Publishers.
2. Dana, E.S.,(1955),Text book of Mineralogy, John Wiley., Deer
3. Gupta R.P. (2005), Remote Sensing in Geology, Springer Verlag Edition
4. Jonathan Anderson et.al.,(1970).-Thesis and Assignment Writing 0- Wiley Eastern Ltd., New Delhi.
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8. Maeve O' Connon R. and Peter Woolford,(1976).-Writing Scientific Papers in English
9. John F.Koegel Buford (2005).-Twelfth Edition-Pearson Education-Multimedia Communications – Directions & Systems
10. Parsons, C.J. (1973)-Thesis and Project work –Allen and Unwin Ltd.,London
11. Pettijohn, F.J., (1975) Sedimentary rocks Harper an drow.
12. Todd.D.K. (2003). Groundwater Hydrology, John Wiley and Sons, New York.

Outcome Mapping

POs& PSOs/COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	2	2	1	1	3	3	1	2	3	2	3
CO 2	3	2	2	1	1	3	2	2	2	3	2	3
CO 3	3	2	1	2	2	3	2	1	2	3	2	2
CO 4	3	2	3	3	3	3	3	2	2	3	3	3
CO 5	3	2	2	3	3	3	2	1	2	3	2	3

Note: POs-Program Outcomes, PSOs -Program Specific Outcomes and CO-
Course Objective and Cognitive level: K1- Remembering, K2-
Understanding& K3- Applying.

18MPMGT01 – Advanced Research Methodology

Course Objective:

1. To learn basics research methods in social science
2. To familiarize the students on research methodology, data collection and report preparation
3. To use research concepts in management research
4. Helping students understand the Processing and Analysis of Data
5. Enabling the techniques involved in writing of reports

Course Outcome:

1. Infer the basics research methods in social science(C01, K2)
2. Develop the students on research methodology, data collection and report preparation(C02, K6)
3. Apply research concepts in management research(C03, K3)
4. Students analyze and understand the Processing and Analysis of Data(C04,K4)
5. Formulate the techniques involved in writing of reports(C05,K6)

UNIT I:

Basics of Research: Research Meaning, Scope and Objectives – Types of Research – Research Vs. Research Methodology – Hypothesis – Types of Hypothesis - Research Process - Relevance of Research for Decision Making in Various Functional Areas of Management.

Unit II:

Problem Definition– Techniques - Formulation of Research Hypothesis - Choosing the Appropriate Research Design – Types - Sampling Design – Techniques - Steps – Sample Size Determination - Precautions – Errors.

Unit III:

Measurement and Scaling Techniques - Data Collection - Primary Data and Secondary Data – Methods of Collection – Questionnaire Design – Essentials of a Good Questionnaire – Pre Testing a Questionnaire – Pilot Study – Merits and Demerits of Questionnaire – Use of Schedules – Structured and Unstructured Interviews – Observation Method.

Unit IV:

Processing and Analysis of Data: Editing – Types of Editing – Guidelines for Editing - Coding – Classifications – Tabulation – Need, Nature and Guidelines – Ungrouped and Grouped Frequency Tables, Charts and Diagrams – Use of Computer Packages for Data Analysis – Application of Statistical Tests and Interpretation of Test of Results (Only Theory – No Problems) – Selection of Suitable tests (Based on HR, Marketing, Finance and other Functional Areas).

Unit V:

Conceptual Framework – Review of Literature – Guidelines – Database sources – References and Citations – Styles – Article writing & Publications – Plagiarism Checking – Need and importance – Software Packages for Plagiarism Check.

Presentation of Research Results - Organizing a Research Report - The Significance Report – Steps in Writing Report - The Integral Parts of a Report – Types of Reports – Precautions for Writing Research Reports.

Text Book:

1. C.R.Kothari, Research Methodology (2009), Second Revised Edition, New Age International Publishers, New Delhi.

Reference Books:

1. Good & Hatt, Research Methods in Social Science
2. E.Mory & Cooper, Business Research Methods
3. K.V.Rao, Research Methods for Commerce and Management
4. Dr. A.Vinayagamoorthy, Business Research Methods, Vaishali Publications

Mapping With Program Outcomes

C0s	P01	P02	P03	P04
C01	S	S	S	M
C02	S	S	S	M
C03	S	S	S	M
C04	S	S	S	S
C05	S	S	S	M

S-Strong, M-Medium

PAPER – I: RESEARCH METHODOLOGY AND ITS APPLICATIONS

Course Objectives

The course contents are designed to gain knowledge about the research ideas, various aspects relating to research such as preparation of research paper, various citation index, use of statistics, principle and application of various instruments, and role of bioinformatics in research. The learner will get an understanding about the research related skills.

Course Outcome

At the end of the course, the learner will be able to

1. Know the basics aspects of research process, Data presentation and Research report writing.
2. Learn the principles of statistics and its tools, the basics of the various advanced instruments for analysis in research.
3. To provide an exposure to the students on the basic skills for becoming a researcher in microbiology.

UNIT - I

Research Methodology - Meaning and importance. Review of literature - Review and synopsis presentation. Types of Research and research tools, Research designs - Experimental and non-experimental. Preparation of research report. Guidelines for preparing an article - ISSN, ISBN, impact factor, citation index, h-index, I- index, Google scholar, Scopus, Thomson& Reuters, Web of Science. Plagiarism and Antiplagiarism software, Computational- RSM.

UNIT - II

Biostatistics - Introduction - Basic concepts, Sampling and data collection, Data presentation, Descriptive Statistics - Measures of central tendency and Measures of dispersion, Population parameters, sample estimates and confidence intervals. Basic concepts of probability. Probability distributions, Z-scores, Student's t- test, Chi square test, Correlation, regression, ANOVA, SPSS, RSM.

UNIT - III

Units of measurements (Mole, equivalents - Molarity-Molality and normality), Cleaning of laboratory glassware's. Laboratory Instruments Principles and applications of pH meter, Centrifuge, UV-Vis spectrophotometer. Molecular techniques - Electrophoresis, PCR, RAPD, RFLP, field Gel Electrophoresis (PFGE), Two dimensional electrophoresis (IEF), DGCE, TGGE and TRFLP. STRR and LTRR analysis cDNA library - screening by oligonucleotide probe, nick translation, site directed mutagenesis.

UNIT - IV

Bioinstrumentation- Chromatographic Technique- Principles, types and applications of Chromatography -Thin layer chromatography(TLC), Gas Liquid Chromatography (GLC) ,High pressure liquid chromatography (HPLC),Fast performance liquid chromatography (FPLC), Gas chromatography - Mass spectrometry (GC-MS). Compound Microscope- Transmission Electron Microscope (TEM) and Scanning Electron microscope (SEM)- Principles, Procedure and Specimen preparation, Fluorescent Microscope.

UNIT - V

Bioinformatics and IPR - An overview of bioinformatics. Biological databases- Database searching, Sequence analysis, Pair alignment, Visualizing protein structures, Predicting structure and function of protein using sequences, computer based drug designing. Submission of nucleotides in NCBI-FASTA, Construction of phylogenetic tree. Phylogenetic analysis Genomics, Proteomics. Drug design and commercial bioinformatics. Intellectual property rights, patents, trade secrets, copyrights and trade mark. Patenting transgenic organisms. Plant breeder's right. Ethics in animal biotechnology.

References

1. Petter Laake, Haakon Breien Benestad and Bjorn Reino Olsen (2007) *Research Methodology in the Medical and Biological Sciences*, Academic Press.
2. Bajpai, S. (2006) *Biological instrumentation and methodology*, Chand & Company Ltd., New Delhi,
3. Jeffrey, A.W. and Myra, L.S. (2002) *Statistics for the Life Sciences*, 3rd Edition, Prentice Hall.
4. Attwood, T.K. and Parry-Smith, D.J. (2001) *Introduction to Bioinformatics*, Pearson Education, Asia.
5. Subbaram, N. (2003) *Patents*, Pharma Book Syndicate, Hyderabad.
6. Glick, B.R. and Pasternack, J.J. (1998) *Molecular Biotechnology*, 2nd Edition, ASM Press, Washington, DC.
7. Recombinant DNA safety guidelines (1990) Department of Biotechnology, Ministry of Science & Technology, Government of India, New Delhi.
8. Revised guidelines for research in Transgenic plants (1998) Department of Biotechnology, Ministry of Science & Technology, Government of India, New Delhi.
9. Webster, J.G. (2004) *Bioinstrumentation*, Student Edition. John Wiley and Sons.
10. Wilson, K. and Walker, J. (2003) *Practical Biochemistry Principles and Techniques*, 5th Edition. Cambridge University Press.
11. Gurumnani, N. (2006) *Research methodology for biological sciences*, 1st Edition, MJP Pubsihers. A unit of Tamilnadu Book House, Chennai.
12. Glantz, S.A. (2001) *Primer of Biostatistics*, McGraw-Hill.
13. Rosner, B. (1999). *Fundamentals of Biostatistics*, Duxbury Press.
14. Motulsky, H. (1995) *Intuitive Biostatistics*, Oxford University Press.
15. David W.M. (2001) *Bioinformatics, Sequence and Genome Analysis*, Cold Spring Harbor Laboratory Press.
16. Higgins, D. and Taylor, W. (2000) *Bioinformatics, Sequence, Structure and databanks - A Practical Approach*, Oxford University Press.
17. Baxevanis, A.D. and Francis Ouellette, B.F. (2001) *Bioinformatics - A Practical Guide to the Analysis of Genes and Proteins*, Wiley-Interscience.
18. Gibson, G. and Muse, S.V. (2002) *A Primer of Genome Science*, Sinauer Associates, Inc. Publishers.
19. Misener, S. and Krawetz, S.A. (2000) *Methods in Molecular Biology* (Vol 132), Humana Press.
20. Claverie, J.M. and Notredame, C. (2003) *Bioinformatics for Dummies*, Wiley Publishing, Inc.

Web References

1. <http://www.newagepublishers.com/samplechapter/000896.pdf>
2. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/ln_research_method_final.pdf
3. <http://www.math.yorku.ca/scs/statResource.html#General>
4. <http://www.anest.ufl.edu/computer/index.html>
5. <http://www.jegsworks.com/Lessons/index.html>
6. <http://www.bettycjung.net/statsites.html>
7. <http://www.biostat.harvard.edu/links/>
8. <http://www.ped.mod.utah.edu/genpedscrr/Epibio.html>

Course Outcomes

On the Successful completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know the basics aspects of research process, Data presentation and Research report writing.	K1 & K2
CO2	Learn the principles of statistics and its tools, the basics of the various advanced instruments for analysis in research	K4
CO3	To provide an exposure to the students on the basic skills for becoming a researcher in microbiology	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	M	M	S	S	S
CO3	M	M	S	S	S

S – Strong; M- Medium

M.Phil. Clinical Nutrition and Dietetics Course

Course Code & Title	18UPCND2C01 - ADVANCED RESEARCH METHODS AND STATISTICS IN CLINICAL NUTRITION AND DIETETICS
Cognitive Level	K-1, K-2, K-3, K-4, K5 & K6
Course Objectives	The Course aims • To understand the application of statistical tests for analysis and interpretation. • To relate the various research methods and techniques available to carry out effective research. • To enable students to develop appropriate research methodologies and to analyze the research outcomes of future research.

UNITS	Topics Details
UNIT I	Nature, Methods and Techniques of Research - Research Methodology-Definition, objectives, deductive and inductive methods in research, Merits and demerits of conducting nutritional research in India, uses of information in research, avoiding subjectivity and achieving objectivity. - Methods of study, Forms of scientific methods, Application of different methods to different fields, Techniques of study, Distinction between methods and techniques of research. - Classification of research- Basic, Applied, Descriptive, Historical, Formulative or Exploratory, Experimental, Ex-post facto, The case study, Survey research, Evaluation research, Assessment study, Comparative method and its precautions, Inter disciplinary research-Essentials and need. - Nutritional research in animals- Principles, Methods and Application.
UNIT II	Problem Selection, Formulation and Hypothesis - Characteristics of Research of Monograph, Dissertation and Thesis. - Selecting a topic for research, research problems – types, components, sources, survey of literature, technique of skimming. - Work criteria of a good research problem- Formulating and stating, Definition, Delimitation, Justification, Evaluation. - Hypothesis- Definition, Criteria, Process, Theory- Law- Axiom, Types, Functions, Forms and sources, Difficulties and utility, Testing the hypothesis.
UNIT III	Research Design and Sampling Techniques - Research Design- Meaning, Need, Features, Concepts- Dependent and Independent, Extraneous, Control, Confounded relationship, Experimental and control groups, Relation between problem formulation and research design. - Different Research designs in nutrition studies– Exploratory studies, Descriptive studies, Diagnostic studies, Experimental studies, Hypothesis-testing research studies, Major steps in preparing research design, evaluation, factors affecting, Conclusion.

	c) Experimental Designs- Basic principles, Types- Before and After without control design, Before and After with control design, After only with control design, C.R design, R.B. design, L.S. design, Factorial designs. d) Sampling- Definition, principles, types- probability and non-probability, Combination of probability and non-probability, Sampling and Non-sampling errors.
UNIT IV	Statistical Application in Clinical Nutrition and Dietetics Research a) Statistical Research-Percentages, Frequency distribution, Measures of central tendency – Mean, Median, Mode, Standard deviation. b) Measures of variability, Measurement of trend analysis and Methods of Correlation. c) Parametric tests of difference- T test, ANOVA, Parametric tests of association: Pearson's product moment co-relation, Regression Analysis. d) Non-parametric tests of difference - Mann-Whitney, Sign, Median, and Kruskal -Wallis, Chi square test, Non-parametric tests of association: Spearman's rank co-relation.
UNIT V	Research Communication a) Essentials of a scientific report, categories of audience report, oral report, written report, stages in preparing research report. b) Drafting report- first, second and end draft. Presentation of sampling errors, inconclusive or negative results in report, significance of report writing. c) Types of report- technical and popular, Structure of research report, Mechanics of writing research report. d) Ethics in Clinical Nutrition and Dietetics –Human-Animal research.

Course Outcomes	On completion of the course, students should be able to CO1: Define a research problem and draft a research design for solving. CO2: Apply the appropriate sampling techniques for projects. CO3: Plan and design tools for data collection. CO4: Interpret the results by performing statistical analysis.
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COs Consistency with POs and PSOs

CO/PO/PSO	PO							PSO			
	1	2	3	4	5	6	7	1	2	3	4
CO1	M	M	S	S	S	M	S	M	M	L	L
CO2	M	S	S	S	S	L	S	M	L	L	L
CO3	M	S	S	S	S	L	S	M	L	L	L
CO4	M	L	S	S	S	L	S	L	L	L	L

*S- Strong Correlation, M- Medium Correlation, L- Low correlation, N- No correlation

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	5	5
Understand	5	5	5	5
Apply	15	15	20	20
Analyse	15	15	15	15

Evaluate	10	10	15	15
Create	10	10	15	15
Total	50	50	75	75

References

Text Books:

- Kothari.C.R -Research Methodology, Methods and Techniques, Fourth edition, 2019, New Age International Publisher.
- Gupta.S.C - Fundamentals of Applied Statistic, Sultan Chand and Sons
- Gupta.S.P., Statistical Methods,2018, Sultan Chand and Sons

Reference Books:

- Van Maanen - Qualitative Methodology, 1983, Sage Publication
- Kerlinger - Foundation of Educational Research, Wadsworth Publishing Company
- Bryman A. and Cramer D - Quantitative Data Analysis for Social Scientist, Rev.Ed.
- Ranjit kumar- Research Methodology, 4th Ed. Edition, 2014, Sage Publishing.
- P.N.Arora and P.K.Malhan (2010) Biostatistics Himalaya Publishing House.
- Scrimshaw NS and Gleason GR: Rapid Assessment Procedures, Qualitative Methodologies for Planning and Evaluation of Health Related Programmes. International Nutrition Foundation for Developing Countries, Boston.

Web Resources:

- <https://explorable.com/research-methodology>
- <https://www.mbaknol.com/research-methodology/the-basic-types-of-research>

Paper-II :

Advanced Physics

- Objectives :**
- To understand the advances of different experimental spectroscopic techniques.
 - To learn the theory of molecular quantum mechanics and electronic structure of molecules.
 - To know about X-rays, Crystals, X-ray diffraction, symmetry and crystal structures.
 - To study the principles and detailed theory of production of Lasers and non-linear optics.
 - To understand the advances in solar cells and electric energy storage systems.

Unit-I

Atomic adsorption and Atomic emission spectroscopy: Principle of atomic absorption spectroscopy (AAS) - classification of atomic spectroscopic methods - measurement of atomic absorption - instrumentation for AAS - sensitivity and detection limit in analysis - applications of AAS - atomic emission spectroscopy (AES) - principle of origin of spectra - instrumentation and applications of AES - photoelectron spectroscopy (PES) - principle of ionization processes - types of X-ray PES (XPES or ESCA) - Auger electron spectroscopy - chemical shift in ESCA - instrumentation and applications.

Unit-II

Methods of quantum chemical calculations: Introduction electronic structure determination - Hartree-Fock SCF method - Formulation Hartree-Fock approach - Restricted and unrestricted HF calculations - Roothaans equations - basis sets - electron correlation - Moller-Plesset many body perturbation theory - Density functional theory - Semi-empirical methods.

Unit-III

X-rays: X-ray radiation sources - Production of X-rays - Synchrotron radiation – X-ray Laser sources.

Crystals, X-ray diffraction, symmetry and structure: Crystals - lattices - unit cell - planes - Miller indices for symmetric systems – X-ray diffraction - direct and reciprocal lattices - construction of reciprocal lattice – Braggs Law in reciprocal Lattice - crystal systems - symmetry - point group symmetry - space group symmetry - outline of crystal structure determination.

Unit -IV

Lasers : Basic principles of lasers - Nd:YAG laser - He-Ne laser - Semi-conductor diode laser - Dye laser - Co-chemical laser - Tunable laser - Colour centre lasers-applications of lasers in medicine - industry - communication and holography.

Non-Linear Optics: Harmonic generation - second and higher order harmonics generation - phase matching - optical mixing - optical parametric oscillations - multiphoton processing.

Unit -V

Solar Photovoltaic: Principle of photovoltaic conversion of solar energy - types of solar cells and fabrication - Photovoltaic applications: battery charger - domestic lighting - street lighting - water pumping - power generation schemes.

Electric energy storage systems: Batteries : primary, secondary, lithium, solid-state and molten solvent batteries - lead acid batteries - nickel cadmium batteries - role of carbon nano-tubes in electrodes – Supercapacitor : electrochemical double layer capacitor (EDLC) - principle of working, structure, performance and application, role of activated carbon and carbon nano-tubes.

Book for Study

1. Spectroscopy - H. Kaur, Pragati Prakashan Educational Publishers, Second Edition, 2017.
2. Introduction to computational Chemistry- Frank Jensen - John Wiley publications, England, Third Edition, 2017.
3. X-ray Structure Determination - George H. Stout and Lyle H. Jensen - John Wiley Interscience Publications, Second Edition, 1989.
4. Laser Spectroscopy: Basic Concepts and Instrumentations -Wolfgang Demtroder, Springer Science Publications, Third Edition, 2013.
5. Laser Fundamentals - William T. Silfvast - Cambridge University Press, Second Edition, 2008.
6. Lasers and Nonlinear Optics - B.B. Laud, Wiley Publications, Second Edition, 1992.
7. Principles of Solar Engineering - D. Y. Goswami, F. Kreith and J. F. Kreider, Taylor and Francis publications, Philadelphia, USA, Second Edition, 2000.
8. Energy Storage: Fundamentals, Materials and Applications - R.A. Huggins, Springer Publications, Second Edition, 2015.

Books for Reference

1. Handbook of Spectroscopy – Gunter Gauglitz and Tuan Vo-Dinh, John Wiley Publications, 2006.
2. Molecular Quantum Mechanics - Fourth Edition, Oxford University Press, 2005.
3. Essential of Computational Chemistry: Theories and Models – Christopher J. Cramer; John Wiley & Sons, England, Second Edition, 2004.
4. Fundamentals of Crystallography - C. Giacovazzo - Oxford Press, Second Edition – 2002.
5. Structure Determination by X-ray Crystallography – M.F.C. Ladd and C.A. Palmer, Springer Publications, Second Edition, 2003.
6. Lasers: Principles, Types and Applications - K.R. Nambiar, New Age International Publishers, New Delhi, First Edition, 2004.
7. Nonlinear Optics - R.W. Boyd, Academic Press, New York, Third Edition, 2008.
8. Optics - Ajoy Ghatak – Tata McGraw-Hill Publications, Third Edition, 2006.
9. Energy storage in power systems - F. Díaz-González, A. Sumper and O. Gomis-Bellmunt, John Wiley Publications, First Edition, 2016.

Course Code & Title	18DMPSO01 Research Methodology and Statistics		
Class	M.Phil. Sociology	Semester	I
Cognitive Level	K1,K2,K3,K4,K5,		
Course Objectives	<i>1. To make the students to comprehend the philosophical roots of social research.</i> <i>2. To throw a light on basic understanding of research process.</i> <i>3. To get acquaintance on methods and tools of data collection.</i> <i>4. To understand the significance of statistics in data analysis.</i> <i>5. To instill the students with processing of data and report writing.</i>		
Unit	Content		No. of Hours
I	Philosophical Roots of Social Research– a. Issues of epistemology b. Hermeneutics – inductive analysis, Positivism, Phenomonology, Ethnomethodology and Symbolic Interactionism, Interpretative understanding. Problems in Social Research; Objectivity and subjectivity in social sciences Types of Social Research- Pure/Basic/Fundamental, Action, Applied and Policy research.		16 Hours
II	Research Process: Role of theory, fact and hypothesis in social research. Concepts; Problems of Conceptualization and operationalisation Steps to be followed in social research. Research Design: Meaning and Types- Explorative/Formative, Descriptive, Diagnostic and Experimental		16 Hours
III	Data Collection: Methods: Observation, Interview, Case Study, Content Analysis oral History and Narrative. Tools: Interview Guide, Interview Schedule, Questionnaire and Mailed questionnaire. Sources of data: Primary and secondary sources, Participatory Research. Measurement and Scaling method – Likert, Bogardus social distance.		16 Hours

IV	Analysis of Data: Statistics: Meanings, Functions and Importance of Statistics in Social Sciences. Measures of Central Tendency and Dispersion. Association: Chi-square, Association of Attributes, Gamma test. T-test. Correlation: Rank Correlation and Karl Pearson Co-efficient of Correlation. Use of computer in social research-Statistical Packages for Social Sciences (SPSS).	16 Hours
V	Processing of data and Report writing: Editing, Coding, Classification, Tabulation and Interpretation of data. Procedures and Steps in Report Writing. Features of good research report.	16 Hours
References	1. Ahuja, Ram. 2006. Research Method. Jaipur, Rawat Publications. 2. Kothari, C.R. 1992. Research Methodology: Methods and Techniques. New Delhi, Wiley Eastern Limited. 3. Krishnaswami, O.R. 1996. Methodology of Research in Social Sciences. Mumbai, Himalaya Publishing House. 4. Sharma, Ram Nath and Sharma. 1983. Research Methods in Social Sciences. Mumbai, Media Promoters & Publishers Pvt. Ltd. 5. Das, Lal.D.K. 2008. Designs of Social Research. Jaipur, Rawat Publications. 6. Goode, William, J and Hatt, P.K. 1952. Methods of Social Research, New Delhi, McGraw-Hill. 7. Young, P.V. 1966. Scientific Social Surveys and Research, New Delhi, Prentice Hall. 8. Wilkinson, T.S. and Bhandarkar, P.L. 1984. Methods and Techniques of Social Research, Bombay, Himalaya Publishing House. 9. Galtung, John. 1967. Theory and Methods of Social Research, London, Allen & Unwin. 10. Gupta, S.P. 1991. Statistical Methods. New Delhi, Sultan Chand & Sons Publishers.	
Course Outcomes	<i>After completion of the course, the students will able to</i>	
CO1	<i>Remember the basic roots of sociological research.</i>	
CO2	<i>Identify the basic process of research in conducting sociological research.</i>	

CO3	<i>Demonstrate the appropriate methods and tools of data collection instruments on par with field as well as nature of research.</i>
CO4	<i>Equip necessary skills to understand the concepts of statistics and SPSS and its' application in testing the hypotheses.</i>
CO5	<i>Explain the importance of data processing and basic facets of report writing.</i>

SEMESTER I

AIMS

1. To develop knowledge, understanding and experience of the theory, practice and application of selected areas of statistical computing and to produce graduates needed by public and private sector to help and solve practical problems using the skills and techniques of these areas and to develop analytical skills for respective Sector.
2. To develop enterprise competences emphasizing the key skills of learning and communication for Statistical theory.

OBJECTIVES

1. An understanding of the Statistical principles, techniques and applications of selected areas of Statistics and computing.
2. The ability and confidence to analyse and solve problems both of a routine and of obvious nature towards applications of Statistical theory.
3. To gain deeper understanding, problem solving skills and greater knowledge of selected topics in Statistical computation.

SEMESTER 1.1 RESEARCH METHODOLOGY IN STATISTICS

Paper code	18URSTA1C01
Paper title	Research Methodology in Statistics
Number of teaching hrs per week	4
Total number of teaching hrs per semester	60
Number of credits	4
Cognitive level	K1, K2, K3, K4, K5, K6
Course Objective	➤ To understand the importance of Research problem in Statistics, and significance of report writing. ➤ Learning some statistical methodology for random variables ➤ Acquiring knowledge of R software for statistical Computation.

Unit I

Research Methodology - Concept of Research in Statistics – Identify Research Problem - Necessity of Defining the Problem-Technique Involved in Defining a Problem-Selection of Topic for Research.

Unit II

Meaning of research design - Features of good design - Important concepts relating to research design - Different research designs - Significance of report writing-Importance of literature survey – Reports, Thesis and assignment writing - Different steps in writing report - Layout of the research report.

Unit III

Statistical Studies – Significance – Data Measurement Scales, Nominal, Ordinal, Ratio and Interval Scales – Sources of error in measurement – Tests of Measurement

– Technique of Developing Measurement Tools – Scaling Technique – Likert type Scaling – Cumulative Scaling.

Unit IV

Simulation - Concept and Advantages of Simulation – Event type Simulation – Generation of Random Numbers – Monte-Carlo Simulation Technique – Generation of Random Numbers using uniform (0,1), Exponential, Gamma and Normal random variables – Simulation Algorithm.

Unit V

R Language and its simple applications – Writing coding for the Computation of probabilities and cumulative probabilities using Binomial and Poisson models - Evaluation area and ordinate under normal distribution using R Software.

Book for Study

1. Kothari, C. (2005). Research Methodology, New Age International Publications, New Delhi.

Books for Reference

1. Jonathan, Anderson et al. (1977). Thesis and Assignment Writing, Wiley Eastern Ltd, New York.
2. Pannerselvam, R. (2006). Research Methodology, Prentice-Hall of India Private Limited, New Delhi.
3. Kanti Swarup, Gupta, P.K., & Man Mohan. (2008). Operations Research Sultan Chand & Sons, (Publications), New Delhi.
4. Maria L.Rizzo.(2007). Statistical Computing with R, Chapman & Hall/CRC, Taylor and Francis Group.
5. Sudha.G.Purohit, Sharad.D.Gore and Shailaja R.Deshmukh.(2008). Statistics Using R, Narosa, Publishing House, New Delhi.

Course outcome:

On completion of the course, the students should be able to.,

Course Outcome No.	Course outcome statement	Cognitive level
CO1	Describe the necessity of defining the problems and techniques and can explain the importance of literature survey, Layout of the research report and significance of report writing-	K1, K2
CO2	Generalise the statistical studies using the data measurement scales, (nominal, ordinal, ratio and interval scales)	K2,K3
CO3	Apply the sources of error in measurement compare the scaling technique (likert type scaling ,cumulative scaling).	K3,K4

CO4	Summarize the knowledge of simulation Concept and its Advantages with respect to Simulation Algorithm and analyse the simulation techniques with random number generation.	K4,K5
C05	Describe the R language and interpret the statistical computation. Manipulate the R coding to categorize the cumulative probabilities using Binomial and Poisson models.	K1,K2,K3, K6

MODEL BLUEPRINT		
Subject Code		18URSTA1C01
Title of the Paper		Research Methodology in Statistics
Unit Number	Number of Hours	Total Marks
1	12	15
2	12	15
3	12	15
4	12	15
5	12	15
	60	75
Maximum marks for the paper		75



PERIYAR UNIVERSITY

SALEM - 636 011, TAMIL NADU

NAAC A Grade – STATE UNIVERSITY- NIRF RANK 83

Gender

Template for Course Syllabus

Course Code & Title	18SOCC14 GENDER AND SOCIETY		
Class	M.A. Sociology	Semester	IV
Cognitive Level	K1,K2,K3,K4,K5,K6		
Course Objectives	1. To address the nature of gender and gender equity by looking at the intersectionality of class, race, gender, and understanding there are different outcomes for women and men as expressed through various masculinities or and feminist views. 2. Students will learn to identify major feminist approaches (liberal, radical, and socialist feminisms) used to analyze gender diversity and equity and the social barriers to these goals through the reading, analysis, and critique of original research in the area of gender. 3. Explain the role of education in women development and how it is related to bring the changing value of their own self as well as new social gender identity of them. 4. Understand the intersections of gender, employment and constitutional provisions to women so forth as they intersect with the family, education systems, workplaces and political field. 5. To understand the role of women in globalization era and it's impact on social development as well as the self development of women.		

UNIT	Content	No. of Hours
I	The Biological Construction of Gender: Defining Sex and gender- Gender and Biology- Gender identity and self image- socialization and gender roles- gender inequality- sex preference- sex ratio	12 Hours
II	Theoretical perspectives: socio- historical and socio-biological approach- Liberal feminism- Marxist / socialist feminism –feminist theory and psychology- deconstruction feminist theory- post modern feminism.	14 Hours
III	Women in family and marriage: Gender role division- invisible role – dual role- role conflict and coping mechanism- network and support for working and non- working women- gender and health.	12 Hours
IV	Gender and work: employment trends- description, trends of labour force participation and occupational sex –segregation- construction of masculinities and feminities in various occupational settings – pay equity and affirmative action.	14 Hours
V	Women and development- women's work and technology- impact of development policies, liberalization and globalization on women- the role of women in development-sustainable development	12 Hours

	–Factors responsible for women empowerment	
References	1. Maccoby, E and Jacklin, C.1975. <i>The psychology of Sex differences</i> , Stanford: Stanford University Press 2. Sharmila Rege(ed), 2003 <i>Sociology of Gender</i>, Sage publications, London 3. Mocormark,C and M.Strathern.1980. <i>Nature, Culture and Gender</i>, Cambridge: Cambridge University Press. 4. Oakley, A. 1972..<i>Sex, Gender and Society</i>, New York, Harper and Row. 5. Philips, L.2000 <i>Flirting with danger: young women’s reflections on sexuality and domination</i>. New York: New York university press. 6. Connel, R.W.1995..<i>Masculinities</i>. Berkeley: University of California press 7. Folbre, N.1994. <i>Who pays for the kids? Gender and the structures of constraint</i>. New york Routledge. 8. Thorne, B.1994 <i>Gender Play: Girls and Boys in School</i> .Brunswick, WJ:Rutgers University Press 9. Marget Pernau, Imtiaz Ahmad and Helmut Reifeld, 2003 <i>Family and Gender- Changing values in Germany and India</i>. Sage publications, London, United Kingdom. 10. Sumi Krishna,2004 <i>Livelihood and Gender Equity in community resource Management</i>, Sage Publications, India Pvt.Ltd.New Delhi.	
Course Outcomes	On completion, the course, Students should be able to	
	CO	1. Students will be able to define and describe how sex and gender are socially constructed by reading and they also able to how the categories are maintained or transformed with regard to concerns of equity.
	CO	2. Students will be able to apply theoretical approaches of feminism and connect with the relationship of the complexities of race, class and gender inequality and they will be able to overcome from their day to day life crisis
	CO	3. Students will be able to explain how one’s educational achievements within intersecting social forces impacts one’s worldview and able to discuss the changing attitude in relationships in personal, familial and working settings. The relationship between gender and health also to be reviewed by the students.
	CO	4. Students will be able to analyze and appraise how the modern economy and political field are offering a new face value and social identity to women. They will also able to investigate the cause and effect of women contribution in the working sectors and political arena too.
	CO	5. Able to reveal the importance of liberalization and globalization era for women and also prove the influence of women in economic development.

THIRD YEAR –CORE-VIII
Template for Course Syllabus

Course Code & Title	CORE COURSE :VIII. 17BEDC08 :GENDER, SCHOOL AND SOCIETY		
Class	B. Ed	Year	III
Cognitive Level	K-1: K2:, K3: K-4: K-5		
Course Objectives	To enable the learner to: • Understand the concept of Gender • make student understand about the gender issues faced in school • make students aware about the role of education in relation to gender issues • make them aware about constitutional provisions of human rights and women rights • aware on challenges in gender issues in schools		

UNIT	Content	No. of Hours
I	Gender and development: Introduction - Definition of Gender - Difference between Gender and Sex - The Concept of Gender, sexuality and Development - Gender Dynamics and Development - Basic Gender Concepts and Terminology - Social Construction of Gender - Gender Roles - Types of Gender Roles - Gender Roles and Relationships Matrix - Gender-based Division and Valuation of Work - Exploring attitudes towards gender.	20 Hours
II	Gender Issues in School: Gender bias in school enrolments, dropouts, house hold responsibilities, social attitudes, towards Girl's education, value accorded to women's education - Issues related to Gender in School: Sexual Abuse, Sexual Harassment, and Perception of safety at school, home and beyond - Adult education and non-formal education for women's development - Importance of vocational training and income generation for women - Representations of gendered role, relationships and ideas in textbooks and curricula.	20 Hours
III	Social aspects of Gender: History and current scenario of Indian women - concept of Patriarchy and Matriarchy and issues related to Indian women - Gender roles in	20 Hours

	society through variety of institutions such as family, caste, religion, culture, the media and popular culture (films, advertisements, songs etc.), law and state - Stereotypes in society -Issue related to women girl child: female infanticide and feticide, sex ratio, sexual harassment of women at work place, honour killing, dowry, child marriage, property rights, divorce, widowhood, Identification of sexual abuse/violence and its verbalization, combating the societal outlook of objectification of the female body.	
IV	Legal and Quality aspects of Gender: Introduction to laws related to women - Property inheritance, Trafficking) - Women's reservation bill - history and current status - The Indian constitution and provisions according to women - Human rights and women's right. Quality aspects of Gender: Gender disparity and gender parity - Quality education for girls – Life skill course to deal with gender issues – Critical analysis on co-education - Strategies to develop parity, gender equality and empowerment - Support services for girl's education -	20 Hours
V	Challenges in Gender issues : How schools nurture or challenge creation of young people as masculine and feminine selves - Role of schools, peers, teachers, curriculum and textbooks in challenging gender - inequalities or reinforcing gender parity.	20 Hours
Mode of transaction	Lecture, Discussion, Assignment and project.	
Practicum	• Write a critical report on challenges faced by different women groups in present society based on valid published reports. • Organizing drama and debate to develop awareness for gender issues.	
References	Text Books: • Aggrawal.N (2002) Women and Law in India. New Delhi: New Century Publications. Agnes.F.,Chandra.S&Basu,M. (2004), Women and Law in India, NewDelhi: Oxford University Press • Curran Daniel. J. and, Renzetti Claire .M. (1993) : Contemporary Societies ; Problems and Prospects, Prentice Hall, New jersey., N-1, 2009) • Kammeyer.C.W., George Ritzer and Yetman.R.(1987): Sociology(E5), Allyn and Bacon,London. .	

	References: • Larsen Randy .J. and Buss David.M. (2011). Personality Psychology, New Delhi: Tata Mcgraw hill Companies. • Sullivan Thomas.J. (2001): Sociology (E5), Allyn and Bacon.
Course Outcomes	After studying these chapters: • Students will understand the concept of Gender. • Students will be able to understand about the gender issues faced in school. • Students will get awareness about the role of education in relation to gender issues. • Students will get awareness about constitutional provisions of human rights and women rights. • Students will get awareness on challenges in gender issues in schools.

SUPPORTIVE COURSE – III

Course Code & Title	SUPPORTIVE COURSE – III: 18MEDS03 WOMEN'S EDUCATION		
Class	M.Ed., (2 Yrs) Education	Semester	II
Cognitive Level	K-1; K-2; K-3; K-4; K-5		
Course Objectives	1. To make them to understand the concept of Women education 2. To make them to perceive the importance of Women education 3. To understand them to aware of the policies and programmes for Women Development 4. To develop necessary skills to improve their empowerment in all the levels 5. To analyze critically the issues and problems of Women in India		

UNIT	Content	No. of Hours
I	Introduction to Women's Education: Concept, Meaning and need for Women Education – Scope of Women Education - Women Education as an academic discipline; Role of women: Girl child in the society, Child labourers, Changing role of women, Marriage, Single parent, Motherhood widows.	20 Hours
II	Importance of Women's Education: Sex Ratio: Definition – Sex ratio in India, Factors responsible for adverse sex ratio in India, Consequences of adverse sex ratio, measures to achieve the balance between the sexes; Fertility – Mortality – Morbidity – Nutrition and Health; Position and status of women in Indian society and Religion.	20 Hours
III	Policies and Programmes for Women: National committees and Commissions for Women-Government Organization for women and Child Development- Women Development approaches in Indian five year Plans-Collectivity and group dynamics-Self-help groups and participation in Political process.	20 Hours
IV	Women Empowerment: Meaning of empowerment, Need,	20 Hours

	Importance and nature of Women's Empowerment and its historical perspectives - Social aspects of Women empowerment; Transition of women towards new millennium; Social safety for women; Obstacles to women's empowerment - Women and NGO; Women Entrepreneurship: Concept, Growth, need and obstacles - Motivation and Training for Women entrepreneurship - Promoting entrepreneurship amongst women - Problems in enterprise set-up and Management; Impact on Women's Development - skills and income generation - New economic policy and its impact on women's employment.	
V	Women in India: Issues and Problems: Female foeticide, Female Infanticide, child Marriage; Dowry, Divorce, Widowhood, Female commercial sex workers, Domestic violence, problems of Elderly and single women; Problems of Dalit and Tribal Women; Devadasis, Problems of Women prisoners, Women living with HIV/AIDS and women who are physically and mentally challenged; Impact of media on women.	20 Hours
References	Text Books: Khan.M.A. (2007). <i>Women and Human Rights</i>. First Edition. New Delhi. SBS Publishers & Distributors PVT Ltd. Kumar Raj. (2000). <i>Women and leadership</i>. New Delhi: Anmol Publishers. Mishra.R. C. (2013). <i>Women's Education</i>. First Edition. New Delhi: APH Publishing Corporation. Saritha Bhandari. (2005). <i>Problems of Women Education</i>. New Delhi: Arise Publishers. Shanthi.K. (2005). <i>Women in India: Retrospect and prospect</i>. New Delhi: Anmol Publishers. Yadav.C.P. (2000). <i>Empowerment of Women</i>. , New Delhi: Anmol Publication. References: Arun.R.K. (2009). <i>Women's Education</i>. First Edition. New Delhi: Centrum Press	

	Govinda, R. (ed.). (2002). <i>India Education Report: A Profile of Basic Education</i>. New Delhi: Oxford University Press. Ramachandran & Vimala. (2004). <i>Gender and Social Equity in Education: Hierarchies of Access</i>. New Delhi: Sage Publications. Sarojini Nayak & Jeevan Nair. (2005). <i>Women's Empowerment in India</i>. Jaipur: First Edition. Pointer Publishers. Sharat Dwivedi. (2008). <i>Status of Women in Independent India</i>. . New Delhi: Cyber Tech Publications. Usha Sharma. (1995). <i>Women Education in modern India</i>. New Delhi: Commonwealth Publisher. Usmani. B.D. (2004). <i>Women Education in 21st Century</i>. First Edition. New Delhi: APH Publishing Corporation.
Course Outcomes CO1 CO2 CO3 CO4 CO5	After studying these chapters 1. Students will be able to make them to understand the concept of Women education 2. Students will be able to make them to perceive the importance of Women education 3. Students will be able to understand them to aware of the policies and programmes for Women Development 4. Students will be able to develop necessary skills to improve their empowerment in all the levels 5. Students will be able to analyze critically the issues and problems of Women in India

Course Code & Title	(CORE: 2) 18MPEDU02 – HIGHER EDUCATION IN INDIA		
Class	M. Phil	Semester	I
Cognitive Level	K-1: K-2:, K-3: K-4: K-5		
Course Objectives	The course will enable the scholars to 1. Orient the scholars on the foundations of Higher Education 2. Enable them to gain knowledge about the University Education 3. Make them to know the activities of Higher Education commission and committees 4. Enable them to know the perspectives of Women's Education 5. Orient the Scholars in Utilizing Different Evaluation Methods.		

UNIT	Content	No. of Hours
I	Introduction to Higher Education: Objectives of Higher Education – Development of Higher Education – Envelopment of Colleges and University in Recent Years – Management of Higher Education – Democratization in Higher Education – Innovation in Higher Education- Role of Higher Education in National Development- XII Five Year Plan- Equalization of Educational Opportunities in Higher Education- Public Private Partnership (PPP) in Higher Educational System- Quality Assurance-Role of NAAC.	20 Hours
II	University Education: Higher Education a Historical Perspective- Reports of University Education Commission- Types of Universities: Formal, Affiliated, Federal, Unitary, Unitary residential-Deemed	20 Hours

	Universities- Institute of National Importance- Rural Universities- Open Universities-Correspondent Course. Present status: Number of Institutes of Higher Education in India. UGC and its role in the development of Higher Education- Need for research in Higher Education-Funding Agencies in Higher Education- UGC, ICSSR, DST, CSIR, ICMR, NCERT, NUEPA, TANSCH and State Planning Commission.	
III	Commission on higher Education: University Education commission (1948-1949) - Indian Education Commission (1964 - 1966) Yashpal committee reports on renovation and Rejuvenation of Higher Education (2008) -National Knowledge Commission (2005)-NCFTE (2009) - J.S. Verma Commission on Teacher Education (2012) - Educational policies and programmes - National policy on Education (1968-1986) - Programme of Action (1992) - Rashtriya Uchchatar Shiksha Abhiyan (2013).	20 Hours
IV	Information and Communication Technology in Higher Education: Meaning and concept of ICT- Importance of ICT in Higher Education: Teaching, Research and extension- Modern trends in ICT in Education: e-learning, M-learning, blended learning, virtual classroom, Flipped classroom and cloud computing- Preparation of e-content and multimedia package- Issues and challenges of ICT in Higher Education.	20 Hours
V	Agencies of Technology in Higher Education: Role and Functions of Agencies of Technology in Higher Education- EMMRC-CEC-CIET-NITTTR – National Policy on ICT in Education.	20 Hours
Internal Practical	i) Case Study Report of the Higher Education Institution of National and International Importance	

	ii) Preparation of a Learning Resource of any Sub Unit	
References	<u>Text Books:</u> Arun, R. K. (2009). <i>Women's Education</i>, New Delhi: Centrum. Chhaya Shukla (2004). <i>Research in Higher Education</i>, New Delhi: Sumit Enterprises. Dhir, R.N.(2006). <i>Higher Education</i>. Chandigarh: Abhishek Publications Pandey, V.C. (2005). <i>Higher Education in a Globalizing World</i>. New Delhi: Isha Books. Patel, K.M (2005). <i>NAAC Accreditation of Higher Education</i>. Jaipur: Mark Publications. Ramesh Chandra. (2005). <i>Trends in Higher Education</i>. New Delhi: Kapalz Publications. Trehan, M.K. (2006). <i>Higher Education and Social Empowerment</i>. New Delhi: Cyber Tech. <u>References:</u> Bourai, H.H.A, Uniyal B.P. (2005). <i>Challenges in Administration of Higher Education</i>. New Delhi: Abhijeet Publications. Linn. L Robert and Gronlund. E. Norman. (2005). <i>Measurement and Assessment in Teaching</i>. Singapore: Pearson Education. Pawan Agarwal. (2009). <i>Indian Higher Education: Envisioning the Future</i>. New Delhi: Sage Publication. Peter Jarvis.(2000). <i>Professional Education</i>. London: Routledge Taylor & Francis Group. Peter Harhey, Amanda Woods, Martin Pill. (2005). <i>Enhancing Teaching in Higher Education</i>. London: Routeldge Taylor & Francis Group. Swarupa Rani, T. Priya Darsini, J.R, Bhaskara Rao, D, (2004). <i>Educational Measurement and Evaluation</i>. New Delhi: Discovery Publishing House.	
Course Outcomes	After studying these chapters	

CO1	1. Scholars will be able to Orient them on the foundations of Higher Education
CO2	2. Scholars can enable them to gain knowledge about the University Education.
CO3	3. Scholars will be able to make them to know the activities of Higher Education commission and committees.
CO4	4. Scholars will be able to enable them to know the perspectives of Women's Education.
CO5	5. Scholars will be able to Orient in the Utilizing Different Evaluation Methods.

GENDER ECONOMICS

Course Objectives

1. Focus on Gender, theories of employment and women empowerment strategies
2. Enables them to understand the women and economics in research setting
3. Critically analyze the economic policies required for human development particularly women

UNIT-I: Women and Employment

Sex Vs Gender-Visible and invisible work - Feminization of Employment-Rural and Urban - Organized and unorganized sector-Time allocation and gender - Women in corporate sector-Globalization and its impact on women's work - Women as entrepreneurs - Farm and nonfarm - Self employment and wage employment - Theories of labour market discrimination-Women and migration - Economic evaluation of women's work-Women's role in GDP.

UNIT- II: Women and Education

Human capital Theory- Women's education - Determinants-school dropouts-Obstacles and gender divide in higher education professional and non professional - Poverty and rural women's education - -Educational opportunities of rural and urban women-Role of marriage in women's higher education-Women and technical education-Women's educational benefits in the family and in the economy.

UNIT-III: Women and Development

Theories of development-The paradigm shift in women's development-Women in development - Women and Development - HDI-GDI-GEM - MDGS and SDGS - Women and decision making-Intra household allocation of resources-Gender equality and equity-Dimensions and measurement of gender gap-Causes of gender inequalities-Wellbeing and quality of life-empowerment and gender equality.

UNIT- IV: Women, Environment and Health

Environment and gender issues-Women in nature - Women and CPR management - Waste management in the households-Environmental degradation - Women in green economy-Green budgeting problems in healthy environment - Women and environment in rural and urban.

Reproductive healthcare-health care programmes - ageing problems- behavior-nutritional status
– Role of institution in women’s health – Occupational health hazards.

UNIT-V: Role of State and Women

Rights of women legal, social and political - Policies and programmes – Poverty employment and welfare programmes - National commission on women -Ministry of women and child development - Women’s participation in local governance - women in administration – women as leaders-capacity building programmes - Role of NGO’s-Panchayet Raj and co-operative institutions-Educational and health policies of women.

REFERENCES

1. Franchise D Blau (2005) “Gender Paul Grave’s Dictionary of Economics”, pp: 291-293.
2. Becker G.S. (1995) “Human Capital: A Theoretical and Empirical Analysis”, Columbia University Press, New York.
3. Kind M and Hill M.A (eds) (1993) “Women’s Education in Developing Countries: Barriers Benefits and Politics”, John Hopkins, Baltimore.
4. Wazir R. (2000) “The Gender Gap in Basic Education. NGOs as Change Agents”, Sage Publications, New Delhi
5. Seth M (2001) “Women and Development”, Sage Publications, New Delhi.
6. Agarwal, S.K. and Carg RK (1998) “Environmental Issues and Researches in India” India Himansh publications, Udaipur.
7. Shanthi K. (2005) “Women in India”, Anmol Publications, New Delhi
8. ILO (1978) “Women’s Participation in the Economic Activity of Asian Countries”, ILO, Geneva
9. Nancy David & Loganathan (2013) Women and the Economy, Gita Press, New Delhi.
10. Pandya B.A. (2005) “Women Organisations and Development” Illustrated Book Publishers, Jaipur.
11. Paul Chandhru(1992) “Women Welfare and Development”, India Publications, New Delhi
12. Shanthi .K. (1998) “Empowerment of Women”, Anmol Publications, New Delhi.

Course Outcomes

On the successful completion of the course, students will be able to attain the following

CO Number	CO Statement	Knowledge Level	Order
CO1	Knowledge on gender economics and the role of women in economic development	K1, K2	LO
CO2	Apply and analyze the issues concerned with women in health, economy and society at the micro and macro levels	K3	IO
CO3	Develop the critical thinking capacity about the gender economics and acquiring skills in conducting the research in the gender economics	K5, K6	HO

Mapping of course outcomes with programme objectives

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	L	L	-	L	L	L	-	-	L	L	-	L
CO2	M	-	M	-	M	M	-	M	M	-	M	-
CO3	S	S	S	S	-	-	-	S	S	-	S	S

ECONOMICS OF IRRIGATION

Objectives

1. To understand the concepts of Economics of irrigation
2. To prepare the students to understand the causes, pricing policies and devising the appropriate solutions for proper irrigation management
3. To equip the students with the tools and techniques for a systematic research in the economics of irrigation

UNIT– I: Water Resources in India

Irrigation development and water resources - Various sources of irrigation- Utilizable resources - Water resource management – issues - Water Harvesting.

SYLLABUS

Women and Entrepreneurship Practical

(Applicable for only girls students)

Subject code: 18WSCS01

Credit Hours: L+T+P=C

Marks: 100

0+1+2=3

Objectives

1. To foster entrepreneurship band innovation
2. To offer idea to business journey in a structured way
3. To impart actionable awareness regarding the systematic process of developing launch-ready business

UNIT – I (Theory) – 1 Credit– 1 Hour of Instruction per Week

1. Concept and Meaning – Significance of Women Entrepreneurship – Entrepreneurial traits.
2. Factors contributing to Women Entrepreneurship - Social, Cultural, Economic, Political and other factors.
3. Relationship between Entrepreneurship and Empowerment – Gender and Technology – Technology's Impact on women's development
4. Self employment opportunities- State and Central Initiatives – NIESBED – NABARD – NSIC – SIDBI – IIE – DIC – SIDO - KVIC

UNIT – II (Practical Activity) 2 Credit – 2 Hours of Activity per Week

Group discussion, Presentation, Survey, Case studies, Field Visit, Group project based on following issues:

Exercise No.1 Entrepreneurial role model

Exercise No.2 Ideation

Exercise No.3 Problem Brief

Exercise No.4 Reframe the Problem

Exercise No.5 Problem Validation

Exercise No.6 Business Idea

Exercise No.7 Product and Process

Exercise No.8 Value Proposition and Canvas

Exercise No.9 The Business Model

SYLLABUS

Gender Sensitization Practical

(Applicable for both boys and girls students)

Subject code: 18WSCS03

Credit Hours: L+T+P =C

Marks: 100

0+1+ 2 =3

Objectives:

- To understand basic concepts in gender studies
- To emphasize the impact of traditional, cultural assumptions of gender roles & its impact on gender as a category of analysis.
- To provide an integrated and interdisciplinary approach to understand the social and cultural constructions of gender that shapes the experiences of women and men in society.
- To generate the awareness in regard to equality in law, social system and democratic activities.

UNIT – I (Theory) – 1 Credit– 1 Hour of Instruction per Week

1. Gender : Definition, Nature and Evolution, Culture, Tradition, Historicity.
2. Gender Spectrum: Biological, Sociological, Psychological Conditioning.
3. Gender Based Division of labour - Sex role, Stereotypes, Gender Role, Work, and Family
4. Gender Equality /Equality: Equality Vs Equity, HDI, GDI and GEM
5. Gender and Development Issues: Health, Violence, Development policies and programmes

UNIT – II (Practical Activity) 2 Credit – 2 Hours of Activity per Week

Group discussion, Presentation, Role play, Survey, Case studies, Film Shows, Field Visit, Group project based on following issues:

- Social, Biological, Psychological, Political, Economic, Cultural, Health Issues.
- Domestic Violence, Eve-Teasing, Sexual Harassment
- Real Life Experience of Gender Interaction.
- Print and Electronic Media and Gender Inequalities.
- Contemporary Challenges.

SYLLABUS

WOMEN AND LIFE MANAGEMENT PRACTICAL

Subject code: 12WSCS02

Marks : 100

Credit Hours: L+T+P=C

0+1+3= 4

Objectives

1. To impart a sound basis on gender analysis related aspects.
2. To educate the various available facets related to law and safety for women
3. To help in maintaining the self image and self well-being through health and personality management techniques.
4. To stimulate the managerial, financial and interpersonal skills.
5. To value educate the various government schemes and sanitation practices

Unit I - Gender

Exercise No. 1: De-freezing

Exercise No. 2: Gender Stereotype Analysis

Exercise No. 3: Gender Analysis Matrix

Unit II – Law and Safety

Exercise No. 4: Women related Laws

Exercise No. 5: Mobile apps for Women Safety

Exercise No. 6: Protecting Cyber Privacy

Unit III – Health and Personality Management

Exercise No. 7: First Aid Management

Exercise No. 8: Assessment of Self-Nutritional Status

Exercise No. 9: Body Language and Personal grooming

Unit IV - Managerial Skills

Exercise No. 10: Role Play

Exercise No. 11: SWOT Analysis

Exercise No. 12: Personal Financial Portfolio

Unit V – Environment and Sanitation

Exercise No.15: Central and State Government Schemes (Health, Social and Economic Empowerment) for Women

Exercise No. 16: Personal Hygiene and Sanitation Practices for women

Field Practicum: Case Study (Women Entrepreneurship).

SEMESTER - IV
CORE PRACTICAL – II
GARMENT CONSTRUCTION – II (WOMEN'S WEAR)

SUB CODE - 15BTADCP02

Marks – 60

1. Designing, drafting and constructing the following garments for the features given below
2. Calculate the cost of the garment.
 - i. Salwar
 - ii. Kameez
 - iii. Short Kurta
 - iv. Ladies Pant
 - v. Skirt

Paper XVI: (Elective: 5) (Code No:)

Course Code & Title	18SOCC12 & Social Movements in India		
Class	M.A.Sociology	Semester	III
Cognitive Level	K1, K2, K4		
Course Objectives	1. To create basic understanding on social movements. 2. To study the various determinants of social movements 3. To get acquaintance on social movement and the change 4. To provide Theoretical orientation regarding social movement formation 5. To Sensitize about the context of Indian social movements and and leaderships		
UNIT	CONTENT	No. of Hours	
I	Introduction: Meaning and Characteristics of Social Movements - Structural Determinants of Social Movements - Life cycle of social movement - Types of social movement.	14 Hours	
II	Theories of Social Movement: Marxist Theory - Weberian Theory- Relative Deprivation, Strain and Revitalization Theories.	12 Hours	
III	Social Movement and Leadership: Role and Types of Leadership - Relationship between Leaders and Masses - Social Movement and Social Change.	12 Hours	
IV	Reform Movements in India: Brahmo Samaj - Arya Samaj – DK Movement – SNDP Movement – Naxalbarri Movement.	12 Hours	
V	Empowerment Movement: Tribal Movements – Women Movements – Dalit Movements – Peasant Movements.	14 Hours	
References	1. Banks, J.A. – The Sociology of Social Movements, London Macmillan 1972. 2. Desai, A.R. Ed- Peasant Struggles in India, Bombay, OUP 1979. 3. Dhanagare, D.N.- Peasant Movements in Indian 1920-1950, Delhi, OUP 1983. 4. Gore, M.S.- The Social Context of an Ideology : Ambekdar’s Political and Social Thoughts, New Delhi, Sage 1993. 5. Oomen, T.K. : Protest and Change : Studies is Social Movements, New Delhi, Sage,1990 6. Rao, M.S.A.- Social Movement, in India, New Delhi,		

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	Manohar, 1979.11 7. Rao, M.S.A.- Social Movements and Social Transformation, Delhi, Macmillan, 1979. 8. Singh K.S.- Tribal Movements in India, New Delhi, Manohar 1982. 9. Zilliot, Eleanor- From Untouchable to Dalit : Essays on the Ambedkar Movement, New Delhi, Manohar 1995. 10. Gouldner, A.W.- Studies in Leadership New York : Harper and Brothers, 1950. 11. Oomen T.K. Charisma, Stability and Change: An Analysis of Bhodan and Gramdan Movement, New Delhi, Thomas Press, 1972. 12. Shah, Ghanashyam, Protest Movements in two Indian States, New Delhi, Ajanta, 1997. 13. Shah, Ghanashyam, Social Movements in India; A Review of the Literature(Delhi :Sage) 1990. 14. Shah,Nandita, The Issues at Stake : Theory and Practice in the Contemporary Women's Movements in India, New Delhi : Kali for Women,1992 15. Jogand, P.G.,New Economic Policy and Dalits, Jaipur, Rawat, 1991 16. Omvedt, Gail, Dalit Visions; The Anti caste Movement and the construction of an Indian Identity, New Delhi, Orient Longman, 1995
Course Outcomes	Completion of this course enables students to
CO1	Remember the features ,Characteristics and determinants of social movements
CO2	Compare and contrast different perspectives on social movements.
CO3	Anaylsis Critically the leadership patterns involved in social movements
CO4	Explain the context and significance of Indian social movements
CO5	Discuss the importance of empowerment movements.

FOURTH SEMESTER
Template for Course Syllabus

Course Code & Title	18SOCC13 & SOCIAL PROBLEMS IN INDIA		
Class	M.A. Sociology	Semester	IV
Cognitive Level	K1,K2,K3,K4,K5,K6		
Course Objectives	6. To achieve the realistic knowledge about social problems with its different dimension of approaches 7. To learn the knowledge of structural problems of society which become the social problems from the downtrodden and up to the developed too. 8. To carry out the issues of familial problems with its all aspects 9. To bring out the understanding of social problems in the aspect of developmental aspects i.e., regional disparities, ecological disorganization and also its values which disrupts the existing social structures. 10. To study the disorganizational causes which promote the crime, white collar crime, drug addiction, suicide and terrorism and so on.		

UNIT	Content	No. of Hours
I	UNDERSTANDING SOCIAL PROBLEMS: Meaning, Definition, Characteristics, Causes and types of social problems - Approaches to social problems: Functional Approach (anomie, social pathology, deviant behavior, and social disorganization) Conflict Approach (deprivation, exploitation, inequality, oppression).	16 Hours
II	STRUCTURAL: Poverty – Types, Causes and Consequences. Measurement of Poverty line. Inequality of Caste and Gender - Problems related to Religious, Ethnic and Regional Minorities, backward classes, SC.	14 Hours
III	FAMILIAL: Dowry - Domestic Violence – Divorce - Intra and inter- Generational Conflict – Problems of Elderly.	12 Hours
IV	DEVELOPMENTAL: Regional Disparities - Development induced displacement - Ecological Degradation and Environmental Pollution – Consumerism - Crisis of Values.	14 Hours
V	DISORGANIZATIONAL: Crime and Delinquency, White Collar Crime - Drug Addiction – Suicide – Terrorism - Cyber Crime – Black Money and Corruption.	12 Hours
		32

References	1Jogan, Sankar. (ed.), Social Problems and Welfare in India, Ashish, New Delhi, 1992. 2Madan, G.R. Indian Social Problems, Vol. I and II, Allied, Bombay, 1973. 3Ahuja, Ram. Social Problems in India, Rawat, Jaipur, 2002. 4Jain, Prabha Shasi and Singh Mamta. Violence Against Women, Radha, New Delhi, 2001. 5Mishra, Girish and Pandey Brajkumar. White-Collar Crimes, Gyan, New Delhi, 1998. 6Ahmad, Siddique. Criminology (5th ed.), Eastern Book Company, New Delhi, 2005. 7Paranjape, N.P. Criminology (12th ed.), Central, Allahabad, 2005. 8 Horton, Paul B and Leslie, Gerald R. The Sociology of Social Problems (Fifth ed.) Prentice - Hall, New Jersey, 1974. 9Weinberg, M.S., Rubington Earl Sue Kiefer Hammersmith. The Solution of Social Problems - Five Perspectives, (2nd Edition), Oxford University Press, New York, 1981. 10. Robert K. Merton and Robert Nisbet, (ed.) <i>Contemporary social problems</i>, Harcourt Brace, New York. 1971. 11. Elliot, Mabel A and Merrill, Francis E., <i>Social Disorganization</i>, Harper and Brothers, New York, 1950	
Course Outcomes	On completion of the course, CO 6. Students will be able to define the social problems with its nature and able to evaluate the role of different approaches of social problems in their day to day life. CO 7. Identify the causes of structural issues or problems with its variety of types and analyze how it is disrupts the existing social activities by that provide the solution to the social problems CO 8. Utilize knowledge to indicate the different types of familial issues and will be able to classify of causes of its emergence CO 9. To examine the root causes of social problems as well as its different types which helps to evaluate the existing social structures to bring the new dimension of ideas CO 10. To analyze the main influential factors which promotes the various types of crimes and bring a chance to the students to create a new ideas about to solve the existing crime levels and how to rehabilitate the affected criminals.	

FOURTH SEMESTER – CORE – XIII

Course Code & Title	CORE: XIII 18MEDC03 INCLUSIVE EDUCATION		
Class	M.Ed., (2 Yrs) Education	Semester	IV
Cognitive Level	K1; K2; K3; K4; K5; K6		
Course Objectives	The course will enable the students to: 1. To know the concept of inclusive education 2. Understand the meaning of special education mainstream and inclusive education 3. Understand the global and national commitments towards the education of children with diverse needs 4. Orient them on curriculum and evaluation for inclusive learners 5. Enhance competency in dealing children with diverse needs.		

UNIT	Content	No. of Hours
I	Introduction to Inclusive Education Definition, meaning of inclusive education, integrated education and inclusive education-Facts and myths of inclusive education with reference to Indian context –Need for inclusive education-Recommendations of education commissions and Committees on restructuring policies and practices- National initiatives for inclusive education –Government schemes and provisions of policy perspectives supporting inclusive education for children with diverse needs-Advantages of inclusive education for the individual and society.	20 Hours
II	Preparation for Inclusive Education Concept, meaning of diverse needs - Educational approaches and measures for meeting the diverse needs- Concept of remedial education, special education, integrated education and inclusive education- Building inclusive learning friendly classrooms, overcoming barriers for inclusion - Creating and sustaining inclusive practices -Role of teachers, parents and	20 Hours

	other community members for supporting inclusion of children with diverse needs.	
III	Children with Diverse Needs and Utilization of Resources Definition and characteristics of children with sensory, intellectual, developmental disabilities-Social and emotional problems-Scholastic backwardness, under-achievement, slow learners, children with special health problems, environmental difficulties and children belonging to marginal groups -importance of early detection, functional assessment for development of compensatory skills - Role of teachers working in inclusive settings-Developing and enriching academic skills for higher learning-Adaptations in instructional objectives, co-curricular activities-Technology for meeting diverse needs of learners- Treating conducive environment in inclusive schools: Material resources and human resources.	20 Hours
IV	Curriculum Adaptations and Evaluation for Children with Diverse Needs Concept, meaning and need for curriculum adaptations for children with sensory Intellectual and developmental disabilities-Guidelines for adaptation for teaching and practicing science, mathematics, social studies , languages, physical education yoga, heritage arts theatre and drama in inclusive settings -Utilization of case profiles for identification, assessment, and intervention for inclusive classrooms - Techniques and methods used for adaptation of content, laboratory skills and play material.	20 Hours
V	Teacher Preparation for Inclusive Education Review existing educational programmes offered in secondary school-roles, responsibilities, skills, competencies and professional ethics of teachers and teacher educators for inclusive settings - NCF 2005 and curriculum for teacher preparation and transaction modes-Evaluation and follow up programmes for improvisation of teacher preparation programmes-Role of different agencies in promoting inclusive education -	20 Hours

	Planning and conducting research activities: Selecting specified areas based on needed for enhancement of learning, steps involved in planning and supervising research activities, recent trends-supportive services for inclusion.	
References	Text Books: Ahuja. A & Jangira, N.K (2002).<i>Effective Teacher Training; Cooperative Learning Based Approach</i>. New Delhi: National Publishing house. Douglas Fisher & Caren Sax (2003).<i>Inclusive high schools: Learning from contemporary classrooms</i>. USA: Paul H Brookes publishing Co. Douglas Fisher & Craig H Kennedy (2001). <i>Inclusive middle schools</i>. USA: Paul H Brookes publishing Co. References: Huw Thomas. (2007). <i>Inclusion</i>. UK: Taylor and Francis group. Jha, M (2002). <i>Inclusive Education for All: Schools without Walls</i>, Chennai: Heinemann Educational publishers, Multivista Global Ltd. Mithu Alur & Michael Bach (2005). <i>Inclusive education: From rhetoric to reality</i>. New Delhi: Viva books (p) Ltd. Neena Dash. (2012). <i>Inclusive education for children with special needs</i>. New Delhi: Atlantic publishers and distributors (p) Ltd. Rosemary Sage (2007). <i>Inclusion in schools: Making a difference</i>. New York: Network continuum education. Sharma P.L (2003). <i>Planning Inclusive Education in Small Schools</i>. R.I E. Mysore Tim Loreman, Deppeler, J & David Harvey (2006).<i>Inclusive education</i>. UK: Routledge Falmer. Tony Booth, Kari Nes & Marit Stromstad (2003). <i>Developing inclusive teacher education</i>. USA: Routledge Falmer.	

தமிழ் முதுகலை -- நான்காம் பருவம்

தாள்- 15 இக்காலத்தமிழ் இலக்கியம் (முதன்மைப் பாடம்)
குறியீட்டெண் 18TAM C15

நோக்கம்:

- தமிழ் இலக்கிய வரலாற்றில் பிற்காலத்தில் தோன்றிய இலக்கிய வகைகளை அறிமுகப்படுத்துதல்.
- கவிதை, புதினம், சிறுகதை, நாடகம், உரைநடை, பயண இலக்கியம் இவற்றின் தோற்றம் மற்றும் வளர்ச்சி நிலைகளை அறிந்துகொள்ளுதல்.
- மாணவர்களைப் படைப்புத் திறனில் ஆர்வம்கொள்ள வழிவகை செய்து, இளம் படைப்பாளிகளை அடையாளப் படுத்துதல்.
- கவிதையின் வழி நல்லதமிழில் கவிதைகளை வாசிக்கும் திறனை வெளிக்கொணர்தல்.
- நாடகத்தின் இலக்கணத்தைக் கற்பித்தலின் வாயிலாக ஒரு நாடகத்தை இயற்றவும் நடிக்கவும் பயிற்சியளித்தல்.
- இக்காலத்தமிழ் இலக்கியங்களின் வகைகளையும் அதன் இலக்கணங்களையும் அறிந்துகொள்ள வழிவகை செய்வதோடு படைப்புத்திறனை உருவாக்குதல்.

அலகு - 1 பாரதியார் பாரதிதாசன் கவிதைகள்
பாரதி – பாஞ்சாலி சபதம் (முழுவதும்)

நாமக்கல் கவிஞரின் கவிதைகள்

காந்தி பற்றிய பாடல்கள் (இராஜவேல் தொகுப்பு நூல் - 18, 23, 24, 35, 36)

பாரதிதாசன் - சஞ்சீவிபர்வதத்தின் சாரல்

நா. காமராசு - கருப்பு மலர்கள்

அலகு - 2 புதினம் மலர்வதி - தூப்புக்காரி

சிறுகதை

புதுமைப்பித்தன் - சாபவிமோசனம்

ஜெயகாந்தன் - ஒரு பகல் நேரப் பாசஞ்சர் வண்டியில்

பாவண்ணன் - வேர்கள் தொலைவில் இருக்கின்றன.

கு. அழகிரிசாமி— ராஜா வந்திருக்கிறார்

ஆர் சூடாமணி— தனிமைத் தளிர்

எஸ். ராமகிருஷ்ணன் - தாவரங்களின் உரையாடல்

ஜெயமோகன் - மாடன் மோச்சம்

இறையன்பு - நரிப்பல்

வண்ண நிலவன் - எஸ்தர்

சுந்தரபாண்டியன் - களவு

அலகு - 3 **நாடகம்** ந. முத்துசாமி - நாற்காலிகாரர்
உரைநடை பண்புடையோரின் பத்துறைப் பார்வைகள் -
டாக்டர் கா. மீனாட்சி சுந்தரம்

அலகு - 4 **புதுக்கவிதை**

சிற்பியின் சர்ப்பயாகம்
அப்துல் ரகுமான் - ஆலாபனை

அலகு - 5 **ம.ப. பெரியசாமி தூரன் - (இந்திய இலக்கிய சிற்பிகள்
வரிசையில் இடம்பெற்றது தூரன் பற்றி எழுதப்பட்ட நூல். சாகித்ய
அகாதெமி வெளியீடு)**

பயணஇலக்கியம்
இறையன்பு – பத்தாயிரம் மைல் பயணம்

பாடநூல்கள்

புதுமைப்பித்தன் கதைகள், 2008. தொகுப்பாசிரியர் எம்.வேதசாகாயகுமார்,
புதுமைப்பித்தன் பதிப்பகம், சென்னை.

ஜெயகாந்தன் முத்திரைக்கதைகள், கவிதா பப்ளிகேஷன்ஸ், சென்னை.

பாவண்ணன், வேர்கள் தொலைவில் இருக்கின்றன, காவ்யா பதிப்பகம்,
சென்னை.

அழகிரிசாமி சிறுகதைகள், பழ. அதியமான் (பதிப்பாசிரியர்), காலச்சுவடு
பதிப்பகம், நாகர்கோவில்.

தேர்ந்தெடுக்கப்பட்ட இறையன்பு சிறுகதைகள், ந. முருகேசபாண்டியா
(தொகுப்பாசிரியர்), நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், சென்னை.

வண்ணநிலவன், எஸ்தர், - - - - -
சுந்தரபாண்டியன், களவு, காவ்யா பதிப்பகம், சென்னை.

முத்துசாமி நாடகங்கள்
எஸ். இராமகிருஷ்ணன் - தாவரங்களின் உரையாடல், உயிர்மை
பதிப்பகம், சென்னை.

தூப்புக்காரி – நாவல் - மலர்வதி
மதிவெளியீடு – கிழக்குவிளை, வெள்ளிக்கோடு, முளகுமுடு அஞ்சல்,
கன்னியாகுமரி மாவட்டம்

பார்வைநூல்கள்

இருபதாம்நூற்றாண்டுத் தமிழ்இலக்கியம், 1973. மா. இராமலிங்கம்,
தமிழ்ப்புத்தகாலயம், சென்னை.

தமிழில் சிறுகதைகளின் தோற்றமும் வளர்ச்சியும். 1966. கா. சிவத்தம்பி.

தமிழ் நாவல் இலக்கியம், 1999. கு. கைலாசபதி, குமரன் பப்ளிஷர்ஸ், சென்னை.

தற்காலத் தமிழ்இலக்கியம், இரா. தண்டாயுதம், தமிழ்ப்புத்தகாலயம், சென்னை.

புதுக்கவிதையின் முற்போக்கும் பிற்போக்கும், 1978. நா. வானமாமலை, மக்கள்வெளியீடு, சென்னை.

புதுக்கவிதையின் தோற்றமும்வளர்ச்சியும், 1992. வல்லிக்கண்ணன், அன்னம் வெளியீடு, சிவகங்கை.

புதுக்கவிதை ஒரு புதுப்பார்வை, 1983. பாலா, அகரம் வெளியீடு, சிவகங்கை.

விளையும் பயன்கள்

- இப்பாடத்தைப் பயிலுவதால் தமிழ்மொழியில் திறனுடையவர்களாய்த் தகுதிபெறுதல்.
- தற்காலப் படைப்புகளின் உட்பொருளை அறியும் அறிவினைப் பெறுதல்.
- இன்றைய படைப்புகளின் வழிநின்று சமூகப் பண்பாட்டுப் பதிவுகளைப் புரிந்துகொள்வர்.
- தமிழக அளவில் நிகழ்ந்து வரும் ஒரு பிரச்சனையைப் படைப்பின் வழி உணர்ந்து அதனைத் தீர்ப்பதற்கான வழிமுறையைக் கலைந்துரையாடலின் வழி தீர்க்க முயலுதல்.
- இக்காலப் படைப்புகளைக் கற்பதன்வழி 'போலச் செய்தல்' மரபில் புதிய படைப்புகளை மாணவர்கள் உருவாக்குதல்.
- கவிதைகளின் வழி கவிதையாக்க உணர்வினையும் உரைநடை இலக்கியத்தின்வழி பல்வேறு வரலாறுகளையும், தமிழனுக்கான தமிழ் இலக்கியத்திற்கான தனித்த அடையாளத்தையும் அறிதல்.

*வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.

தாள் - 16 பெரியாரியல் (முதன்மைப் பாடம்)
குறியீட்டெண் 18TAM C16

நோக்கம்:

- சமுதாயச் சீர்திருத்த நடைமுறைகளை செயற்படுத்திய தந்தை பெரியாரின் வாழ்வையும் பணியையும் சிந்தனைப் போக்குகளையும் உணர்த்துதல்.
- பெரியார் வழியல் திகழ்ந்த இந்திய சீர்திருத்த இயக்கவாதிகளான இராஜாராம் மோகன்ராய், சுவாமி தயானந்த சரஸ்வதி, ஸ்ரீ நாராயண குரு போன்றவர்களின் வாழ்வை மாணவர்களுக்கு எடுத்துச்சொல்லுதல்.
- சுயமரியாதையை மாணவர்களுக்கு எடுத்துரைத்தல்
- தீண்டாமை ஒழிப்பு, வேதமறுப்பு, சமத்துவம், சமூகநீதி, உடன்கட்டை எதிர்ப்பு போன்றவற்றை மாணவர்களுக்குக் கற்பித்தல்.
- பெரியார் நடத்திய தமிழ் தமிழ்மக்கள் நலப்பேராட்டங்களை மாணவர்கள் அறியச்செய்தல்.

அலகு -- 1 பெரியார் வாழ்வும் பணியும்

பிறப்பு (1879), பள்ளிக்கல்வி, திருமணம், பகுத்தறிவு மனப்பாங்கு, கள்ளுக்கடை மறியல் (1922), வைக்கம் பேராட்டம் (1924), நாகம்மை மறைவு (1933), ஜகவல்ய சாமியார் தொடர்பும் புராண இதிகாச சித்தாந்த அறிவும் (1903), பொதுவாழ்வு - காங்கிரஸ் நுழைவு (1907), காங்கிரஸ் மாநாட்டிலிருந்து வெளியேறல் (1925), குடிஅரசு இதழ் தொடக்கம் (1925), சுயமரியாதைக் கொள்கை சுயமரியாதைச் சங்கம் நிறுவ முயற்சி (1926-1926) (பிராமணர் அல்லாதார் நன்மை, தீண்டாமை ஒழிப்பு), பார்ப்பனரல்லாதார் மாநாடு (மதுரை, 1926) (வருணாசிரம ஒழிப்பு, எல்லோருக்கும் அர்ச்சகராகும் உரிமை), ரஷ்யப் பயணம் (1931), ஆப்பிரிக்கா, கிரீஸ் இலங்கை போன்ற பிற அயல்நாட்டுப் பயணங்கள், இந்தி எதிர்ப்புப் பேராட்டமும் சிறையும் (1938), தமிழ்நாடு தமிழருக்கே முழுக்கம், பெரியார் எனும் சிறப்புப் பெயர் (1938), திராவிடர் கழகத் தோற்றம் - நீதிக்கட்சித் தலைவர் (1938), நீதிக்கட்சி திராவிடர் கழகப் பெயர் மாற்றம் (1944), மக்கள் இயக்கமாதல் (1947), மறுமணம், திராவிட முன்னேற்றக் கழகத் தோற்றம் (1949), தமிழ் தமிழ்மக்கள் நலப் பேராட்டங்கள் (1950-1962), மறைவு (1973).

அலகு -- 2 இந்திய, தமிழகச் சங்கச் சீர்திருத்த இயக்க வரலாறு

ஆந்திரநாடு பசவர் (1131-1167) (தீண்டாமை ஒழிப்பு), கவிஞர் வேமணா (15ஆம் நூற்றாண்டு) (பிராமணிய எதிர்ப்பு), 'வங்காளம் இராசாராம் மோகன்ராய் (1772-1833) பிரம்மசமாஜம் (உருவவழிபாடு உடன்கட்டை எதிர்ப்பு, விதவை மறுமணம்), சுவாமி தயானந்தர் - ஆரியசமாசம் (உருவவழிபாட்டு மறுப்பு பார்ப்பணிய எதிர்ப்பு), சூரத் துக்காராம் மஞ்சாராம், தாதோபா பாண்டூராவ் - மாணவதர்ம

சபை (சமத்துவம் சமூகநீதி), சோதிபா பூலே (வேத மறுப்பு, பெண்பள்ளி திறப்பு), சத்ய சோத சமாசம் - தந்தை பெரியாரின் தன்மதிப்பு இயக்க முன்னோடி. கேரளம் ஸ்ரீ நாராயணகுரு (1855-1928) (ஈழவர் தீயவர் சமூகவிடுதலை தீண்டாமை ஒழிப்பு).

தமிழகம் - திருமூலர் திருமந்திரம் (பிராமணிய எதிர்ப்பு), பக்தி இயக்கம் - நாயன்மார் ஆழ்வார், சாதிய வேறுபாடு இன்மை, சம்பந்தர் அப்பர் உறவு, இராமானுசர் சூத்திரப் பெரிய நம்பியைக் குருவாக ஏற்றல், திலகவதியார், காரைக்காலம்மையார், ஆண்டாள், சித்தர் மரபு - சிவவாக்கியர் போன்றவர், சிற்றிலக்கிய மரபு. அத்திப்பாக்கம் அ.வேங்கடாசலநாயகர் (1800-1897) (சாதி, மதம் சாத்திரம் புராணம் மூடப்பழக்கவழக்கம், புரோகிதம், சோதிடம் - எதிர்ப்பு), வைகுண்டசாமி (1809-1851) (பார்ப்பனியத்திலிருந்து விடுதலை, சுயமரியாதை, சமத்துவசங்கம், தாலி தவிர்ப்பு, பேய் பிசாசு சடங்கு உருவவழிபாடு இவற்றின் மறுப்பு), இராமலிங்கஅடிகளார் (1823-1874) (வேதமறுப்பு, சாதிய அமைப்பு மூடப்பழக்க வழக்க எதிர்ப்பு) சமரசசுத்த சன்மார்க்கசங்கம், திரு. வி. க. சென்னை மாகாண சங்கம்.

அலகு -- 3 சுயமரியாதையும் சுயமரியாதை இயக்க வரலாறும்

சுயமரியாதை இயக்கத் தோற்றமும் வரலாறும் - முதற் பெயர் பார்ப்பனரல்லாதார் சுயமரியாதைச் சங்கம், நோக்கம் - தன்மதிப்பு, சமத்துவம், சகோதரத்துவம், சுயமரியாதை இயக்கத் தோற்றம் (26-12-1926), பார்ப்பனர் அல்லாதார் பத்தாவது மாகாண மாநாடு (1926) தீர்மானங்கள் - உயர்வு தாழ்வு இன்மை, 2. மதச்சடங்கு உயர்வுகுப்பார் விலக்கல், இந்துக்களின் பூசை தொழுகை சமஉரிமை, 4. பார்ப்பனியர் இல்லாத் திருமணம் (சேலம் 1926), செங்கற்பட்டு சுயமரியாதை மாநாடு (1929) —தீர்மானங்கள் - வகுப்புவாரி உரிமை, சாதிபேதம் உயர்வு தாழ்வு வருணாசிரம மறுப்பு, பெண்ணின் திருமண வயது 16, விதவைமறுமணம், தாய்மொழி அரசமொழி தவிர பிற மொழிக் கல்விக்கு அரசு நிதி ஒதுக்கீடு தரக்கூடாது. கோவில் வழிபாட்டில் காசு தரகர் மறுப்பு, பார்ப்பனரல்லாதார் இளைஞர் சங்கம், மூடப்பழக்க வழக்க ஒழிப்பு, சோவியத்யூனியன் பயணத்தாக்கம் - தொழிலாளர் உரிமைகள், சுயமரியாதை வடிவங்கள்.

அலகு -- 4 பெண் விடுதலை

ஆண் பெண் உயர்வு தாழ்வு, கற்பு, விதவை மறுமணம், விபச்சாரம் - விதவைத் தன்மையின் தொடர்ச்சி, குழந்தை மணம் - இளவயது மணவிலக்குச்சட்டம், மணவிலக்கு உரிமை (1955), சொத்துரிமை பெண்கிளர்ச்சியின் தேவை, பெண்ணடிமைக்குக் காரணம் சொத்துரிமை இன்மை, பெண்விடுதலைத்தடைகள் - கார்ப்பத்தடை, கார்ப்பஆட்சி, சோதனைக் குழாய்க் குழந்தை சிந்தனை, ஆண்பெண் சமத்துவம் ஒத்த உரிமை இன்மை, தனிச்சொத்துடைமை உள்ள நாட்டில் பெண்ணடிமை இருத்தல், அரசியல் பதவி வேலைகளில் ஐம்பது விழுக்காடு வேண்டல்.

வைதீக எதிர்ப்பு, வருணாசிரம அமைப்பும் தீண்டாமைக் கொள்கையும். வைக்கம்கிளர்ச்சி - ஈழவர்க்கான அழைப்பு, வைக்கம் கோயில் நாற்புறச் சாலைப் பொதுச்சாலை ஆதல், கோயில் நுழைவுப் போராட்டம் - கமுதி, ஈரோடு கோயில் நுழைவுப் போராட்டம், கோயில் நுழைவும் தீண்டாமையும் வகுப்புவாரி உரிமை.

மொழி, எழுத்து - ஈ. வெ. ரா. கருத்து, மொழி கருத்துப் பரிமாற்றக் கருவி, பலமொழிச் சூழலுக்குக் காரணம் - தொடர்பு இன்மை, பழக்கவழக்கப் பண்பு வேறுபாடுகளும் கருத்தாக்க வேறுபாடுகளும், வடமொழி எதிர்ப்பு - வடமொழி அடிமைப்படுத்தும் மொழி, தமிழ் மொழி விடுதலைக்கான வழிகாட்டி, வேற்றுமொழி எதிர்ப்பு - இந்தி எதிர்ப்புப் போராட்டம், தமிழ்மொழிக்காப்பு, கலைச் சொல்லாக்கம் தமிழில் வேண்டும், எழுத்துச் சீர்திருத்தம்

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விளையும் பயன்கள்

- பெரியாரின் சுயமரியாதை இயக்கவரலாற்றை மாணவர் அறிவர்.
- பெரியாரின் சீர்திருத்தத்தைப்போல் பிற மாநில, சமூகச் சீர்திருத்த இயக்கவாதிகளின் வரலாற்றை தெரிந்துகொள்வர்.
- பெண்விடுதலைக்காகப் பெண்ணின் உயர்வு, விதவை மறுமணம், இளவயது மணவிலக்கு உரிமை, பெண்களுக்கான சொத்துரிமை போன்றவற்றிற்கு பெரியார் நடத்திய போராட்டத்தை அறிந்துகொள்வர்.
- எழுத்துச் சீர்திருத்தம் பற்றிய பெரியாரின் கருத்தையும், எழுத்துச் சீர்திருத்தத்தையும் மாணவிகள் அறிவர்.
- ஒடுக்கப்பட்டவருக்காக பெரியார் கொடுத்த குரலை மாணவர்கள் அறிவர்.

*வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.



PERIYAR UNIVERSITY

SALEM - 636 011, TAMIL NADU

NAAC A Grade – STATE UNIVERSITY- NIRF RANK 83

Human Values

Paper XII: HUMAN RIGHTS & DUTIES
(Compulsory Paper) (Code No. 06PHR01)

Unit – I: Introduction

Meaning and Definitions of Human Rights – Historical Evolution of Human Rights –Formation of UNO, Universal Declaration of Human Rights 1948 – Constitutional Provision for Protection of Human Rights – Fundamental Rights and Directive Principles of State Policy – Fundamental Duties and Human Rights Education.

Unit – II: Civil, Political and Economic Rights

Right to Work – Right to Personal Freedom – Right to Freedom of Expression – Right to Property – Right to Education – Right to Equality – Right to Religion – Right to Form Association and Unions – Right to Movement – Right to Family – Right to Contract – Right to Constitutional Remedies – Right to Vote and Contest in Elections – Right to Hold Public Offices – Right to Information – Right to Criticize the Govt. - Right to Democratic Governance. Right to Work – Right to Adequate Wages – Right to Reasonable Hours of Work – Right to Fair Working Conditions – Right to Self Govt. in Industry – Customer Rights – Social and Cultural Rights – Rights to Life – Right to Clean Environment.

Unit – III: Human Rights Activities in India

Human Rights Act 1993 - Structure and Functions of National Human Rights Commission - State Human Rights Commission and Human Rights Courts- Rules and regulations of state human rights commission 1997.

Unit – IV: Human Rights Movements for Social Development

Indian Freedom Movement – Peasant Movement – Women's Movement – SC/ST Movements – Environment Movement.

Unit – V: Human Rights Violation

Violation of Rights among Children, Women, Minorities, SCs and STs, HIV/AIDS Patients, Trans-genders, Convicts and Prisoners, Slavery and Disabled, Provision of constitutional rights during the arrest.

References:

1. **Baradat Sergio** and **Swaronjali Ghosh**. Teachings of Human Rights: Dominant Publishers and Distributors, New Delhi. 2009.
2. **Umesh Bhatt**. Human Rights Achievements and Challenges: Vista International Publishing House, Delhi. 2005.
3. **Roy A.N.** Human Rights Tasks, Duties and Functions: Aavishkar Publishers and Distributors, Jaipur. 2007.
4. **Asish Kumar Das** and **Prasant Kumar Mohanty**. Human Rights in India: Sarup and Sons. New Delhi. 2007.
5. **Sankar Sen**. Human Rights in a Developing Society. A.P.H. Publishing Corporation, New Delhi. 2009.
6. **Bani Borgohain**. Human Rights Social Justice and Political Challenge. Kanishka Publishers and Distributors. New Delhi. 2007.
7. **Rathod, P.B.** Focus on Human Rights: ABD Publishers, Jaipur. 2007.
8. **Velan, G.** Human Rights and Development Issues: The Associated Publishers, Ambala Cantt. 2008.
9. **Meena, P.K.** Human Rights Theory and Practice: Murali Lal and Sons, New Delhi, 2008.
10. **Bhavani Prasad Panda**. Human Rights Development and Environmental Law: Academic Excellence, Delhi. 2007.
11. **Viswanathan, V.N.** Human Rights – Twenty First Century Challenges: Kalpaz Publications, New Delhi. 2008.
12. **Goswami**. Human Rights and Reforming the Law. Raj Publishing House, Jaipur. 2008.
13. **Digvijay Nath Pandey**. Teaching of Human Rights: Lotus Press, New Delhi, 2007.
14. **Ansari, M.R.** Protecting Human Rights: Max Ford Books, New Delhi, 2006.
15. **Rao, M.S.A.** Social Movements in India – Social Movements and Social Transformation in India Vol. 1 & 2: Manohar Publications, New Delhi. 1978.
16. **Bakshi, P.M.** The Constitution of India: Universal Law Publishing Co. Pvt. Ltd., Delhi. 2006.

AREA PAPER –X

VALUE EDUCATION- 18MPEDU03-10

Course Code & Title	(CORE: 3) 18MPEDU03-10 – VALUE EDUCATION (AREA PAPER-X)		
Class	M. Phil	Semester	II
Cognitive Level	K-1: K-2:, K-3: K-4: K-5		
Course Objectives	The course will enable the scholars to 1. Make the Scholars to understand the concept of Values and its significance. 2. Create Awareness among Scholars to acquaint them on the role of Values and personal development. 3. Enable them to sensitize the scholars to know the importance of family and social values in life. 4. Make them Familiarize with orient them the Ethical and professional values. 5. Make them understand and the role of yoga and meditation in calculating values.		

UNIT	Content	No. of Hours
I	UNIT-1: EDUCATION AND VALUES Definition, Concept, Classification, Theory, Criteria and Sources of values, Aims and objectives of value education. Role and Need for value education in the contemporary society -Role of education in transformation of values in society - Role of parents, teachers, society, peer group and mass media in fostering values-Teaching approaches and strategies to inculcate values through curricular and co-curricular activities.	20 Hours
II	UNIT 2: VALUE EDUCATION AND PERSONAL DEVELOPMENT Human Values: Truthfulness, Sacrifice, Sincerity, Self-Control, Altruism, Scientific Vision, relevancy of human values to good life. Character Formation towards Positive Personality-Modern challenges of adolescent: emotions and behavior. Self-analysis and introspection: sensitization towards gender equality, physically	20 Hours

	challenged, intellectually challenged.	
III	UNIT-3: VALUE EDUCATION TOWARDS NATIONAL & GLOBAL DEVELOPMENT Constitutional Values: Sovereign, Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, Fraternity. Social Values: Pity and Probity, Self-Control, Universal Brotherhood. Professional Values: Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, Faith. Religious and Moral Values: Tolerance, Wisdom, character. Aesthetic Values: Love and Appreciation of literature, fine arts and respect for the same. Environmental Ethical Values: National Integration and international understanding.	20 Hours
IV	UNIT-4: FAMILY VALUES IN EDUCATION Family Values: Components: structure and responsibilities of the family – Threats of Family life – Status of Women in Family and Society- Social Values – Faith, Service and Secularism, Social Awareness, Respect to -age, experience, maturity, family members, neighbors, co-workers. Consumer Awareness, Environmental issues, and Responsibilities.	20 Hours
V	UNIT-5: SOCIAL VALUES IN EDUCATION Controls of the mind through simplified, meditation, yoga and activates. Components of Value Education – Self-analysis and Introspection - Character formation. Social Issues- Corruption, Cyber Crime, AIDS Awareness and Substance Abuse – Source, Consequences and Remedy, Values for Professionals in the work place.	20 Hours
References	<u>Text Books:</u> Aruna Goel, S.C., and Goel. (2005). <i>Human Values and Education</i> , Delhi: Deep & Deep Publications Pvt. Ltd. Bhandari, R.S. (2003). <i>Value of Education</i> , New Delhi: Abhishek Publications. Chand, J. (2007). <i>Value Education</i> , Anshah Publishing House. Dhananjay, Joshi. (2006). <i>Value Education in Global Perspectives</i> , Delhi: Lotus Press. Fraenkel, J.R. (1977). <i>How to Teach about Values: An Analytic Approach</i> . New Jersey & E. Cliffs: Prentice Hall, Inc. Ismal, Thamarasserri.(2013). <i>Value of Education</i> , New Delhi: APH Publishing Corporation.	

Course Name	Yoga and Fitness - Practical	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNV01	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	I

COURSE OUTCOMES:

On completion of the course, the students will be able to

C01: Perform the different postures of yoga

C02: Improve their concentration and breathing

C03: Integrate the moral values and ethics in their life

C04: Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness

C05: Enhance the activities like include academic, sport, heightened awareness and balanced attitude for social activity.

Mapping of COs with POs, PSOs

COs / Pos & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
C01	1	3	2	2	2	2	2	3	2	2	2
C02	1	3	2	2	2	2	2	3	2	2	2
C03	1	3	2	2	2	2	2	3	2	2	2
C04	1	3	2	2	2	2	2	3	2	2	2
C05	1	3	2	2	2	2	2	3	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

RUBRICS FOR PRACTICAL:

Assessment Rubrics / Scaling Percentage	Outstanding (81 - 100%)	Good (66 - 80%)	Satisfactory (50 - 65 %)
Conduct of Experiment (20)	Meticulous hands on skill in conducting experiments with clear understanding of principle and procedure	Able to conduct the experiment based on the given procedure	Lack of hands on skill and clarity in conducting experiments
Observation (20)	Excellent interpretation of the objectives and able to obtain accurate results	Good interpretation of the objectives and able to obtain result in tolerance range	Fair in interpreting the objectives and able to obtain result below tolerance range
Record (20)	Exceptional maintenance of records by following appropriate formats and adhering to deadline	Fair maintenance of records by following appropriate formats and submitting slightly beyond deadline	Lack of fair maintenance of record and delayed submission beyond deadline
Viva-voce (15)	Excellent in preparedness, clear delivery and knowledge in application	Good in preparedness, delivery and knowledge in application	Fair in preparedness, delivery and inadequate knowledge in application

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

S. No.	Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
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1.	Unit - I Standing Postures of yoga	1. Perform the different postures of yoga 2. Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness	6
2.	Unit-II Sitting Postures of Yoga		6
3.	Unit-III Prone Postures of Yoga		6
4.	Unit-IV Supine Postures of Yoga		6
5.	Unit-V Breathing Exercises and Kiriya	1. Improve their concentration and breathing 2. Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness	6
6.	Unit-VI Dharana and Meditation	1. Integrate the moral values and ethics in their life 2. Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness 3. Enhance the activities like include academic, sport, heightened awareness and balanced attitude for social activity.	6

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

OUTCOME BASED EDUCATIONAL ACTIVITIES FOR THEORY:

S. No.	Name of the Activity	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomot or domain level
Unit - I Standing Postures of yoga					
1.	Tadasana (Mountain Pose)	CO1,CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2.	Arthakatti Chakrasana				
3.	Virabhadrasana III (Warrior III)				
4.	Padhakasthasana				
5.	Artha Chakrasana				
6.	Thirikonasana				
7.	Parivirutha Thirikonasana				
8.	Ukattasana				
Unit-II Sitting Postures of Yoga					
1.	Vajrasana	CO1,CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2.	Sasangasana				
3.	Pachimottanasaana				
4.	Baddhakonasana				
5.	Artha padmasana				
6.	Padmasana				
Unit-III Prone Postures of Yoga					
1	Maharasana	CO1,CO4,	K3,P	1. DEMONSTRATION AND PRACTISE	SI
2	Dhanurasana				

3	Pujangasana			2. VIDEO PRESENTATION	
4	Salabasana				
Unit-IV Supine Postures of Yoga					
1	Sethubanadasan	CO1,CO2, CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2	Sarvangasana				
3	Pavanamuktasan				
4	Halasana				
5	Matsyasana				
6	IRT				
7	QRT				
8	DRT				
9	Savasana				
Unit-V Breathing Exercises and Kiriya					
1	Tiger Breathing	CO1,CO2,C03 CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2	Rabid Breathing				
3	Dog Breathing				
4	Nadi Suthi				
5	Kapabathi				
6	Basthirika				
7	OMM Chanding (AAA, UUUU, MMMM)				
Unit-VI Dharana and Meditation					
1	Yama niyama	CO1,CO2,C03 CO4, CO5	K3,K4,K5	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2	Dharana				
3	Dhiyana (Meditation)				

REFERENCES

TEXTBOOKS	
1	The Breathing Book: Good Health and Vitality Through Essential Breath Work., by, Donna Farhi , Published November 15th 1996 by Holt Paperbacks
2	Yoga Nidra (The Meditative Heart Of yoga), by Richard Miller , Published on November 30th 2005 by Sounds True Inc (first published November 28th 2005)
3	Medical Therapeutic Yoga, Biopsychosocial rehabilitation and wellness care, Ginger GARNER ,
4	Yoga Therapy: A Guide to the Therapeutic Use of Yoga and Ayurveda for Health and Fitness – December 14, 2004, by A.G. Mohan (Author), Indra Mohan (Author), Ganesh Mohan (Author), Nitya Mohan (Author)
REFERENCE BOOKS	
1	Bhandev, 'Yoga Vidya', Rajkot : Pravin Prakashan.2000.
2	Yadav Yogacharya Hansraj, „Yoga for Students', Bombay: Vhora & Co. Publishers, 1973.
4	PRINCIPLES AND METHODS OF YOGA THERAPY (Compilation), January 2007, Publisher: Dhivyananda Creations, Authors Ananda Balayogi Bhavanani

JOURNALS	
1	Broan, R.P., et.al., "Sudarshan Kriya Yogic Breathing in the Treatment of Stress", Journal of Alternative and Complement Medicine, 11.4 (2005): 711-7.
2	Dalal, Geeta "Positive Health through Yoga." Paper Presented in The International Conference on "Yoga Research and Value Education", Held at Kaivalya Dhama, Lonavla (India), (Dec. 2002): 28-31.
3	Gajjar, Nilesh "Effect of Yoga Exercises on Achievement, Memory and Reasoning Ability", International Journal for Research in Education, December: 2012, 1:1, 34-53.

Template for Course Syllabus

Course Code & Title	Paper IV: INDIAN SOCIETY (Core: 4) (Code No: 18SOCC04)		
Class	M.A.(2yr.) Sociology	Semester	I
Cognitive Level	K-1: ✓ K-2: ✓		
Course Objectives	1. To understand the changes that have taken place in the social structure, cultural values like Purusharthas and Varnashrams. 2. To identify the students with different approaches, issues and debates in studies of marriage and kinship. 3. To understand the changing contemporary nature of family, family Disharmony: Domestic Violence, Dowry, Divorce and Inter-generational Conflict relation in the modern world. 4. To understand the concepts of caste, and religion and their significance in the study of the Indian society. 5. To understand the theoretical perspectives of Indological studies from sociological perspectives.		

UNIT	Content	No. of Hours
I	Hindu Social Organization: Purusharthas: Karma, Artha, Kama and Moksha. Varnashrams: Pramacharuya, Grahasta, Vanaprastha and Saniyasa.	16 Hours
II	Marriage and Kinship: Marriage: Meaning, Types and Norms. Marriage as Contract and as a Sacrament. Marriages of Hindus, Christians and Muslims. Kinship: Meaning, Terms and Usages. Rules of Residence, descent and inheritance.s	16 Hours
III	Family: Meaning, Forms of family, Functions of family. Changes in the Indian Family Structure. Family Disharmony: Domestic Violence, Dowry, Divorce and Inter-generational Conflict.	16 Hours
IV	Religion and Caste: Religion: Meaning, Characteristics and Functions. Origin of Caste. Recent Changes in Caste System. Jajmani System. Dominant Caste. Caste and Class; Caste and politics.	16 Hours
V	Theoretical perspective: Indological/Textual (G.S. Ghurye, Louis Dumont) b. Marxism (D.P. Mukhaerjee, A.R. Desai) c. Subaltern (B.R. Ambedkar, David Hardiman)	16 Hours

References	Text Books: • Shankar Rao C.N Introduction to Sociology Schand 2008 • Abigail Fuller “ Introduction to Sociology” Connections Rice University Jan 2014 • Inkeles, Alex, “What is Sociology” An Introduction to the Discipline and Profession, Prentice Hall of India Private Limited New Delhi.2003 • Gisbert, P. “Fundamentals of Sociology” Orient Lomgman, Bombay 1989. References: 1. Mandelbum, D.G. 1990. <i>Society in India</i>, Berkeley, University of California Press, Vol. 1. 2. Singh, Yogendra. 1983. <i>Modernization of Indian Tradition: A Systematic Study of Social Change</i>, New Delhi, Thompson Press. 3. Srinivas, M.N. 1962. <i>Caste in Modern India and Other Essays</i>. Bombay, Asia Publishing House. 4. Srinivas, M.N. 1966. <i>Social Change in India</i>. Orient Longman, Delhi. 5. Dhanagare, D.N. 1999. <i>Themes and Perspectives in Indian Sociology</i>. Jaipur, Rawat Publications. 6. Beteille, Andre. 2002. <i>Sociology: Essays on Approach and Method</i>, New Delhi, OUP. 7. Deshpande, Satish. 2004. <i>Contemporary India: Sociological Perspectives</i>. New Delhi, Sage Publications. 8. Ahuja, Ram. <i>Society in India: Concepts, Theories and Changing Trends</i>. 1999. Rawat Publications, Jaipur. 9. Kuppusamy, B. 1993. <i>Social Change in India</i>. Konark Publishers Pvt. Ltd. Delhi. 10. Singh, Yogendra. 2004. <i>Ideology & Theory in Indian Sociology</i>: Rawat Publications, Jaipur.										
Course Outcomes	The student after studying these chapters will be <table> <tr> <td>CO</td><td>1. Understand the components of social structure.</td></tr> <tr> <td>CO</td><td>2. Analyzing social institutions and social structure</td></tr> <tr> <td>CO</td><td>3. Identify the impact and implications of contemporary problems and issues of society</td></tr> <tr> <td>CO</td><td>4. Demonstrate knowledge about the roles and functions of marriage and family</td></tr> <tr> <td>CO</td><td>5. Gain knowledge about the contemporary relevance of the various indological theories of Indian society</td></tr> </table>	CO	1. Understand the components of social structure.	CO	2. Analyzing social institutions and social structure	CO	3. Identify the impact and implications of contemporary problems and issues of society	CO	4. Demonstrate knowledge about the roles and functions of marriage and family	CO	5. Gain knowledge about the contemporary relevance of the various indological theories of Indian society
CO	1. Understand the components of social structure.										
CO	2. Analyzing social institutions and social structure										
CO	3. Identify the impact and implications of contemporary problems and issues of society										
CO	4. Demonstrate knowledge about the roles and functions of marriage and family										
CO	5. Gain knowledge about the contemporary relevance of the various indological theories of Indian society										

CO Number	CO Statement	Knowledge Level
CO1	To Understand the Importance of Business Environment and its Process	K1, K2
CO2	To Comprehend the Various Businesses and its Suitability	K3
CO3	To know the Various Organizational Strategies	K4
CO4	To Learn the Leadership Qualities	K5
CO5	To Identify Relevant Managements' Conceptual Framework	K6

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	M	S	M	S	M
CO3	S	S	S	S	M
CO4	M	M	S	S	M
CO5	M	S	S	S	S

S-Strong M-Medium L-Low

ORGANISATIONAL PROCESSES – 18COMC01

Unit I: To Understand the Importance of Business Environment and its Process

Business system: Introduction – concept- nature – types - scope - social responsibilities- business interaction to business ethics and values - India's experience of liberalization and globalization, Technological innovations - Emerging opportunities in business; Franchising, Outsourcing, and E-commerce - 'Make in India' Movement.

Unit II: To Comprehend the Various Businesses and its Suitability

Business sector and various forms of business organizations – meaning - features, objectives - types -relative merits, demerits & suitability Business combinations.

Unit III: To know the Various Organizational Strategies

Organisational Strategies – production planning and control – objectives – need and importance –Planning – Decision Making – Strategy Formulation – Organizing – Departmentation - functional, project, matrix and network. Delegation and decentralization of authority.Dynamics of group behaviour.

Unit IV: To Learn the Leadership Qualities

Leadership: Concept - styles -trait – theories: Motivation: Concept - Importance- Theories; Communication: Process and Barriers; Control: Concept and Process.

Unit V: To Identify Relevant Managements' Conceptual Framework

Conceptual Framework of Marketing Management, Financial Management, and Human Resource Management - Change Management: Resistance to change and strategies to manage change, Conflict levels, causes and resolution. Functional and Dysfunctional aspects of conflict.

(Note: Question Papers Consists of 100% theory)

Suggested Readings:

1. V.K.Kaul, Business Organisation and Management, Pearson Education, New Delhi
2. M.C. Shukla, Business Organisation and Management, Sultan Chand & Sons, New Delhi.
3. P.C. Tulsian, Business Organisation & Management, Pearson Education, New Delhi.
4. C. R. Basu, Business Organization and Management, McGraw Hill Education.
5. T.N.Chhabra, Business Organisation and Management, Sun India Publications, New Delhi.
6. C.B. Gupta, Modern Business Organisation, Mayur Paperbacks, New Delhi
7. Koontz and Weihrich, Essentials of Management, McGraw Hill Education.
8. Francies Cherunilam, "International Business – Text and Cases", PHI Pvt. Ltd, New Delhi
9. R.N.Gupta, Business Organization and Management, Taxmann publishers, New Delhi.

18COMC02	Financial Accounting	Category	L	T	P	Credit
		Core		---		4

Preamble

The students can understand the in-depth financial accounting practices in all aspects.

Course Outcome

The Students may know the various accounting practices and standards adopted in National and International wise.

CO Number	CO Statement	Knowledge Level
CO1	Acquire the fundamental knowledge, accounting standard and IFRS	K1,K2and K4
CO2	Understanding the advance accounting practices in partnership firm.	K3,K4
CO3	Have a comprehensive knowledge in inflation and double accounting system	K3,K4
CO4	To learn how to prepare accounting for Self Help Groups, Hawkers and self Proprietors	K4,K6

THIRD SEMESTER –CORE-X

Course Code & Title	(Core: X) 18MEDC10 - GUIDANCE AND COUNSELLING		
Class	M. Ed	Semester	III
Cognitive Level	K-1: K;2:.K:4 K:5		
Course Objectives	1. Develop understanding the concept of guidance. 2. Get acquainted with process and techniques of counseling. 3. Develop an insight into guidance and counseling tools. 4. Know and aware about the guidance programmes. 5. Understand the guidance and counseling of exceptional children.		

UNIT	Content	No. of Hours
I	Guidance: Concept of guidance - Purpose of guidance: self-understanding, self-discovery, self-reliance, self-direction, self-actualization - Types of guidance- Major guidance areas: Personal, Educational, Career, Social, Health, Marital and Family.	20 Hours
II	Counselling: Need, characteristics, principles of counselling - Types- Directive, non-Directive and eclectic approaches in counselling - Counselling therapies: Client Centered Therapy (Carl Rogers), Behavior therapy (B.F. Skinner) and Psychoanalytic Therapy (Sigmund Freud)-Qualities of counsellor - Relationship between guidance and counselling - Place of counselling in the total guidance programme.	20 Hours
III	Guidance and Conselling Tools: Tools: Intelligence tests, achievement tests, aptitude tests, personality inventories, interest Inventories and attitude Scales – Non-testing devices: Cumulative record card, sociometric techniques, case study, anecdotal record, autobiography, home visits, interview and observation - Presenting, analyzing, interpreting and reporting the data.	20 Hours
IV	Guidance Programme: Guidance at various levels of education - School Guidance: a collaborative effort of school and community -	20 Hours

	Organisation of guidance programmes in schools- Types of guidance services: Orientation, information, individual inventory, counseling, placement, follow-up - Resources required for organizing guidance services - Role of principals and teachers in guidance programmes- Importance of guidance in educational institutions.	
V	Guidance and Counselling of Exceptional Students: Exceptional children: Meaning and Nature - Identification - Guidance and counselling of students with behavioural problems and underachievement - violence, bullying, drug abuse, truancy and dropout- nature of stress and its causes- consequences of stress - types of coping skills - Guidance for gifted, creative, physically and intellectually challenged students – Delinquency: Causes, identification and guidance - Promoting psychological well-being and peace through school based programmes.	20 Hours
References	Text Books: • Agrawal, J.C. (2000). <i>Educational Vocational Guidance and Counselling</i>, New Delhi: Daba House. ◀ ◀ • Bhatnagar, Asha and Gupta, Nirmala (Eds.) (1999). <i>Guidance and Counseling</i>, Vol. I: A Theoretical Perspective, New Delhi: Vikas Publishing house Pvt. Ltd. ◀ • Chauhan S.S. (2001). <i>Principles and Techniques of Guidance (2nd ed.)</i>, New Delhi; Vikas Publishing house Pvt. Ltd. ◀ ◀ • Daniel Gartrell (1998). <i>A Guidance Approach for the Encouraging Classroom (2nd Ed.)</i>, Delmar: Delmar Publishers. ◀ ◀ • Dash B.N (2005) <i>Guidance Services in Schools</i>, New Delhi: Dominant Publishers and Distributors. References: • Gibson, R.L. & Mitchell, M.H. (1986). <i>Introduction to Guidance</i>. New York: McMillan • Glickman, C & Wolfgang, C. (1981). <i>Solving Discipline Problems: Strategies for Classroom Teachers</i>. Boston: Allyn and Bacon. ◀ • Indira Madhukar (2005). <i>Guidance and counselling</i>, New Delhi; Authors Press India ◀ ◀ • Kochhar S.K. (2006). <i>Guidance and Counselling in Colleges and University</i>,	

	New Delhi: Sterling Publishers Private Limited. < < • Robert L. Gibson and Marianne H. Mitchell (2014). <i>Introduction to Counselling and Guidance, (7th Ed.)</i>, New Delhi: PHI Learning Pvt. Ltd. < < • Safaya B.N. (2002). <i>Guidance and counselling</i>, Chandigarh: Abhishek publications. < < • Tamara E. Davis (2005). <i>Exploring School Counselling Professional Practices and Perspectives</i>, New York: Hoonghton Mifflin Company.
Course Outcomes CO CO CO CO CO	The student after studying these chapters will be able to 1. Apply knowledge on concept, purpose of guidance and the types of guidance. 2. Understand the knowledge on counseling types and relationship between guidance and counseling 3. Illustrate the knowledge of guidance and counseling tools and non-testing devices 4. Categorize the guidance at various levels and Importance of guidance in educational institutions. 5. Identify the basic facts about guidance and counseling of students with behavioral problems and underachievement.

CORE II
BRITISH LITERATURE II
(From the Age of Dryden to the Romantic Age)

Course Objectives:

- To enable students to read and appreciate the poems of this age.
- To cultivate among students a sense of understanding in order to make them better human beings by exposing them to literature.
- To introduce students to representative texts by major writers of the period.

Course Outcomes:

On successful completion of the course, the students will be able to

- CO1 - gain knowledge on different genres and their characteristic features in the works of Restoration and Romantic Ages-K 1
- CO2 - realize the works in Socio-cultural contexts-K2
- CO3 - attain knowledge of various techniques of writings-K3
- CO4 - understand the evolution of literature in the Restoration and Romantic ages –K5
- CO5 - demonstrate the literary sensibilities in creative writings and research –K4 & K6

Unit I

Introduction to the age of Dryden to the Romantic age

Unit II Poetry

Detailed

John Dryden	:	Macflecknoe Lines 1-150
William Wordsworth	:	Three Years She Grew
Samuel Taylor Coleridge	:	The Ancient Mariner
Percy Bysshe Shelley	:	Ode to the Skylark
John Keats	:	Ode to the Grecian Urn

Non Detailed

Alexander Pope	:	Ode on Solitude
Oliver Goldsmith	:	The Village School Master
William Blake	:	A Poison Tree

Robert Burns	:	A Red, Red Rose
Lord Byron	:	When We Two Parted

Unit III Prose

Detailed

Charles Lamb	:	From Essays of Elia
		1. Old China
		2. In Praise of Chimney Sweepers
		3. South Sea Houses

Non Detailed

Joseph Addison and Richard Steele:	From Coverley Papers
	1. Sir Roger and the Club
	2. A Village Witch

Unit IV Drama

Detailed

Richard Brinsley Sheridan	:	The Rivals
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Non Detailed

Oliver Goldsmith	:	She Stoops to Conquer
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Unit V Fiction

Jonathan Swift	:	Gulliver's Travels
Jane Austen	:	Mansfield Park
Sir Walter Scott	:	Kenilworth

Books Prescribed:

1. Hudson, William Henry. An Outline History of English Literature. Atlantic Publishers, 1999.
2. The Winged Word. Ed by David Green, Macmillan India Limited, 2009

References:

1. Compton-Rickett, Arthur. A History of English Literature. Vol. 85. TC & EC Jack, 1912.
2. Daiches, David. A Critical History of English Literature. Secker and Warburg, 1972.

3. Legouis, Emile, and Louis François Cazamian. A History of English Literature. Vol. 2. JM Dent & Sons Limited, 1927.
4. Saintsbury, George. A History of English Prose Rhythm. Macmillan and Company, Limited, 1922.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	S	S	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	S
CO5	S	S	S	S	M

S- Strong M-Medium

CORE III
BRITISH LITERATURE III
(From the Victorian Age to the Modern Age)

Course Objectives:

- To improve the literary and critical competence of the students pertaining to this age.
- To make students familiar with the various styles and thoughts expressed by the writers of the age.
- To introduce students to representative texts by major writers of the period.

Course Outcomes:

On successful completion of the course, the students will be able to

- CO 1 Foster the emergence of science, rational thinking and existentialism (K 1)
- CO 2 Cultivate the understanding of politics behind governance and religion (K 2)
- CO 3 Enrich the applications of theories and criticism (K 1)
- CO4 Contextualize the transition in modernism (K 4)
- CO5 Assist to perceive the ideas of equality, liberty and fraternity (K 5)

Unit I

Introduction to the Victorian age to the Modern age

Unit II Poetry

Detailed

T.S. Eliot : The Waste Land

Non Detailed

Alfred Lord Tennyson : Break Break Break

Robert Browning : Fra Lippo Lippi

William Butler Yeats : The Second Coming

W.H.Auden : The Shield of Achilles

Unit III Prose

Detailed

Matthew Arnold : The Study of Poetry

Non Detailed

Thomas Carlyle : The Hero as Poet

Unit IV Drama

Detailed

George Bernard Shaw : Pygmalion

Non Detailed

Samuel Beckett : Waiting for Godot

Unit V Fiction

Charles Dickens : A Tale of Two Cities

James Joyce : Portrait of the Artist as a Young Man

Thomas Hardy : Far From the Madding Crowd

Wilkie Collins : The Moonstone

Books Prescribed:

1. Hudson, William Henry. *An Outline History of English Literature*. Atlantic Publishers & Dist, 1999.
2. David Green, editor. *The Winged Word*. Macmillan, Madras, 1974.

References:

1. Compton-Rickett, Arthur. *A Primer of English Literature*. T. Nelson, 1941.
2. Daiches, David. *A Critical History of English Literature*. Secker & Warburg, 1991.
3. Legouis Émile, et al. *A History of English Literature: In 2 Vol*. Dent, 1926.
4. Saintsbury, George. *A Short History of English Literature*. Macmillan, 1898.

Web Sources:

1. <https://www.thefamouspeople.com/19th-century-british-writers.php>
2. <https://neoenglish.wordpress.com/2010/12/27/the-influence-of-science-on-victorian-literature/>
3. <https://www.bl.uk/romantics-and-victorians/themes/technology-and-science>
4. https://www.wwnorton.com/college/english/nael/20century/topic_2_05/welcome.htm

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	M	M	M	S
CO3	M	M	S	M	S
CO4	M	S	S	M	S
CO5	M	S	S	M	S

S - Strong M - Medium

**CORE V
SHAKESPEARE I**

Course Objectives:

- To introduce the significance of Shakespeare and his works.
- To kindle the enthusiasm, interest and desire to study his plays further.
- To appreciate his contribution to English literature.

Course Outcomes:

On successful completion of the course, the students will be able to

CO1- understand the greatness and uniqueness of Shakespearean characterization, themes and techniques – K2

CO2- analyse and differentiate personalities in literature and life – K4

CO3- understand the effectiveness of language in Shakespeare's plays – K1

CO4- acquire skills like decision-making and problem-solving – K4

CO5- apply Shakespearean technique of handling people in the present context – K3

Unit I and II

Detailed

Hamlet

Unit III

Detailed

Taming of the Shrew

Unit IV

Non Detailed

Richard II

Unit V

Sonnets – 30, 54, 77, 128, 146

A Midsummer Night's Dream

References:

1. Bradley, A C. *Shakespearean Tragedy*. New Delhi: Atlantic, 2010.
2. Johnson, Samuel. *Preface to Shakespeare*. BLURB, 2019.
3. Bevington, David M. *Twentieth Century Interpretations of Hamlet: A Collection of Critical Essays*. Englewood Cliffs, N.J: Prentice-Hall, 1968.
4. Watts, Cedric. *Twayne's New Critical Introductions to Shakespeare*. Boston: Twayne Publ, 1988.
5. Huston, J. Dennis. *Shakespeare's Comedies of Play*. Palgrave Macmillan, 2014.
6. Brooke, Nicholas. *Shakespeare: Richard II: A Casebook*. London: Macmillan, 1983.
7. Tillyard, Eustace M. W. *Shakespeare's History Plays*. London: Penguin Books, 1991.
8. Leggatt, Alexander. *Shakespeare's Comedy of Love*. Routledge, 2005.

Web Sources:

<https://www.sparknotes.com/nofear/shakespeare/hamlet/>
<https://www.sparknotes.com/nofear/shakespeare/shrew/>
<https://www.bl.uk/works/shakespeares-sonnets>
<https://www.rsc.org.uk/a-midsummer-nights-dream/>
<http://www.novelguide.com/node/3695>

Mapping with Programme Outcomes:

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	S	M	S
CO3	M	S	M	S	S
CO4	S	S	M	M	M
CO5	M	S	M	S	S

S - Strong M - Medium

ELECTIVE II WORLD SHORT STORIES

Course Objectives:

- To understand the origin and development of short story.
- To appreciate the creative nuances of writers across the world recognizing and appreciating the multiplicity of voices.

Course Outcomes:

On Successful completion of the course, the students will be able to

- CO 1 Inculcate the interest of reading and articulate the value assumptions through short stories (K1 & K2)
- CO 2 Improve communication skills by LSRW method (K 3, K 4 & K 5)
- CO 3 Enrich the word power & vocabulary of English language (K 3)
- CO4 Induce the art of creative writing and make them to understand how short stories can express individual and human values within a particular historical context. (K 4)
- CO5 Import classical, romantic & modern style short stories and demonstrate awareness of the scope and variety of short stories that focus on gender, class, race, etc. (K 5)

Unit I

Introduction to Short Stories

Unit II American Literature

Francis Richard Stockton	:	A Lady or the Tiger
Edgar Allan Poe	:	The Fall of the House of the Usher
John Steinbeck	:	The Chrysanthemums
W.W. Jacobs	:	A Monkey's Paw

Unit III British Literature

Oscar Wilde	:	The Model Millionaire
R.L.Stevenson	:	Markheim
Katherine Mansfield	:	A Cup of Tea
W Somerset Maugham	:	The Verger

Unit IV Commonwealth Literature

Alice Munro	:	Boys and Girls
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Chinua Achebe	:	Marriage is a Private Affair
Patrick White	:	A Glass of Tea
Ian McDonald	:	Driftings

Unit V Indian Short Stories

R.K.Narayan	:	A Horse and Two Goats
Rama Chandra Behera	:	The Passenger
Kalki	:	The Poison Cure
Khuswant Singh	:	Karma

References:

1. *Short Stories of Yesterday and Today* – Shiv K.Kumar
2. *Daughter of Man and Other Stories*. Ed. by Prof. S. Anthony Sivam and Dr.K. Gunasekaran
3. Kumar, Shiv K. *Short Stories of Yesterday and Today*, OUP, 1992.

Web Sources:

1. <https://www.rcboe.org/cms/lib010/GA01903614/Centricity/Domain/4395/Elements%20of%20a%20Story.pdf>
2. <https://schools.ednet.ns.ca/avrsb/070/rsbennett/eng12/coursematerials/shortstories/STSTORY%20intro.pdf>
3. http://acip.sd79.bc.ca/vocab_sheets/short_story_terms.pdf

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	M	M	S	S	M
CO3	M	S	S	S	M
CO4	S	M	S	S	S
CO5	M	S	S	S	M

S - Strong M - Medium

Course Name	Public Health Nutrition	Programme Name	M.Sc. Food Science, Technology and Nutrition
Course Code	18FSNTC12	Academic Year	2018-2019
Type of Course	Theory	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Understand public health nutrition and able to assess nutritional status
CO2	Identify the surveillances of nutrition status in emergency population
CO3	Discuss the nutrition transition and food security system, policies of developing countries
CO4	Describe the public health nutrition strategies for nutritional problems in India
CO5	Recognize the role of nutrition education in community

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	3	2	3	3	3	3	3
CO2	3	1	2	1	3	3	2	3	3	3	3	3
CO3	3	1	2	2	3	3	2	3	3	3	3	3
CO4	3	1	2	2	3	3	2	3	3	3	3	3
CO5	3	2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Community Nutrition	To impart knowledge on Growth monitoring methods and assessment of nutritional status of the community	10+3+1=14
Nutrition assessment and surveillance	To understand the nutritional status, epidemiology and to assess the indicators of the surveillance	10+3+1=14
The nutrition transition and food security system, policies to developing countries	To illustrate the nutrition transition and food security system, diversity, environmental impact and policies to developing countries	10+3+1=14
The public health nutrition strategies for nutritional problems in India	To elaborate strategies of the public health nutrition, nutritional problems and program for prevention of the nutritional problems	10+3+1=14
The role of nutrition education in community	To Appraise the types, methods, Planning In nutrition education, problems and career of public health nutrition	10+3+3=16
Total Hours of Instruction		72 (18x4)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN :

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
UNIT 1: Community Nutrition					
35.	Definition of community	CO1	K1,F	Dramatize the community nutrition	K3,S3
36.	Public health nutrition and cycle	CO1	K2,C	Collect the recent information on public health nutrition	K2,S1
37.	Nutritional status assessment(Direct)	CO1	K3,P	Identify a mode of direct assessment method and create a video	K3,S3
38.	Growth monitoring methods and body composition studies	CO1	K4,P	Discriminate the different growth monitoring methods	K6,S1
UNIT 2: Nutrition assessment and surveillance					
39.	Assessment of Nutritional Status(indirect)	CO2	K2P	Collect the video on indirect nutritional assessment	K2,S1
40.	KAP survey , nutrition indicators	CO2	K5P	Create a report on KAP survey	K4,S4
41.	Assessment and surveillance of nutrition status in emergency affected population.	CO2	K4P	Collect recent information on emergency situation occurred in India	K5,S5
42.	Nutritional epidemiology	CO2	K2C	Prepare a document on the relation between food and disease	K1,S1
UNIT 3: The nutrition transition and food security system, policies to developing countries					
43.	Nutrition transition in developing countries	CO3	K2,C	Collect the information on nutrition transition for ppt presentation (idea generate)	K2,S1

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

44.	Definition of food security	CO3	K1,C	Describe the food security	K6, S1
45.	Factors affecting food security system and food security status assessment	CO3	K2,C	Formulate a questionnaire regarding KAP survey (report)	K5,S5
46.	National and international approaches to improve food security	CO3	K2,C	Collect the current scenario concept that improves food security	K4,S2
47.	Dietary diversity and its assessment	CO3	K2,C	Describe the household dietary diversity survey report	K6,S3
48.	Environmental impacts	CO3	K4,F	Conclude the environmental impacts that affects food security	K2,S1
49.	Insecure employment and energy reliance	CO3	K2,C	Case study on insecure employment	K5,S1
50.	Political, economical and social processes influencing food	CO3	K2,C	Awareness program to the public on food insecurity	K6,S2
51.	Nutritional policies and legislation	CO3	K2,C	Illustrate the nutritional policies and legislation followed in India	K4,S2
UNIT 4: The public health nutrition strategies for nutritional problems in India					
52.	Policies and program address food insecurity	CO4	K2,C	Describe the policies and programmes related to food security	K6,S3
53.	Hunger and intervention in diverse population	CO4	K4,C	Prepare a module to reduce the hunger in diverse population	K3,S5
54.	Nutrition related program	CO4	K2,C	Appraise the nutritional related programmes	K4,S3
55.	Prevention of public health and nutrition problems	CO4	K2,C	List out the program in history of one program	K1,S1
56.	Preventive programmes of nutritional problems in India	CO4	K2,C		
UNIT 5: The role of nutrition education in community					
57.	Types and method of nutrition education	CO5	K1,F	Design a flowchart about the different types of methods in nutrition education	K5,S5
58.	Principles of planning in nutrition education	CO5	K2,F	Explain the principles of planning in nutrition education	K6,S2
59.	Executing and evaluating nutrition education programmes	CO5	K2,C	Evaluate the nutrition education programmes and justify	K6,S5
60.	Problems of nutrition education	CO5	K2,C	Relate the problems in nutrition education	K3, S1
61.	Roles and responsibilities of public health nutritionist and careers in public health nutrition	CO5	K2,C	Point out the roles and responsibilities of public health nutritionist	K4, S5

REFERENCES

TEXTBOOKS	
1.	Michael J. Gibney, Barrie M. Margetts et al, (2013) Public health nutrition, Blackwell publishing, 1 st edition.
2.	Suryataba Das (2018) Textbook of community nutrition, Academic Publishers, 3 rd Edition.
3.	Natalie stein (2014) Public Health Nutrition, Jones & Bartlett learning publishers, 1 st Edition.
REFERENCE BOOKS	
1.	Sheila Chander Vir, (2011) Public Health Nutrition in Developing Country, WPI Publishing, Part -1.
2.	Margaret, Ronny et al, (2020) Public Health Nutrition (Rural, Urban, and Global Community-Based Practice), Springer Publishing.
3.	Bratati Banerjee, DK Taneja's (2017) Health policies programmes in India, Jaypee Brothers Medical publishers, 15 th Edition.
4.	Mark Lawrence & Toney Worsley (2007) Public Health Nutrition from Principles to practice, Open University Press, 1 st Edition.
5.	Natellie Stein, MS (2014) Introduction to public health nutrition. Pp 4-12
6.	Bamji, MS Rao et al (2003) Textbook of Human Nutrition, Oxford and IBH Publishing Co.Pvt.Ltd., New Delhi.
7.	Michael J. Gibney, Barrie M. Margetts, John M. Kearney, Lenore Arab (2013) Public Health Nutrition, Wiley Blackwell.
8.	Michigan Natalie Stein. Public Health Nutrition, 2014
9.	Sheila ChanderVir (2015) Public Health and Nutrition in Developing Countries (Part I and II). Wood head publishing India PVT Ltd, New Delhi
10.	Judith L. Buttriss, Ailsa A. Welch, John M. Kearney, Susan A. Lanham-New (2017) Public Health Nutrition, Wiley Blackwell.
11.	Jacqueline Edington (1999) Problems of nutritional assessment in the community. Proceedings of the Nutrition Society (1999), 58,47-51
12.	K. Vijayaraghavan (2011) Food and nutrition situation in India. Pp -878-889
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Course Name	Nutritional Policies and Programmes	Programme Name	M.Sc. Food Science Technology and Nutrition
Course Code	18FSTNE06	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	III

COURSE OUTCOMES:

On completion of the course, the students will be able to												
CO1:	Generalize the nutritional policies and Schemes available in india											
CO2:	Associate the principles of nutrition programmes and educational level of nutrition programme.											
CO3:	Classify various organization and Services provided.											
CO4:	Find out the merits and demerits of the each organization sector											
CO5:	To Provide the voluntaries Service among the community											
Mapping of COs with POs, PSOs												
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	2	1	1	3	3	2	3
CO2	3	1	1	1	1	2	2	2	3	2	2	3
CO3	3	1	1	1	1	2	2	2	3	2	2	3
CO4	3	1	1	1	1	2	1	2	1	2	3	3
CO5	3	2	1	2	1	3	2	3	2	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Nutrition Policies and Schemes	To impart nutrition policies and schemes	10+3+1=14
Nutrition Programmes	To understand the nutrition programmes	10+3+1=14
National Organization	To elucidate the national organizations and it structure	10+3+1=14
International Organization	To elaborate the international organizations and it structure	10+3+1=14
International Voluntary Services	To illustrate the international voluntary service and its current scenario	10+3+3=16
Total Hours of Instruction		72 (18x4)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN:

Unit/Chapter	Intended learning practices	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
UNIT 1: Nutrition Policies and Schemes					
1.	History of Nutritional Policies and Programmes	CO1	K1,F	Identify the of Nutritional Policies and Programmes in India	K1,S2
2.	Millennium Development Goals (MDG)	CO1	K2,C	Tabulate the eight different millennium development goals	K3,S2
3.	Nutritional Policies in India (National Nutrition Goals, National Nutrition policy, National Food Security Mission, National Food Security Bill, Public Distribution System, National plan of Action on Nutrition).	CO1	K2,C	Identify the different kinds of nutritional policies and compare each other	K3,S1
4.	Nutrition Schemes in India (Ministry of Agriculture, GraminBhandranYojana, Ministry of Women and Child Development, SABALA or Rajiv Ghandhi Scheme for Empowerment of Adolescent girls, Ministry of Tribal Affairs, Village Grain Bank Scheme, Ministry of Rural Development, Annapurna Scheme, Ministry of Consumer Affairs (SC/ST/OBC Hostels)).	CO1	K1,F	Identify the nutrition schemes available in India and compare each other	K3,S1
5.	Nutrition in India(Targeting the first 1000 days of child's life, Scheme for Supply of food grains to welfare institutions, AkshayaPatra and private sector participation in mid-day meals,	CO1	K2,C	Sketch out the mid-day meal programme, Akshayapatra, SampoornaGrameenRozgarYojana, SaravaShikshaAbhiyan, RashtriyakrishiVikasYojana	K3,S2

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	SampoornaGrameenRozgarYojana, SaravaShikshaAbhiyan, RashtriyakrishiVikasYojana)				
UNIT II: Nutrition Programmes					
6.	Ministry of Rural Development	CO2	K2,F	Identify and explain the schemes/ programmes in ministry of rural development	K3,S1
7.	Applied Nutrition Programme	CO2	K2,C	Sketch out the applied nutrition programme	K3,S2
8.	Ministry of social welfare (ICDS-Integrated child development scheme, Balwadi Nutrition Programme, Special Nutrition Programme).	CO2	K1,P	List out the social welfare programmes and explain in detail	K4,S1
9.	Ministry of Health and Family welfare (National Nutritional Anemia Prophylaxis programme, National prophylaxis programme for prevention of Blindness due to Vitamin A Deficiency, National Iodine Deficiency Disorder Control Programme)	CO2	K2,C	Sketch out the national nutritional programmes	K3,S2
10.	Ministry of Education(Mid-day meal programme, programmes for communicable and non-communicable diseases, Wheat based supplementary nutrition programmes).	CO2	K2,C	Elaborate the ministry of education programmes such as Mid-day meal programme, programmes for communicable and non-communicable diseases, Wheat based supplementary nutrition programmes	K6,S1
11.	World Food Programme Projects(CARE assisted Nutrition Programmes, Tamil Nadu Integrated Nutrition Projects, UNICEF Assistance For Women and Children, Emergency Feeding Programme).	CO2	K2,C	Criticize the current scenario of world food programme project	K1,S2
12.	National Programme for Nutrition Support to primary Education,	CO3	K2,C	Sketch out the overall responsibility of national nutritional programmes that support primary education	K4,S2
13.	National Food for work Programme.	CO3	K2,C	Appraise the national food for work programme	K5,S2
UNIT III: National Organization					
14.	ICMR	CO3	K2,C	Sketch out the national organization and explain the current scenario	K3,S4
15.	NIN	CO3	K2,C		
16.	NNMB	CO3	K2,C		
17.	CFTRI	CO3	K2,C		
18.	DFRL	CO3	K2,C		
19.	ICAR	CO3	K2,C		
20.	NIPCCD	CO3	K2,C		
21.	NSI	CO3	K2,C		
22.	NFI and IDA	CO3	K2,C		
UNIT IV: International Organization					
23.	FAO	CO4	K2,C	Sketch out the international organization and explain the current scenario	K3,S2
24.	WHO	CO4	K2,C		
25.	UNICEF	CO4	K2,C		
26.	UNESCO	CO4	K2,C		
27.	UNDP	CO4	K4,C		
28.	World Bank Data	CO4	K4,C		
UNIT V: International Voluntary Services					
29.	CARE	CO5	K2,C	Criticize the forms and structure of International Voluntary Services	K5,S1
30.	CRS	CO5	K2,C		
31.	IDRC	CO5	K2,C		
32.	Micronutrient Intitative(MI)	CO5	K4C		

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

33.	IFPRI	CO5	K2C		
34.	WFS	CO5	K2C		
35.	WFP	CO5	K2C		
36.	AUSAID	CO5	K2C		
37.	CIDA	CO5	K2C		
38.	SIDA	CO5	K2C		
39.	DANIDA	CO5	K2C		
40.	USAID	CO5	K2C		

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TEXTBOOKS	
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2	Brown, K., & Osborne, S. P. (2012). Managing change and innovation in public service organizations. Routledge.
3	Rao, K. M. (2005). Textbook of horticulture. Macmillan.
REFERENCE BOOKS	
1	Frison, E. A., Smith, I. F., Johns, T., Cherfas, J., & Eyzaguirre, P. B. (2006). Agricultural biodiversity, nutrition, and health: making a difference to hunger and nutrition in the developing world. Food and nutrition bulletin, 27(2), 167-179.
2	Andrews, N., Khalema, N. E., & N'Dri, T. (Eds.). (2015). Millennium Development Goals (MDGs) in Retrospect: Africa's Development Beyond 2015 (Vol. 58). Springer.
3	World Health Organization. (2018). The state of food security and nutrition in the world 2018: building climate resilience for food security and nutrition. Food & Agriculture Org..
4	Jolly, R. (2014). UNICEF (United Nations Children's Fund): Global Governance that Works. Routledge.
5	Geissler, C., & Powers, H. J. (Eds.). (2017). Human nutrition. Oxford University Press.
JOURNALS AND DOCUMENTS	
1	International Journal of Nonprofit and Voluntary Sector Marketing, Wiley-Blackwell Publisher
2	The Indian journal of medical research, Indian Council of Medical Research

PROGRAMME SPECIFIC OUTCOMES

To enable the students to develop their skills related to competitive examinations.

To make the student select a career in historical research

To focus on the students to prepare for the UGC- NET Examination.

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I SEMESTER

CORE COURSE

18HIC01

ANCIENT SOCIETIES

COURSE OBJECTIVES

It is intended to provide the students higher level understanding of the history of the ancient societies.

To make the students aware of the Great Civilizations of the World.

To explore the world of ancient societies.

To develop a critical understanding of the subject.

To study various aspects of the Civilizations like polity, literature, philosophy, and Arts of the Civilizations.

COURSE SPECIFIC OBJECTIVES

The different aspects belonging to the ancient world will be thoroughly examined in the light of the new researches in the mentioned field.

UNIT- I: Origins

Age of the Earth - the Evolution of Man in Africa, Europe and Asia - Origin and growth of Primitive cultures.

UNIT- II: From Food-gathering to Food-production

Hunting and Gathering –Food production and village settlements – Division of labour and craft specialization

UNIT- III: Bronze Age Civilizations

Economy; Society; Religion; State structure- Egypt (old kingdom); Mesopotamia (up to the Akkaadian Empire)

UNIT- IV: Slave societies in Ancient Greece and Rome

Agrarian economy - Urbanization and Trade - Athenian Democracy - Roman Empire - the Roman and Greek cultures.

UNIT- V: Decline of the Roman Empire

Disappearance of Latifundia and the emergence of colonate and patrocinium systems – Germanic social formations and the Germanic invasions of the Roman Empire – The origins of Feudalism.

References

- Jones Arnold H.M., *The Decline of the Ancient World*.
Austin M.M & Vidal-Naguet. P, *Economic and Social History of Ancient Greece*
Bengston, H., *Introduction to Ancient History*.
Braidwood, R.J., *The Near East and the Foundation of Civilization*.
Chang,K.C., *The Archaeology of Ancient China*.
Childe,V.Gordon, *Man Makes Himself*.
Childe,V.Gordon, *Social Evolution*.
Childe,V.Gordon., *What Happened in History*.
Clark, Grahame &Piggot Stuart, *Pre-Historic Societies*.
Hawkes, J., *The First Great Civilization: Life in Mesopotamia, the Indus and Egypt*.

COURSE OUTCOME

To analyse Ancient world civilization

Highlight the significance of Roman & Greek Cultures.

To understand the process of development into different fields of human civilization;

To enlighten the students with the socio-cultural formation and the need for heritage building measures.

COURSE SPECIFIC OUTCOME

To inculcate historical understanding on the process of Ancient society.

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II SEMESTER

CORE COURSE

18HIC05

HISTORY OF MODERN EUROPE (CE 1453 TO 1789)]

COURSE OBJECTIVES

This course provides a survey from the fall of Constantinople in 1453 to the French Revolution in 1789.

To make the students understand world history

To facilitate the students to understand the concepts on world history

To inculcate the spirit of universal brotherhood

To analyse different issues on world history

COURSE SPECIFIC OBJECTIVES

To study the significant period in the history of Europe its important social, cultural, intellectual and technological changes in this period.

UNIT- I: The Transition from Medieval to Modern

Significance of the fall of Constantinople - Renaissance and Reformation – Economic and Technological Developments in Early Modern Europe –Transition from Feudalism to Capitalism - Rise of New Monarchies in England, Spain and Russia.

UNIT- II: Explorations, Conquest and Colonization

Portuguese Explorations and the Sea Route to India - Spanish Explorations – Columbus and the discovery of the New World - Spanish conquest of America – American Silver and the Price Revolution - The Columbian Exchange.

UNIT- III: European State System

Growth of Absolutism in Spain and England - The Thirty Years War – France under the Bourbons – Expansion and Europeanisation of Russia – Economic Nationalism and Mercantilism – The Dutch Commercial Empire - Anglo-French Rivalry - The Hegemony of Britain.

UNIT- IV: English and French Revolutions

English Civil War and Puritan Revolution - Cromwell's Regime – Stuart Restoration - Glorious Revolution and its aftermath – Nature and causes of the French Revolution.

UNIT- V: Intellectual Currents

Scientific Revolution from Copernicus to Newton - Intellectual Revolution of the seventeenth century – Eighteenth Century Enlightenment.

References

- Adas, Michael. *Machines as the Measure of Men: Science, Technology and Ideologies of Western Dominance*, Delhi, Oxford University Press, 1990.
- Ashton, Trevor. *Crisis in Europe, 1560-1660*, London, Routledge, 1970.
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- Crosby, Alfred W., *The Columbian Exchange: Biological and Cultural Consequences of 1492*, Westport, Praeger, 2003.
- Davis, R., *The Rise of the Atlantic Economies*, London, 1975.
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- Poulton, Richard, *A History of the Modern World*, London, 1984.
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- *World History from Early Times to A.D. 2011*, New Delhi, Sterling Publishers, 2014.
- Stavrianos, L., *The World Since 1500: A Global History*, New Jersey, 1982.
- Swain, J.E. *A History of World Civilization*, New Delhi, Eurasia Publishers, 1970.
- The New Cambridge Modern History*, Vol. I to XII, 1960-65.
- Thomson, David, *Europe Since Napoleon*, London, Penguin, Reprint, 1966.
- Wright, Esmond, gen. ed., *History of the World: The Last Five Hundred Years*, London, 1984.

COURSE OUTCOME

- To critically evaluate different events in world history
- To comprehend the influence of Renaissance in making of world history
- To figure out the impactful events in the Transition of world History

COURSE SPECIFIC OUTCOME

- To know the various scientific developments during Enlightenment period and its contributions for emergence of new scientific world .

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II SEMESTER

CORE COURSE

18HIC06

SOCIETY AND ECONOMY OF COLONIAL INDIA

COURSE OBJECTIVES

The course aims at providing comprehensive understanding of the transformations in the economy of colonial India.

It covers the introduction of land and agrarian policies under the British rule.

It also delineates the transformation that was effected in the urban space of British India.

COURSE SPECIFIC OBJECTIVES

It focuses on the emergence of modern Industry and the rise of new social classes in colonial India.

UNIT- I: Rural economy and Society in 18th century India

The rural agrarian social structure – Land Revenue Settlements -Agrarian Transformation - Rise of Land Lordism - Commercialization of Agriculture – Peasants and landless labour - Rural Indebtedness.

UNIT- II: Trade and Urbanization

Changes in the trading economy of India in the 18th century–Surat, Bengal and Coromandal – Trade and Trade routes - Transformation of the Urban Space: Colonial Urbanization and the rise of new urban centres.

UNIT- III: Social and Religious Reform

British Policies and Social Transformation: Growth of Western Education and the Press - Indian Renaissance - Rise of New Social Classes - Caste mobilization – Anti-Caste movements and movements for Social Justice.

UNIT- IV: Emergence of Modern Industries

De-Industrialization and the decline of the artisans - Growth of Modern Industry: Cotton Textile Industry - Jute Industry - Iron and Steel Industry.

UNIT V: Changing Role of Women

Reform Movements and Women - Growth of female education - Women's organizations - The Movement for Women's Suffrage - Women and work in colonial India

References

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- Tomlinson, B.R. *The Economy of Modern India, 1860-1970*, New Delhi, Oxford University Press, 1993.

COURSE OUTCOME

To bring out the important changes in the rural economy & society during 18th Century.
 Understand the Colonial Urbanization and the rise of new urban centres
 Highlight the significance of Growth of Western Education in India.

COURSE SPECIFIC OUTCOME

The examines the role of women's legal status in pre India; focuses on women's contribution to social and environmental movements in colonial India.

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III SEMESTER

CORE COURSE

15HIC10

HISTORY OF CONTEMPORARY INDIA (Since 1947)

COURSE OBJECTIVES

- To understand the realm of current politics through democracy governments.
- To expose India's foreign policies of various governments.
- To evaluate economic policies and development of science and technology
- To study social changes which transformed the Indian society
- To analyze the issues and challenges in contemporary India.

COURSE SPECIFIC OBJECTIVES

This course attempts to understand contemporary India through political, economic and social changes by the different governments.

UNIT – I: The Making of Modern India

The Aftermath of Partition – The Integration of Princely States - Making of the Constitution – Reorganization of States- Indian Emergency – Emergence of Coalition Politics – The Mandal Commission - The Punjab Crisis - Panchyat raj and reservation for women – Anti Mandal protests - Ayodhya Dispute – Era of Coalitions.

UNIT – II: India's Foreign Policy: Origins, Continuity and Changes

Panch Sheel - Issues in India-Pakistan Relations - Chinese Aggression – India China War - Non-Alignment - India-Pakistan War of 1971 – Simla Agreement – Pokharan I – Siachen Conflict- Look East Policy –Nuclear Policy and Tests- Kargil War.

UNIT – III: Economic Policies and Progress in Science and Technology

Beginnings of Planned Economy – Five Year Plans - Land Question - Industrial Policy – Green Revolution - Progress in Science and Technology in the Nehruvian and post - Nehruvian Era— Liberalization of Economy – Economic transformation.

UNIT – IV: Social Change and Transformation

Land Marks in the Progress of Education - Hindu Code Bills - Changes in Family Structure, Caste and

Stratification - Assertion of Dalits and Backward castes — Civil Society Activism: Bhoodan, Chipko and Save Narmada Movements.

UNIT – V: Contemporary Issues and Challenges

Regional Separatism – Identity Politics in India – Left Wing Extremism and Insurgency – Corruption in Indian Public Life: Scams and Scandals — Women and Personal Laws – The Affirmative Action Debate in India

References

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- Vanaik Achin & Rajeev Bhargava. *Understanding Contemporary India Critical Perspective*, Hyderabad, Orient Black Swan, 2010.

COURSE OUTCOME

Acquired the knowledge on Making of Contemporary India
Obtained the role of political parties to built secular democracy.
Assess the significance of India's Foreign Policy
Highlights the development of Indian Economy in the Global context.

COURSE SPECIFIC OUTCOME

To draw on the students into historical understanding of contemporary Indian politics, economic and social conditions.

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IV SEMESTER

ELECTIVE COURSE

18HIEC04

INTERNATIONAL RELATIONS SINCE 1945 CE

COURSE OBJECTIVES

The broad aim is to make students aware about the International relations since 1945 to present days.

To highlight the Theories on International Relations

To approach analytically the challenges of International Relations

To disseminate the Challenges and responses of International Relations

COURSE SPECIFIC OBJECTIVES

To achieve a personal understanding of whether or not they possess the ability, motivation and interest to pursue further postgraduate study in History.

UNIT- 1 Introduction to International Relations

Nature and Scope of International Relations – Theories of International Politics – National Power and National Interest – Balance of Power and its relevance – Collective Security – Determinants of Foreign Policy and Diplomacy.

UNIT- II United Nations Organization

Structure, Power and Functions of U.N.O – Specialized Agencies of U.N.O. – Reformation and Revision of the U.N.O – Challenges before the U.N.O – Evaluation of the U.N.O.

UNIT- III Contemporary Relevance of Cold war

Origin, Meaning and Basis of Cold War – Different Phases of Cold War – Implications and Impact of Cold War – End of Cold War - Collapse of the Soviet Union and the Unipolar World System – Foreign Policies of USA, USSR, China and India.

UNIT- IV Arms Race, Nuclear Disarmament and Terrorism

General factors pertaining to Arms Race and Nuclear Disarmament – Arms Control Treaties: PTBT, NPT, CTBT, SALT – I & II, START etc., East West Military Confrontation – Impact of Nuclear Weapons on International Politics – History of Terrorism – Definitions of Terrorism – Terrorism and Counter Terrorism on International Politics.

UNIT- V Regional Organizations

Military Pacts: NATO, SEATO, CENTO, ANZUS, Warsaw Treaty, COMECON etc., Idea of Regionalism: OAS, APEC, NAFTA, E.U, BRICS, G7, G15, Arab League, OPEC, OAU, Common Wealth, ASEAN, NAM and the Third World Countries.

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- Grenville J. A. S. *A history of the world from the 20th to the 21th Century*, Routledge, London, 2005.
- Jha, Nalini Kant. *India's Foreign Policy in a Changing World*, New Delhi, South Asia Publishers, 2000.
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- Stephanie Lawson. *International Relations*, UK, Polity, 2003.
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COURSE OUTCOME

- To analyse various institutions started in the world to maintain peace.
- To evaluate the peace making process of the international peace lovers.
- To approach the countries that have real challenges to make good relations.

COURSE SPECIFIC OUTCOME

Demonstrate their comprehension and an in-depth orientation to understand of the character of contemporary international relations.

Semester 3: JMC P03 – Television Production [Practical] 4 credits [End Sem-60 + CIA-40]

Curriculum/Course Objective (CO):

1.	To introduce students about the formats of television content
2.	To familiarize students on the distinctions of talk shows and interviews
3.	To teach students about women / children's programmes
4.	To enable students to have an understanding of PSAs
5.	To give a clear vision to the students about news content and newsreel.

Student has to produce programmes in the following formats given below

1. Produce one segment of a *vox populi* not exceeding 05 minutes.
2. Produce one segment of a 'Talk Show' not exceeding 05 minutes.
3. Produce one segment of an 'interview' not exceeding 10 minutes.
4. Produce one *news capsule* for a typical news bulletin not exceeding 05 minutes.
5. Produce one segment of a 'women / Children's Programme' not exceeding 10 minutes.
6. Produce a minimum of five *Public Service Advertisements* not exceeding 30 secs.
7. Each student should do **two** individual projects and submit the record and the program.
8. Produce a *newsreel* consisting of five to six different programmes with voice over not exceeding 10 mins.

All the above sub activities will carry marks evidenced from the record work submitted by the student. There will be a viva voce for the end semester examination and record work will be evaluated along with the programmes.

Course Outcomes (COs): On successful completion of the course, the students will be able to:

		K1	K2	K3	K4	K5
CO1	DEVELOP introduce students about the formats of television content	√	√		√	
CO2	GENERALIZE familiarize students on the distinctions of talk shows and interviews	√		√	√	
CO3	EXPLORE the teach students about women / children's programmes		√	√		√
CO4	UNDERSTAND enable students to have an understanding of PSAs		√	√	√	
CO5	GIVE a clear vision to the students about news content and newsreel.			√	√	√

TOOLS FOR ASSESSMENT

Class observation	Record work	Assignment	Attendance	Total
10 marks	20 marks	5 marks	5 marks	40 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signature			

Sem-VI	Subject code	Subject	Credits	L	P	T	CIA	End Sem	Total
	18 IJMC PRJ01	Documentary production -Project	5			5	40	60	100

Curriculum/Course Objectives

1.	To introduce the basics of script writing for documentaries.
2.	To learn about different types of lightings used during the process of documentary.
3.	To gain knowledge about types of cameras used in documentary shows / films.
4.	To get used to the various techniques and nuances followed in production houses.
5.	To familiarize with shooting, live recording and post processing.

Produce a documentary not more than 15 Minutes

Students will plan the theme, write script, location and schedule of shooting. Students submit the script for approval. Preparation of shooting script and production details for record submission.

Two copies of project DVD to be submitted with titles and certificates.

Course Outcomes (COs)

CO1	Students will be introduced to the basic lighting setups used in documentary production.
CO2	Students will learn about editing software such as premiere pro, avid and final cut pro used for documentary video editing.
CO3	Students will recognize the importance of semi script writing in documentaries during the process of production.
CO4	Students will become aware of the recording instruments used to capture and store audio signals.
CO5	Students will be able to produce documentary film with the help of their batchmates.

On successful completion of the course, the students will be able to:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	L	L							
CO2		M		M					
CO3			M		M	M			
CO4					S	S		S	S
CO5					S	S	S	s	s

(H-High, S-Strong M-Medium, L-Low)

On the successful completion of the course, students will be able to:

		K1	K2	K3	K4	K5
CO1	Students will be introduced to the basic lighting setups used in documentary production.	√	√	√	√	
CO2	Students will learn about editing software such as premiere pro, avid and final cut pro used for documentary video editing.	√	√	√	√	
CO3	Students will recognize the importance of semi script writing in documentaries during the process of production.	√	√	√		
CO4	Students will become aware of the recording instruments used to capture and store audio signals.		√	√		√
CO5	Students will be able to produce documentary film with the help of their batchmates.		√	√	√	√

TOOLS FOR ASSESSMENT

CIA Test – 1	CIA Test – 2	Assignment	Seminar	Attendance	Total
5 marks	5 marks	5 marks	5 marks	5 marks	25 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signatures			

Sem-VI	Subject code	Subject	Credits	L	P	T	CIA	End Sem	Total
	18 IJMC NM02	Indian constitution	3	3			25	75	100

Curriculum/Course Objectives

1.	To enable students to explore the interplay of Law and Ethics to understand the professional responsibilities they have to be conscious while exercising their rights and freedom that the media grants.
2.	To make them to learn various social laws in Press, Broadcast, Human Rights and Cyber Space.
3.	Make the students to critically evaluate the scope and importance of Freedom of Speech and Expression and its restriction on Media.
4.	Introduce the students about various laws and ethics followed in our society.
5.	Students will learn the challenges and issues in content regulation of Media.

Unit 1

Indian constitution: preamble, salient features, Fundamental rights and duties, directive principle of state policy, freedom of speech and expression: article 19 (1) (a) and reasonable Restrictions article 19 (2) - Press Freedom during Emergency.

Unit 2

Union Government and its Administration: Federalism, Centre-State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha.

Unit 3

State Government and its Administration: Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

Unit 4

Local Administration: District's Administration head - Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representatives, Commissioner of Municipal Corporation, Panchayatiraj: Introduction, PRI: District Panchayat, Elected officials and their roles, Chair person of District Panchayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit 5

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

References:

1. History of press, press laws and communication B.N. Ahuja. Surjeet Pub. New Delhi. 1981.
2. Freedom of the press. M.K. Joseph, Anmol Pub. New Delhi 1997.
3. Constitutional law of India. 6e, Dr Justice Durga Das Basu Prentice Hall of India P ltd. New Delhi. 1991.
4. Khosla, Madhav, THE INDIAN CONSTITUTION, Oxford University Press, 2011
5. Kumar, K.R. et al INDIAN CONSTITUTION, Anmol Publications, 2011

Course Outcomes (COs)

C01	EXPLAIN the role and functions of Journalism in society and democracy.
C02	DEVELOP understanding of Media and its relationship with India's Constitution and Media Laws.
C03	APPRAISE on the principles of social ethics besides role and importance of ethical and responsible Journalism
C04	DESCRIBE Indian Constitution, Central and State government functionalities in India.
C05	EVALUATE various Laws in Press, Broadcast, Human Rights and Cyber Space.

On successful completion of the course, the students will be able to:

	P01	P02	P03	P04	P05	P06	P07	P08	P09
C01	L	L							
C02		M		M					
C03			M		M	M			
C04					S	S		S	S
C05					S	S	S	s	s

(H-High, S-Strong M-Medium, L-Low)

On the successful completion of the course, students will be able to:

		K1	K2	K3	K4	K5
C01	To enable students to explore the interplay of Law and Ethics to understand the professional responsibilities they have to be conscious while exercising their rights and freedom that the media grants.	√	√			
C02	To make them to learn various social laws in Press, Broadcast, Human Rights	√	√	√		
C03	Make the students to CRITICIZE the scope and importance of Freedom of Speech and Expression and its restriction on Media.	√	√	√	√	√
C04	Introduce the students about various laws and ethics followed in our society.	√	√	√		√
C05	Students will learn the challenges and issues in content regulation of Media.		√	√	√	√

TOOLS FOR ASSESSMENT

CIA Test – 1	CIA Test – 2	Assignment	Seminar	Attendance	Total
5 marks	5 marks	5 marks	5 marks	5 marks	25 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signatures			

Sem-VI	Subject code	Subject	Credits	L	P	T	CIA	End Sem	Total
	18 IJMC C08	Film Studies	5	4	1		25	75	100

Curriculum/Course Objectives

1.	To enable students to have an overview of the basic theories, ideas, and methods of Film and Media studies through routine readings and screenings
2.	Learn the birth & growth of cinema.
3.	Learn the elements & form of cinema
4.	Learn how to write film appreciation
5.	To introduce important concepts (e.g. realism, authorship, narrative, genre, and national cinema), modes of film practice, and critical approaches

Unit 1

Understanding film - What is film – Characteristics – the language of cinema – authorship - a brief history – film movements – Montage theory and Soviet cinema of the 20s – contemporary international trends.

Unit 2

History and development of Indian Cinema – pioneers of Indian cinema- Phalke and the desi enterprise – Indian cinema 30s to the 60s – The golden 50s – Indian art cinema and the Indian New wave –

Unit 3

History and development of Tamil Cinema – New wave in Tamil cinema – Contemporary trends in Tamil cinema.

Unit 4

Literature and Film - Literary language and Film language- adaptation and notions of fidelity- Narrative structure and strategies in film and fiction - time, space, character and setting - dialogue – music – sound effects.

Unit 5

Censor board- history- New media cinema- television and cinema- Internet and cinema- cinema piracy.

References:

1. Villarejo, Amy. Film Studies: the Basics. Routledge, Indian Reprint, 2009.
2. Hayward, Susan. Key Concepts in Cinema Studies. London: Routledge, 1997.
3. Bywater, Tim and Thomas Sobchack. Introduction to Film Criticism . Pearson India, 2009.
4. Corrigan, Timothy, J. A Short Guide to Writing about Film . Pearson India, 2009.
5. Kupsc, Jarek. The History of Cinema for Beginners. Chennai: Orient Blackswan, 2006.
6. Dix, Andrew. Beginning Film Studies . New Delhi: Viva Books, 2010.
7. Stam, Robert and Alessandra Raengo. Literature and Film: A Guide to Theory and Adaptation. Oxford: Blackwell, 2003

Course Outcomes (COs)

C01	COMPARE gender and sexuality in film making practices.
C02	INDICATE the dimensions and functions of Sound in cinema.
C03	IDENTIFY the tools and techniques of Film production.
C04	RELATE film perception in terms of its forms, reception aesthetics and interpretation.
C05	CONNECT basic theories, ideas, and methods of Film and Media studies through routine readings and screenings of modes of film practice, and critical approaches.

On successful completion of the course, the students will be able to:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
C01	L	L							
C02		M		M					
C03			M		M	M			
C04					S	S		S	S
C05					S	S	S	s	s

(H-High, S-Strong M-Medium, L-Low)

On the successful completion of the course, students will be able to:

		K1	K2	K3	K4	K5
C01	have an overview of the basic theories, ideas, and methods of Film and Media studies through routine readings and screenings	√	√	√	√	
C02	Learn the birth & growth of cinema.	√	√			
C03	Learn the elements & form of cinema	√	√	√		
C04	Learn how to write film appreciation	√	√	√	√	√
C05	Understand important concepts to become a film producing entrepreneur	√	√	√	√	√

TOOLS FOR ASSESSMENT

CIA Test – 1	CIA Test – 2	Assignment	Seminar	Attendance	Total
5 marks	5 marks	5 marks	5 marks	5 marks	25 marks

Course Designed By	Checked by	Verified By HOD	Approved by
Names			
Signatures			

18MBA08 – HUMAN RESOURCE MANAGEMENT

Human Resource Management – Course Objectives

This course aims to help the students in acquiring knowledge on the Nature, scope of Human Resource Management and the Role of HR manager in an Organizational contexts . And to analyse the framework of HR accounting and auditing process to learn the attributes of HRM process from recruitment to selection. Further, it focuses on the concepts of training and compensation and an outline on performance evaluation and Redressal methods of the business concerns . Also, it offers the students a clear understanding on the Worker's participation and grievances handling procedure for an effective Organizational plan.

Learning Outcomes

Upon successful completion of the requirements for this course, students will be able to:

1. To impart knowledge about management issues related to staffing, training, performance, compensation, organizational quality and compliance with human resource requirements.
2. To foster the knowledge on HR planning and Process of HRM that can help them in managing organizational activities.
3. To Discuss the concepts of training and compensation plan in HRM that helps in analyzing the standard outcomes of an Organization.
4. To inculcate the knowledge on Performance evaluation and industrial practices that can help them in handling the career activities.
5. The students can better understand and analyze the concepts of Worker's participation in management.
6. Outline the nature and sources of grievances and explain the different strategies used in handling those grievances.
7. This course also provides an in depth appreciation and understanding of the unique HR practices and effective process of Human Resource activities.

Unit	Unit Title	Intended Learning Chapters (K1-Knowledge Level) K2- Understanding Level)	At the end of the first semester, students studying Human Resource Management will be expected...
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1	Introduction to HRM	Introduction – Meaning and Definition, Nature, Scope, Objectives and Importance of HRM – Functions of HRM - Role of Human Resource Manager – Computer Applications in Human Resource Management – Human Resource Accounting and Audit.	Students will acquire a sound understanding on the importance, Functions of HRM. Discuss the HR accounting and auditing strategy
2	Process of HRM	Human Resource Planning – Importance – Process - Forecasting Human Resource Requirement – Techniques - Matching supply and demand - Recruitment and Selection – Sources of Recruitment – Selection of Employees - Difference between recruitment and selection – Procedures for selection - Tests - Interview – Types of Interview – Process of conducting interview.	To focus on the HR planning, its process from recruitment to selection in different Organizational contexts.
3	Training and Development	Training - Meaning and Definition- Types of Training Methods – Reasons – Benefits – Resistance - Executive Development Programmes (EDP) – Common practices - Benefits – Self Development – Knowledge Management - Compensation Plan – Reward – Career Management – Development of Mentor.	To familiarize with the effective Training methods to be adopted for achieving better career management goals.
4	Performance evaluation methods	Method of performance evaluation – Feedback – Industry Practices - Promotion, Demotion, Transfer and Separation – Implication of job change - The Control Process – Importance – Methods – Requirement of Effective Control Systems Grievances – Causes – Implications – Redressal	To gain knowledge on the Performance evaluation thereby analyzing the need for Promotion, Demotion, Transfer etc And, focus on the grievances

		methods.	handling techniques.
5	Worker's participation	Workers Participation in Management – Evolution of Participative Management – Structure – Functions – Nature and Benefits of Participation – Types and Degree of Participation – Quality Circle – Organization for Quality Circle – Grievance Handling Procedure.	To explain the concept of Worker's participation in Management, its structure and benefits of Participation

Reference Books

1. Agarwal, A.N., 2001 Indian Economy; Nature, Problems and Progress, Vikas Biraj Praksah, New Delhi
2. Aswathappa.K, Human Resources and Personnel Management TMH, New Delhi.
3. Luis R.Gomez-Mejia, David B.Balkin, Robert L Cardy, Managing Human Resource, PHI Learning. 2012
4. Bernadin , Human Resource Management, Tata McGraw Hill ,8th edition 2012.
5. Ivancevich, Human Resource Management, McGraw Hill 2012.

18MBA02 – ORGANIZATIONAL BEHAVIOUR

Course Objectives:

This course aims to help the students in understanding the forces shaping individual, group and organizational sub-system; this is done with a view to preparing the students to see how these forces affect the management of business enterprises, both in the private and the public sectors. Further, this course helps in learning the processes and problems of management and evaluating means of achieving the goals of an enterprise through an effective management of people in the enterprise.

Learning Outcome:

1. Upon successful completion of the requirements for this course, students will be able to:
2. To understand foundation of Management concepts, various levels in it, Role and qualities of Managers, Evolution of Management Thoughts.
3. Students will get to familiaron key functional areas in management, MBO application and its feasibility, concepts of MBE, Organization Structure and its nature.
4. Demonstrate the concepts ofDirecting, importance, elements& its Techniques.Also Controlling, importance, Processand its Types.
5. Experiment effective communication and its objectives, process, barriers and its Types.
6. Learning effective managerial communication by demonstration, role play, assignment, discussion and so on.
7. At the end of the course discussion, the course instructor will validate the learning synergy by hosting course quiz and other assessment methods.

Syllabus Units & Expected Outcome

Unit	Unit Title	Intended Learning Chapters (K1- Knowledge Level) (K2- Understanding Level)	Hours	At the end of the first semester, students studying Concepts of Management and Communication will be able.....
1	Introduction of Management	Introduction of Management: Meaning and definition – Nature of Management – Scope of Management – Importance of Management – Levels of Management – Role and qualities of Managers – Evolution of Management Thought : Contributions of FW Taylor and Henri Fayol		To understand the key terminologies on management, levels and its corresponding role & qualities. Also major contributions built by various management philosophers.
2	Planning, Organizing and Organization Structure	Planning: Nature and importance of Planning – Planning Process – Types of Plans – MBO – MBE - Organizing: Nature and Purpose of Organizing – Organization Structure – Formal and Informal Groups/ Organization – Line and Staff Authority – Departmentation – Span of Control – Centralization and Decentralization – Delegation of Authority.		To Horne their skills on planning. To check the feasibility of applying MBO. To understand the different forms of organizational structure and its responsibility along with authority.
3	Directing and Controlling	Directing: Meaning and definition – importance of directing – elements of directing – Techniques in directing - Controlling: Meaning and definition – importance of Controlling –Process of Controlling – Types of controlling.		To understand the possible ways for directing resource. To assess the alternatives methods of controlling resource and adopt the best possible practice.
4	Communication	Communication: Meaning and definition – objectives of communication – communication process – barriers to communication – Principles of effective communication – Types of communication: Formal Vs. Informal – Downward, Upward, horizontal, Diagonal and Informal communication.		To explain the principles of effective communication. To analyze the possible barriers in communication and find the way to eradicate it. To learn what form of communication will bring attention along with prompt relationship.

5	Written and Oral Communication	Communication Media: Verbal Communication (Written and Oral) – Face-to-Face communication – Visual communication –Business letter – Types and Layout components - Modern communication tools.	Can modulate their body language. To understand the role of business communication To trace out the contemporary communication tools and its structure. To understand do's and dont's in Written and Oral communication.
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Reference Books:

1. Stephen Robbins, Organizational Behaviour, Prentice Hall Publishers,
2. Aswathappa.K - Organizational Behaviour, Himalaya Publishing House.
3. Mishra.M.N. - Organizational Behaviour, Vikas Publishing House Pvt.Ltd.
4. Fred Luthans - Organizational Behaviour, McGraw Hill Publishing House.
5. Prasad.L.M. - Organizational Behaviour, Sultan Chand & Sons.
6. Sarma V.S.Veluri – Organisational Behaviour, JAICO Publishing House

18MBAH01 – HUMAN RESOURCE TRAINING AND DEVELOPMENT

Human Resource Training and Development – Course Objectives

This course aims to help the students in understanding the basic concepts of Training process, its importance and Role of managers and the strategies focusing on Training needs of an organization and evaluating the learning process and outcomes on the areas which are to be focused. Further, it offers the students in analyzing the costing of a training programme to enhance their business activities. Also, it focuses on training methods to be implemented based on the managerial areas of development and career plan.

Learning Outcomes

Upon successful completion of the requirements for this course, students will be able to:

1. To familiarize with the basic concept of Training , Importance and Role of managers and their Contributions and identifying the fundamentals of Training and Development in HRM.
2. To Discuss the Organizational Constraints and Training design modules and implementation and get a clear understanding on its training needs.
3. Analyze the Importance and Find out Techniques and evaluate the cost of a Training Programme.
4. The students can better understand the methods of Training in an Organization which helps them in achieving the Training needs in their upcoming business career.
5. Comprehend the concept of Training and Development to various business environments that fosters to Management developmental activities of the business to enrich their career goals.

Unit	Unit Title	Intended Learning Chapters (K1-Knowledge Level) K2- Understanding Level)	At the end of the first semester, students studying Human Resource Training and Development will be expected...
1	Training- Structure, process&Development Strategies	Training: An Overview – Role of Training in Organizations – Structure of Training Organizations – Training Process Model – Forces Influencing the Workplace and Training –Learning Theories & Training – The Trainer: Roles and Competencies of Trainers - Emerging Training & Development Practices – Business Strategy and Training – Strategies for Effective HR Training & Development.	To explain the Fundamentals of training in an Organization by adopting strategies to develop the business goal.

2	TNA & Training design theories	Training Needs Analysis – Why, When and Where to look for performance discrepancies – Framework for conducting TNA, Outcomes of TNA, Approaches to TNA, Needs Assessment Techniques - Training Design: Organizational/Environmental constraints – Training Objectives – Facilitation of Learning – Training Design Process – Key Factors in Designing – Training Design Theories.	To focus on the Training Need analysis, its constraints and Training design to implement them in their day to day managerial activities in different Organizational contexts.
3	Training Evaluation and ROI	Training Evaluation: Rationale for Evaluation – Training outcomes – Training Evaluation Design Issues – Types of Evaluation Techniques & Instruments – Costing Training Programmes – Measuring ROI of Training Programmes.	To analyze the Training evaluation techniques that can help them in handling the cost of the training programme.
4	Training Methods & Key Areas of Organizational Training	Training Methods: Matching Training Methods with Outcomes – Lectures & Demonstrations, Computer-based Training, Games & Simulations, On-the-Job Training – Audiovisual Enhancements to Training – Training Facilities – Key Areas of Organizational Training: Orientation Training, Diversity Training, Team Training, and other Training Programmes & Issues – Impact of Technology on Training – Choosing a Training Method — Training of Special Groups.	To focus on the training methods thereby analyzing the effective training method to be adopted for a successful business concern.
5	Management Development	Management Development – Training vs. Development – Importance of Management Development – Management Development Implications – Approaches for Management Development – Strategies for Development of Technical Managers, Executives and Future Executives.	To explain the Management Development strategies and approaches and its implications on the future HR business career.

Reference Books:

1. Agochiya: Every Trainer's Handbook, Sage Publications.
2. Graig, R.L. : Training and Development Handbook, McGraw Hill international
3. Lynton and Pareek, Training for Organisational Transformation, Sage Publications.
4. Dayal, I: Management Training in Organisation, Prentice Hall of India
5. Kirpatrick.D.L. : Evaluating Training Programmes, Berret-Koehler, San Francisco.

- Shills and Young- Modern Nutrition In Health And Disease,2012, Lippincott Williams and Wilkins.
- Bennion M.: Clinical Nutrition, John Wiley & Sons.
- Whitney, E. N. and C. B.Cataldo, Understanding Normal and Clinical Nutrition, 1983, West Pub.
- Williams S. R.Essentials of Nutrition and Diet Therapy, 4th edn, 1986, Mosby College Pub. S. Louis.

Web Resources:

- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>
- krishikosh.egranth.ac.in

Course Code & Title	18UPCND1C05- Clinical Biochemistry		
Class	I M.Sc.	Semester	II
Cognitive Level	K-1 ,K-2, K-3, K-4, K-5		
Course Objectives	The Course aims • To enable the students to understand the various mechanism adopted by the human body for the regulation of metabolic cycles. • To learn the interrelationship between various metabolic pathways. • To skill the sources, functions and deficiency conditions of macro and micro nutrients.		

Unit	Content	Number of Hours
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I	Body fluids, Hormones, Enzymes and Bioenergetics Components of blood a) Composition and function of blood b) Plasma and blood corpuscles c) Structure and function of haemoglobin, abnormal haemoglobins. d) Blood coagulation – mechanism and regulation. e) Blood groups Water and electrolyte a) Regulation of water and electrolyte balance b) Hydrogen ion homeostasis and acid-base balance. Hormones and Enzymes a) Mechanism of hormone action and its regulation. b) Hormones of Pancreas, Pituitary, Adrenal, Thyroid and Sex hormones. c) Enzymes in differential diagnosis of diseases and their clinical significance. Bioenergetics a) Electron transport chain, Oxidative Phosphorylation and synthesis of ATP.	16
II	Carbohydrates a) Occurrence, Classification and Structure, Physic-chemical properties and biological importance of carbohydrates. b) Monosaccharide and related compounds, disaccharides and Polysaccharides. Metabolism of carbohydrates a) Aerobic and anaerobic degradation b) Glycogenesis and Glycogenolysis c) Glycolysis and Gluconeogenesis d) Cori's cycle, Pyruvate Dehydrogenase complex e) Krebs-cycle and Pentose phosphate pathway f) Regulation of carbohydrate metabolism. g) Sugar derivatives of biomedical importance and Inter conversion of Hexoses.	14
III	Proteins a) Classification, structure and properties of amino acids, b) Classification, properties and structure of proteins -Primary, secondary, tertiary and quaternary structure. c) Assessment of protein quality Metabolism of Proteins a) General reactions of protein metabolism b) Amino acids – Types, Therapeutic application of specific amino acids c) Inborn errors of protein metabolism –PKU, MSUD d) Metabolism of amino acids - Decarboxylation, Transamination, Deamination,	15

	Glycine, Tyrosine, Tryptophan, Methionine and urea cycle. e) Nucleic acids- Biosynthesis and degradation of purines and pyrimidine's and their regulation.	
IV	Lipids a) Structure and Biological importance and distribution of fats and fatty acids. b) Chemical properties and characterization of fats. Metabolism of Lipids a) Biosynthesis of saturated and unsaturated fatty acids b) β-Oxidation of fatty acid c) Biosynthesis of glycerides, phospholipids and cholesterol. d) Regulation of lipid metabolism and ketone bodies. e) Disorders of lipid metabolism, lipoproteins and their significance. f) Role of free radicals and antioxidants in health and disease	14
V	Vitamins a) Historical Background, Structure, Metabolism, Absorption and Transport Food Sources, Interactions with other Nutrients therapeutic Effects, Toxicity And Deficiency of following vitamins - Fat soluble Vitamins: A, D, E, & K - Water Soluble vitamins: Thiamine, riboflavin, niacin, ascorbic acid, folic acid, biotin, pyridoxine, pantothenic acid, cyanocobalamin, choline and inositol Macro minerals a) Sources, Recommended Dietary Allowances, Requirements, Function, Metabolism and Bio-availability, Deficiency and toxicity of phosphorus, calcium, magnesium, sodium, potassium and chloride. Micro minerals a) Sources, Recommended Dietary Allowances, Requirements and Function, Metabolism, bio-availability, deficiency and toxicity of Iron, copper, iodine, fluoride, zinc and manganese.	16
	Total Hours	75

Course Outcomes	On completion of the course, students should be able to CO1: Summarize the basic concepts of biochemistry. CO2: Explain the metabolism of macro and micro nutrients. CO3: Describe the mechanism of body fluids and bioenergetics. CO4: Determine the inborn errors of metabolism. CO5: Discuss the bioavailability, excess and deficiency conditions of all nutrients.
References	

Text Books:

- AmbikaShanmugam- Fundamentals of Biochemistry for Medical Students, .; Eighth edition, 2016, Wolters Kluwer India Pvt. Ltd
- Lehinger et al. – Principles of Biochemistry, 7th ed. 2017 WH Freeman.
- Satyanarayana. U – Essentials of Biochemistry, 2nd edn, 2008, Books And Allied (p) Ltd

Reference Books:

- Devin. T.M- Text book of Biochemistry with Clinical Correlations, 1997, 4th Ed., Wiley Liss Inc.
- Voet and Prat- Fundamentals of Biochemistry , 8 thEdn, 2004, John Wiley & Sons
- Conn, stumpf. et .al. Outlines of Biochemistry, 2001, 5th Ed John Wiley and Sons.
- Murray et. al. – Harpers Illustrated Biochemistry, 2000, 25thEdn, Macmillan Worth Publishers.

Web Resources:

- www.virutal library biochemistry
- <http://themedicalbiochemistrypage.org>

Course Code & Title	18UPCND1C07 -Human Development and Nutrition		
Class	II M.Sc.	Semester	III
Cognitive Level	K-1, K-2, K-3, &K-4		
Course Objectives	The Course aims • To know the importance of nutrition during life span and also to enlighten on the RDA and dietary modifications for different age groups. • Develop aptitude to learn the stages of growth and development of different age groups • To familiarize the theories of growth and development of all ages.		

Unit	Content	Number of Hours
I	Recommended allowances a) RDA for Indians, basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. b) General concepts about growth and development through different stages of life. Nutrition in Pregnancy a) Reproductive Physiology b) Stages of gestation, maternal weight gain c) Physiology of pregnancy, nutritional requirements and dietary guidelines during and prior to pregnancy	18

Web Resources:

- <https://www.nutraceuticalsworld.com/>
- <https://www.nutraingredients.com/>

Course Code & Title	18UPCND1SC01- Hospital Dietary Internship		
Class	I M.Sc.	Semester	II
Cognitive Level	K-3, K-4, K-5 & K-6		
Course Objectives	The Course aims • To create opportunities to explore the interests of students in clinical nutrition and dietetics. • To develop professional skills and competencies as clinical dietitians. • To apply what is learnt theoretically to actual practice. • To infer with career development by providing real work experiences.		

Course Outcomes	On completion of the course, students should be able to CO1: Identify the different disease conditions. CO2: Interpret the relevance of food and nutrition for the disease. CO3: Devise an individualized diet plan for patients. CO4: Compare and contrast the derived nutritive values with R.D.A using software. CO5: Persuade the patients with appropriate diet counselling techniques.
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Course Code & Title	18UPCND1I01- Skill Based Medical Nutrition Therapy - I		
Class	I M.Sc.	Semester	II
Cognitive Level	K-3, K-4, K-5 & K-6		
Course Objectives	The Course aims • To provide clinical approach to assess the nutritional status of patients using case studies. • Hands on training to frame nutritional guidelines and interventions for the diagnosed disease conditions.		

Unit	Content	Number of Hours
1.	Case study evaluation and nutritional intervention for 1. Infections and Fever 2. Nutrition deficiency diseases 3. HIV with and without comorbidities 4. Different types of cancer 5. Pre & Post bariatric surgery 6. Post burns 7. Obesity 8. Underweight	30
	Total Hours	30

Course Outcomes	On completion of the course, students should be able to CO1: Develop a ready –reckoner for calculating nutrient content of various foods in normal persons and the ability to modify for given disease conditions. CO2: Determine the morbidity of the patients by assessing case sheets. CO3: Apply the principles of diet and determine the dietary essentials for recovery from critical illness. CO4: Plan menu for the given disease condition and compare and contrast with R.D.A using software.
References Text Books: • Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 2001, Oxford Publishing Company. • Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco • B. Srilakshmi- Dietetics, 2019, 8thEdn, New Age International Pvt. Ltd. New Delhi. Web Resources: • www.anme.com.mx/libros/PrinciplesofNutrition.pdf • https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf • krishikosh.egranth.ac.in	

Text Books:

- AmbikaShanmugam- Fundamentals of Biochemistry for Medical Students, .; Eighth edition, 2016, Wolters Kluwer India Pvt. Ltd
- Lehinger et al. – Principles of Biochemistry, 7th ed. 2017 WH Freeman.
- Satyanarayana. U – Essentials of Biochemistry, 2nd edn, 2008, Books And Allied (p) Ltd

Reference Books:

- Devin. T.M- Text book of Biochemistry with Clinical Correlations, 1997, 4th Ed., Wiley Liss Inc.
- Voet and Pratt- Fundamentals of Biochemistry , 8th Edn, 2004, John Wiley & Sons
- Conn, Stumpf. et al. Outlines of Biochemistry, 2001, 5th Ed John Wiley and Sons.
- Murray et al. – Harpers Illustrated Biochemistry, 2000, 25th Edn, Macmillan Worth Publishers.

Web Resources:

- www.virutal library biochemistry
- <http://themedicalbiochemistrypage.org>

Course Code & Title	18UPCND1C07 -Human Development and Nutrition		
Class	II M.Sc.	Semester	III
Cognitive Level	K-1, K-2, K-3, & K-4		
Course Objectives	The Course aims • To know the importance of nutrition during life span and also to enlighten on the RDA and dietary modifications for different age groups. • Develop aptitude to learn the stages of growth and development of different age groups • To familiarize the theories of growth and development of all ages.		

Unit	Content	Number of Hours
I	Recommended allowances a) RDA for Indians, basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. b) General concepts about growth and development through different stages of life. Nutrition in Pregnancy a) Reproductive Physiology b) Stages of gestation, maternal weight gain c) Physiology of pregnancy, nutritional requirements and dietary guidelines during and prior to pregnancy	18

	d) Nutrition related complications with special focus to Adolescent Pregnancy and general complications of pregnancy e) HIV/AIDS during pregnancy – Dietary concerns f) Role of Exercise & Fitness during pregnancy	
II	Nutrition during Lactation a) Physiology of Lactation, hormonal control and reflex action b) Human milk composition c) Nutritional requirements & dietary guidelines d) Benefits of Breast Feeding e) Galactogogues f) Lactation Management in Normal & Special conditions Nutrition in infancy a) Infant feeding and nutrient needs b) Feeding in early and late infancy and Feeding problems and Weaning foods c) Common nutrition problems d) Feeding Preterm and low birth weight infants	18
III	Preschool and Childhood a) Growth and development –stage, Theories – Maturationist theory, Behaviorist theory, Eriksons psycho analytical theory, Piagets cognitive theory, Vygotsky’s theory. b) Nutritional requirements c) Nutrition for children with special health care needs d) Feeding problems e) Factors to be considered for menu planning and packed lunch f) Nutritional concerns and prevention of nutrition related disorders - Obesity , underweight, Deficiency condition and Allergies	18
IV	Adolescence a) Growth and development –stages, Theories – Freud’s psychosexual stage theory, Kohlberg’s moral understanding stage theory, and Bronfenbrenner’s ecological theory. b) Physiological and Psychological changes c) Nutritional requirements of adolescents Nutrition situation with special needs in adolescence a) Pregnancy b) Eating disorders Adulthood a) Theories of Adult Development: Levinson, Vaillant&Neugarten b) Physiological and Psychosocial changes c) Common nutritional concerns d) Nutritional requirements and dietary recommendation e) Physical Activity in adulthood	18
V	Elderly a) Theories of Aging – - Theory Building in Aging- Historical Development of	18

	Theories of Aging, Models and Explanation, Theory Development and Research Design in Aging. - Biological Theories of Aging - Biological Theories of Senescence, Stress Theories of Aging. - Psychological Theories of Aging- Theories of Cognition, Theories of Everyday Competence, Social-Psychological Theories. - Sociological Theories of Aging - Anthropological Theories, Life Course Theories, Social Theories of Aging. b) Physiology of Aging c) Nutritional requirements of the Elderly Nutrition needs during illness and chronic conditions a) Sensory loss, Oral health and GI functions b) Neuromuscular and skeletal functions c) Renal and cardiac function d) Immuno-competence	
	Total Hours	90

Course Outcomes	On completion of the course, students should be able to CO1: Define the nutritional needs of each age group. CO2: Infer the appropriate theories to distinguish the developmental milestones. CO3: Co-relate the physiological and psychological changes adhering to all age groups. CO4: Interpret the nutritional problems pertaining to different ages.
References Text Books: • Brown, J. E-Nutrition through the Life Cycle, 6edn., 2016, Cengage Learning. • Mahan L. K. & Stump S.E Krause's - Food Nutrition and diet Therapy, 11edn, 2003, Saunders. • B.Srilakshmi- Nutrition Science, 2006, New Age International. Reference Books: • Groff, J. L and Gropper, S. S- Advanced Nutrition and Human Metabolism, Belmont CA: Wads worth/Thomson Learning. • Goodhart, R. S. S. and Shils, M. E - Modern Nutrition in Health and Disease, Philadelphia: Lea and Febiger. • Jackson, M. S - Adolescent Nutritional Disorders, 1997, The New York Academy of Science. • Jelliffe D.B- Assessment of Nutrition Status of the Community, 1966, WHO, Geneva. Web Resources: • https://www.universalclass.com/articles/health/nutrition/nutritional-needs-for-different-ages. • https://www.nutrition.org.uk/nutritionscience/life.html • http://www.open.edu/openlearncreate/mod/oucontent/view.php	

COUNSELLING PSYCHOLOGY

Course Objectives:

- To orient students about the importance of Guidance and Counseling
- To understand the nature of counseling situation
- To understand the various areas of Counselling
- To become aware of Ethical and Legal issues in Counselling

UNIT I: GUIDANCE AND COUNSELLING AN INTRODUCTION

Meaning of Guidance – Basic principles and assumptions underlying guidance –Definitions of counseling – Factors contributing to the emergence of counselling - Characteristics of Counsellor – The identity of Counselling – History of Therapeutic Counselling: The ancient Philosopher – The first Psychiatrists – Influences from Psychology – The Guidance era. The counseling era – The era of the therapeutic counseling – Licensing and regulation in Counselling - Guidance and counselling in Indian context.

UNIT II: SETTINGS FOR COUNSELLING

Different roles of Counselors – A set of generic skills – A set of common goals – Developmental and remedial orientation – Team work –Qualities of Counselling relationships – Perspectives on helping relationships.

Counselling process: Creating a relationship in the initial interview: Establishing rules – Planning hope – Assuring confidentiality- Assessing expectations – Collecting information – Identifying problems – Beginning intervention – First session agenda review – Reciprocal influence.

UNIT III: COUNSELLING APPLICATIONS

Group Counselling: Survey of groups, Encounter groups – Guidance Groups – Counselling groups – Therapy groups – Self-help and support groups. Some considerations in the use of group modalities – Counteracting potential limitations – Advantages of group work.

Career counselling: Functions of work – Roles of Counselling- Holland's Theory of career development. Career Education: Abilities – interests – values – Career Decision Making – Trends and Issues in Career Counselling: Changes in the work place – Work and Leisure – Use of Technology – Counselling in Industry.

UNIT IV: MARITAL, FAMILY, SEX AND ADDICTION COUNSELLING

Family Counselling: Theories of Family Counselling – Sex Counselling: Clinical assessment interview – Physical examination and medical history – Exploration of relationship – Sensate focus exercise – Specialized techniques – Evaluation.

Addictions Counselling: Symptoms of addiction: Drug use and abuse – Drug culture – Types of drugs – Effects of drug abuse – Adolescent drug use – Prevention – Abuse in special populations – the Elderly – The disabled – Principles for counselling the Chemically dependent.

UNIT V: PROFESSIONAL PRACTICE

Counselling Diverse Population: Multiculturalism – Influence of Biases – Identity issues – Preferred clients – counselling and gender – Counselling ethnic minorities – Counselling the aged – The counselor and HIV – Counselling clients who are physically challenged.

Ethical and Legal Issues: Professional Codes- Our divided loyalties – Areas of ethical difficulty – Dual relationship and sexual improprieties – Misjudgment and failures – Deception and informed consent – Confidentiality and privileged communication – Recent trends – Making ethical decisions – Legal issues in Counselling – Advice for the passionately committed counselling student.

TEXT BOOKS

Charles J. Gelso., Elizabeth N. Williams., & Bruce R. Fretz. (2014). *Counseling Psychology (3rd Edn.)*. Washington, DC: APA Publications.
Kottler, J.A. and Brown, R.W. (2000). *Introduction to Therapeutic Counselling*. New York: Brooks / Cole.

REFERENCE BOOKS

John Sommers - Flanagan., & Rita Sommers - Flanagan. (2015). *Counseling and Psychotherapy Theories in Context and Practice: Skills, Strategies, and Techniques*. New Jersey: John Wiley & Sons, 22-Jun-2015
Kathryn, G. and David, G. (2008). *Relationship Counselling for Children, Young People and Families*. New Delhi: Sage Publications.
Kinra. (2010). *Guidance and Counselling*. New Delhi: Pearson Learning Inc.
McLeod, J. (2009). *Counselling Skills*. New Delhi: Rawat Books Ltd.
Payne, M. (2010). *Couple Counselling*. New Delhi: Sage Publications.

On the successful completion of the course, students will be able to:

Semester 2 - Counselling Psychology							
		K1	K2	K3	K4	K5	K6
CO1	understand the nuances of guiding principles and factors influencing the outcome		✓		✓		
CO2	understand the need for counselling the client				✓		
CO3	demonstrate the knowledge, skills and ability required in the counselling process			✓			
CO4	follow ethical principles in offering counselling			✓			
CO5	demonstrate the art of counselling in various areas of marital, family, sex and addiction counselling in the gender and cultural context		✓	✓			✓
CO6	maintain professionally appropriate communication and conduct across different settings		✓				✓
CO7	demonstrate concern for the welfare of others				✓		
CO8	understanding of legal issues pertinent to counselling				✓		

On the successful completion of the course, students will be able to:

Semester 2 - Counselling Psychology										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	understand the nuances of guiding principles and factors influencing the outcome		✓							
CO2	understand the need for counselling the client	✓								
CO3	demonstrate the knowledge, skills and ability required in the counselling process		✓							
CO4	follow ethical principles in offering counselling					✓				
CO5	demonstrate the art of counselling in various areas of marital, family, sex and addiction counselling in the gender and cultural context	✓	✓		✓					
CO6	maintain professionally appropriate communication and conduct across different settings	✓	✓			✓				
CO7	demonstrate concern for the welfare of others	✓				✓				
CO8	understanding of legal issues pertinent to counselling	✓		✓						

THEORIES OF PERSONALITY

Course Objectives:

- To enable students to compare and contrast various theories of personality
- To make them to critically evaluate different theories in the background of the empirical evidence.
- To help them to understand the application of personality assessment in clinical practice

UNIT I: INTRODUCTION

Study of Personality - History – Definitions – Personality in the context of internet and social networking – Ethnic and gender issues – Assessment: reliability and validity, self-report, online tests, projective tests, clinical interviews and behavioural assessment. Research – Theory – Questions about human nature.

UNIT II: THE PSYCHODYNAMIC PERSPECTIVE

Classical Psychoanalysis: Sigmund Freud. Neo-psychoanalytic approaches: Carl Jung – Analytical Psychology, Alfred Adler – Individual Psychology, Karen Horney - Neurotic Needs and Trends.

UNIT III: THE LIFE SPAN AND GENETICS PERSPECTIVES

Life Span approach: Erick Erikson. Genetics approach: Gordon Allport – Motivation and Personality, Trait theories: Raymond Cattell, Hans Eysenck, Robert McCrae and Paul Costa, Michael Ashton and Kibeom Lee.

UNIT IV: THE HUMANISTIC AND COGNITIVE PERSPECTIVES

Humanistic Approach: Abraham Maslow – Needs-hierarchy theory, Carl Rogers: Self Actualization Theory. Cognitive approach: George Kelly – Personal Construct Theory.

UNIT V: THE BEHAVIOURAL, SOCIAL AND MINOR PERSPECTIVES

Behavioural Approach: B.F. Skinner – Reinforcement Theory. Albert Bandura – Modeling Theory. Mini – Theories: Locus of Control, Sensation Seeking, Learned Helplessness, Optimism/ Pessimism, Positive Psychology and Happiness and Success.

TEXT BOOK

Schultz, D.P. and Schultz, S.E. (2013). *Theories of Personality* (10th Ed). Delhi.

REFERENCE BOOKS

Cengage Learning India Private Limited.

Lindzey, G., Campbell, J.B. and Hall (2007). *Theories of Personality* (4th Ed). New York: John Wiley (Student Edition).

Kaplan, R.M. and Saccuzzo, D.P (2002). *Psychological Testing: Principles, Applications and Issues* (5th Ed). New Delhi: Asian Book.

On the successful completion of the course, students will be able to:

Semester 2 - Theories of Personality							
		K1	K2	K3	K4	K5	K6
CO1	identify basic biological, psychological and social components of behavioural explanations		✓			✓	
CO2	analyse and differentiate the concepts of personality from various theoretical perspectives				✓	✓	
CO3	analyse and evaluate various assessment methodologies and their theoretical frameworks		✓		✓	✓	
CO4	develop behavioural components of effective personality development programs						✓

On the successful completion of the course, students will be able to:

Semester 2 - Theories of Personality										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	identify basic biological, psychological and social components of behavioural explanations		✓		✓		✓			
CO2	analyse and differentiate the concepts of personality from various theoretical perspectives	✓	✓	✓					✓	
CO3	analyse and evaluate various assessment methodologies and their theoretical frameworks	✓	✓	✓						
CO4	develop behavioural components of effective personality development programs	✓		✓	✓	✓		✓		

POSITIVE PSYCHOLOGY FOR HEALTH AND WELLBEING

OBJECTIVES:

- To orient students to the concepts of Health and Medicine
- To give insight into changing behaviour for better health
- To make them understand psychological process behind illness
- To acquire the skill of coping with illness
- To employ various positive psychological techniques for good mental and physical health

UNIT I: BASICS OF HEALTH PSYCHOLOGY

Health Psychology: Individual Perspective-Conducting Research in Health Psychology: the true experiment- the Correlation- Prospective versus Retrospective Studies- Longitudinal versus Cross-Sectional Research- the Field versus the Laboratory.

Medical Care: Medicine and Alternative Medicine- Psychosomatic and Behavioral Medicine- Medicine Today- Psychological Factors in Illness and Disease- Models of the Physician-Patient Relationship- Communication in therapeutic interaction- Positive Health.

UNIT II: PHYSICAL HEALTH AND BEHAVIOR CHANGE

Staying Healthy: Medical Communication and Physical Health- Prevention of Diseases/Impairments- Degenerative Diseases- Primary Prevention and Behavioral Outcomes- Secondary and Tertiary Prevention and Behavioral Outcomes: Components of Interventions that Work- Controlling Hypertension- Controlling Diabetes.

Behavior Change: Adherence to Medical Regimens-Sources of Health Information- Health Belief Model- Theories of Reasoned Action and Planned Behavior- Specific Beliefs about Health- Persuasion-Social Cognitive Theory- Self-Regulative Theories-Subjective Social Norms-Intentions and Commitment- Behavior Modification- Behavioral Self-Control- Cognitive Modification.

UNIT III: PAIN, STRESS AND COPING

Pain: Perception of Pain- Theories of Pain-Neuro-chemical Basis of Pain and Pain Inhibition- Cognitive Outcomes of Pain- Psychological Factors and Pain- Cognitive Methods of Pain Control-Cognitive-Behavioral Methods of Pain Control- Behavior Modification in Chronic Pain.

Psychological Processes, Stress, and Physical Illness: Psycho-physiological Disorders- the Concept of Stress- Cognitive Appraisal in Stress- Psychoneuroimmunology - Stress and Cardiovascular Disorders - Psychophysiological Disorders and Stress.

Coping Processes: Cognitions and Coping- Cognitive Coping Styles- Causal Attributions- Sense of Control- Coping Interventions: Mental Control- Cognitive Retraining- Exercise-Relaxation Techniques- Systematic Desensitization- Biofeedback.

UNIT IV: BASICS OF POSITIVE PSYCHOLOGY

Positive Psychology: Assumptions and Goals- Psychology of Wellbeing- Positive Psychology and Health Psychology - Positive Therapy- Subjective Wellbeing- Psychological wellbeing and positive functioning.

Positive emotions- Positive Emotions and Health Resources-Positive emotions and well-being- Cultivating Positive Emotions- Genetics and happiness- Personality and happiness-Growth through Trauma- Resilience and its Sources –Self Regulation.

UNIT V: POSITIVE PSYCHOLOGY THE BEHAVIOUR CHANGE

Positive beliefs and Happiness - Optimism and Coping- Wisdom and the model of life management - Religion/ Spirituality and wellbeing - Using positive psychology to treat depression Mindfulness and Wellbeing.

Lifestyle practices for health and well-being: Achieving Sustainable New Happiness- Physical Activity (Positive Psychology in Motion)- Balancing Time Perspective in Pursuit of Optimal Functioning- Positive/ Healthy Aging.

TEXT BOOKS

DiMatteo, M., & Leslie R. Martin (2010). *Health Psychology* (LPE). New Delhi: Pearson Education India.

Steve R. Baumgardner & Marie K. Crothers (2009). *Positive Psychology* (LPE). New Delhi: Pearson Education India.

REFERENCE BOOKS

Alan Carr (2004). *Positive Psychology: The Science of happiness and Human Strengths* (SIE). London: Routledge.

Alex Linley P. & Stephen Joseph (2004). *Positive Psychology in Practice*. John Wiley & Sons, Inc.

David F. Marks, Michael Murray, Brain EvansEmee Vida Estacio (2011). *Health Psychology: Theory, Research and Practice*. Sage.

Seligman, M. E. (2008). Positive health. *Applied Psychology*, 57, 3-18.

Snyder, C.R., Shane J. Lopez, & Jennifer Teramoto Pedrotti (2011). *Positive Psychology: The Scientific and Practical Explorations of Human Strengths* (2nd Ed.). New Delhi: Sage.

Shelly E. Taylor (2008). *Health Psychology* (6th Ed.). New Delhi: Tata McGraw-Hill.

Taylor, S. E., & Sherman, D. K. (2004). *Positive psychology and Health Psychology: A Fruitful Liaison*. In *Positive psychology in practice*, 305-319.

On the successful completion of the course, students will be able to:

Semester 1 - Positive Psychology & Health-being							
		K1	K2	K3	K4	K5	K6
C01	summarise psychological factors that can influence the pursuit of the healthy lifestyle						✓
C02	describe examples of relevant and practical applications of psychological principles to everyday life		✓				
C03	understand, predict, explain and ultimately change the unhealthy behaviour	✓	✓				
C04	critically examine health related research & illustrate the role of scientific methodologies in arriving at important and applicable findings				✓		
C05	identify research that supports principles, strategies, tool and skills of the positive psychology				✓	✓	
C06	integrate and apply core concepts of positive psychology and resiliency factors into their own life to professional practice					✓	

On the successful completion of the course, students will be able to:

Semester 1 - Positive Psychology & Health-being										
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	summarise psychological factors that can influence the pursuit of the healthy lifestyle									
CO2	describe examples of relevant and practical applications of psychological principles to everyday life		✓			✓				
CO3	understand, predict, explain and ultimately change the unhealthy behaviour		✓			✓	✓			
CO4	critically examine health related research & illustrate the role of scientific methodologies in arriving at important and applicable findings									✓
CO5	identify research that supports principles, strategies, tool and skills of the positive psychology				✓		✓			
CO6	integrate and apply core concepts of positive psychology and resiliency factors into their own life to professional practice		✓					✓		

முதுகலைத் தமிழ் - இரண்டாம் பருவம்
தாள் - 09 உரையாசிரியரும் உரையியலும் (விருப்பப் பாடம்)
குறியீட்டெண்: 18TAM E09

நோக்கம்:

- பண்டைய மரபிலக்கணங்கள் உணர்த்தும் உரைவரலாறுகளையும் உரைவகைகளையும் கற்பித்தல். மூல நூல்களின் உண்மைத் தன்மைகளை வெளிப்படுத்தும் உரையாசிரியர்களைக் கண்டறிதல்.
- இளம்பூரணர் முதல் தற்காலம் வரை உள்ள பல உரையாசிரியர்களின் உரைத்திறன்களைத் திறனாய்வு நோக்கில் ஆராய்ந்து கற்பித்தல். உரையாசிரியர்களின் சமயச் சார்பற்ற, பிறமொழி, சார்பற்ற, தனித்தமிழ் இயக்கக் கருத்துக்களையும் வெளிப்படுத்துதல்.
- இலக்கிய இலக்கண ஆய்வுகளுக்கு உதவிய உரையாசிரியர்களின் கருத்துக்களை மாணவர்களுக்குப் போதித்தல். எழுத்து, சொல், பொருள், யாப்பு, அணி போன்ற ஐந்து இலக்கண அறுவகை இலக்கண உரையாசிரியர்கள் வரலாறுகள், அகஇலக்கணம், புற இலக்கணவுரைகள் பாட்டியல் உரைகள், தற்கால இலக்கண உரையாசிரியர்களை அறிமுகம் செய்தல்.
- பழந்தமிழ் இலக்கிய உரையாசிரியர்களால் சிறந்தோர், பெயர் தெரியாத பழைய உரையாசிரியர்கள், நீதி இலக்கியம், காப்பிய உரையாசிரியர்களின் உரைத்திறன்களை வெளிக்கொணர்ந்து கற்பித்தல். சைவம், வைணவம் போன்ற சமயம் சார்ந்த உரையாசிரியர்களின் பக்தி நெறியைப் புலப்படுத்துதல்.
- உரையாசிரியர்களின் உரை நெறிகளும் உரைத்திறன்களும் ஒப்பிட்டு உரைத்தல், அவர்களின் தனித்தமிழ் இயக்க உரை. வடமொழிச் சார்பு உரை போன்றவற்றை மாணவர்களுக்கு அறிமுகம் செய்தல். உரையாசிரியர்களின் தனித்தன்மை, உரைமரபு போற்றல், பல்துறைப்புலமை, அவர்கள் தரும் மேற்கோள்கள், வரலாற்றுச் செய்திகள், இருவேறு உரையாசிரியர்களின் பாடவேறுபாட்டுமுறை போன்றவற்றை உணர்த்துதல்.
- பல்வேறு உரையாசிரியர்கள் இருப்பினும் நச்சினார்க்கினியரின் பணி சொல்லில் அடங்காதது. அதனால் அவரின் வரலாறும் உரையும் தனிப்பட்ட முறையில் போதிக்கப்படுகின்றது.

அலகு -- 1 உரைவரலாறும் உரைவகைகளும்

உரை இலக்கணம், உரைவகைகள் - தொல்காப்பியம் - காண்டிகைஉரை, களவியலுரை-கருத்துரை,பதவுரை (கண்ணழித்துரைத்தல்), பொழிப்புரை, அகலவுரை, இளம்பூரணர் - பொழிப்பு, அகலம், எச்சம், நுட்பம், நன்னூல் - காண்டிகை, விருத்தி, பிறவகை குறிப்புரை அரும்பத உரைவரலாறு—தொடக்ககாலம், இறையனார் களவியல் உரைக்கு முந்திய காலம், முன்னுரைச்சான்றுகள், அகநானூற்றுப் பழையவுரை,

யாப்பருங்கலவிருத்திச்சான்று. அணியியல் உரை, இளம்பூரணருக்கு முந்திய உரை, தொல்காப்பிய உரைகள், தொல்காப்பியவிருத்தி, தொல்காப்பியத்துக்கு முந்திய உரைமரபு, உரைக்கு உரை, செய்யுள்வடிவஉரை, நூலாசிரியரே உரையாசிரியர், உரைப்பயன்கள்.

அலகு -- 2 **இலக்கணஉரைகள் (சுருக்கமான அடிப்படை - அறிமுகம்)**

தொல்காப்பியம்- இளம்பூரணர், சேனாவரையர், பேராசிரியர், தெய்வச்சிலையார், கல்லாடர், யாப்பருங் கலவிருத்திஉரை, யாப்பருங்கலக்காரிகைஉரை. வீரசோழியம் பெருந்தேவனார்உரை, தண்டியலங்காரஉரை, புறப்பொருள் வெண்பாமாலை சாமுண்டிதேவநாயகர் உரை, நம்பியகப்பொருள் நாற்கவிராசநம்பிஉரை, இறையனார் களவியற்காரிகைஉரை, நேமிநாத உரை, பழையஉரை, பாட்டியல் உரைகள் - வெண்பாப் பாட்டியல், நவநீதப்பாட்டியல், சிதம்பரப்பாட்டியல், இலக்கண விளக்கப் பாட்டியல் உரைகள், பிரயோக விவேகம் சுப்பிரமணியதீட்சிதர் உரை, உவமானசங்கிரகஉரை, நன்னூல் - சங்கரநமச்சிவாயர், ஆண்டிப் புலவர். கூழங்கைத் தம்பிரான், இராமாநுசுக்கவிராயர், விசாகப்பெருமாள்ஐயர், ஆறுமுகநாவலர், சடகோபராமாநுசாசாரியார்.

அலகு -- 3 **இலக்கிய உரைகள் (சுருக்கமான அடிப்படை, அறிமுகம்)**

எட்டுத்தொகை உரைகள், பதினெண்கீழ்க்கணக்கு உரைகள் - நாலடியார் - பதுமனார் தருமர் உரைகள், திருக்குறள்உரைகள்- பரிதியார், காலிங்கர், மணக்குடவர், பரிப்பெருமாள், பரிமேலழகர்.

பரிபாடல் உரை, திருக்கோவையார் பழையஉரை, பேராசிரியர் உரை, காப்பிய உரைகள்- சிலப்பதிகாரம் அரும்பதஉரை, அடியார்க்குநல்லார் உரை, நீலகேசி சமயதிவாகர வாமனமுனிவர், கம்பராமாயண உரைகள் - ஆழ்வார்க்குறிச்சி வெ.ப.சுப்பிரமணிய முதலியார் இன்கவித்திரட்டு உரை, அண்ணாமலைப் பல்கலைக்கழக உரைப்பதிப்பு வை.மு. கோபாலகிருட்டிண மாச்சாரியார் உரை.

சமயநூல் உரைகள்

நாலாயிர திவ்வியபிரபந்த வியாக்கியானம் - நாதமுனிகள் வழித்தோன்றல், 6000 படி முதலான படிகள், ஈடு, மணவாளமாமுனி. திருமுறை உரைகள் - திருவாசகம் திருவாசக வியாக்கியானம், சீர்காழித் தாண்டவராயர், பிறர் உரைகள். திருமந்திர உரைகள், பெரியபுராண உரைகள், சைவசித்தாந்த உரைமரபு - சிவஞானபோதம் சிவஞான முனிவர் சிற்றுரை பேருரை (பாடியம்), பாண்டிப்பெருமாள் உரை, மெய்கண்டதேவர் (வார்த்திகப் பொழிப்பு), சிவஞானசித்தியார் ஞானவாரணம் (செய்யுள் வடிவ உரை), பரபக்க சுபக்க உரைகள்.

அலகு -- 4 **உரைநெறிகளும் உரைத்திறன்களும்**

இயல் முன்னுரை தருதல், நூற்பா இயல் வைப்புமுறை கூறல், அவற்றின் இயைபு கூறல், தமிழ்மரபு பேணல், வடமொழிப்புலமை,

ஆசிரியர் கருத்தைப் போற்றல், மேற்கோள் தருதல், வினாவிடை முறை, பிறர் கருத்தை மறுத்தல், பத்துறைப் புலமை, இலக்கிய வரலாற்றுச் செய்தி தரல், தருக்கமுறைப் போக்கு, பாடவேறுபாடு தருதல், நூற்பா இயல் மாற்றம் செய்தல், அவாய் நிலை, விதப்புக்கிளவி.

அலகு- 5

உரையாசிரியர் நச்சினார்க்கினியர்

நச்சினார்க்கினியர் வரலாறும் சிறப்பியல்புகளும் சீவக சிந்தாமணி உரை – தொல்காப்பிய உரை – பத்துப்பாட்டு உரை – கலித்தொகை உரை – பல்கலைப் புலமை.

பாடநூல்கள்

உரையாசிரியர்கள், 1995. மு.வை. அரவிந்தன், மணிவாசகர் பதிப்பகம், சென்னை.

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உரைவிளக்கு, 1985. தமிழண்ணல், மீனாட்சி புத்தகநிலையம், மதுரை.

உரைமரபுகள், 2003. இரா. மோகன், ந. சொக்கலிங்கம், மெய்யப்பன் பதிப்பகம், சென்னை.

பார்வைநூல்கள்

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இலக்கணவரலாறு, 1999. இரா. இளங்குமரன், மணிவாசகர் பதிப்பகம், சென்னை.

இளம்பூரணர் சொர்ணம்மாள் நினைவுச் சொற்பொழிவுகள், 1981. மு.அருணாசலம், அண்ணாமலைப்பல்கலைக்கழகம், அண்ணாமலை நகர்.

உரையாசிரியர்கள் கண்ட சொற்பொருள் நுண்மை விளக்கம், (ஆண்டில்லை). திருநெல்வேலி தென்னிந்திய சைவசித்தாந்த நூற்பதிப்புக் கழகம், சென்னை.

உரையாசிரியரும் திறனாய்வுக் கோட்பாடுகளும், 1999. கி. ஆதிநாராயணன், சித்தரா நிலையம், சென்னை.

திருக்குறள் உரைகள் காட்டும் பொருள்நெறி, 2002. ப. கொழந்தசாமி. பாரதி புத்தகாலயம், சென்னை.

தெய்வச்சிலையார் உரைத்திறம், 1986. சோ. ந. கந்தசாமி,
மணிவாசகர் பதிப்பகம், சிதம்பரம்.

உரையாசிரியர்களும் திறனாய்வுக் கோட்பாடுகளும், 2002,
கி.ஆதிநாராயணன், சென்னை.

விளையும் பயன்கள்

- மரபிலக்கண உரை வகைகளையும் உரைத் திறன்களையும் அறிந்திடுவர்.
- போலிகளை நீக்கி தமிழ்த்தொண்டாற்றிய உரைப் பெருமக்களை அடையாளம் காண்பர்.
- பல்வேறு உரையாசிரியர்களின் உரைகளை ஒப்பிடும் வாய்ப்பு ஏற்படும்.
- தனித்தமிழ் உரையாளர், பிறமொழிக்கலப்பாளர் எழுதும் மரபைப் பெறுவர்.
- பண்டைய இலக்கண உரை, அறுவகை இலக்கண உரை, பாட்டியல் உரை, தற்கால உரை எனப் பாகுபடுத்தி தனிப்பட்ட முறையில் இலக்கண உரைகளைப் பயில இயலும்.
- பண்டையத்தமிழ் இலக்கிய உரை, பழைய உரை, நீதி இலக்கிய உரை, இயல்பையும் தன்மையும் அறிவர்.
- சமயம் சார்ந்த உரைகள் பக்தி நெறியைப் புலப்படுத்த உதவும்.
- உரைநெறிகளையும் உரைத்திறன்களையும் ஒப்பிட்டு உரைக்க இயலும்.
- உரையாசிரியர்களின் பல்துறைப்புலமை, அவர்கள் தரும் மேற்கோள், வரலாறு, பாடவேறுபாடு கற்போருக்கும் இடர்ப்பாட்டை நீக்கும். நச்சினார்க்கினயின் வாழ்வும் பணியும் முழுமையாக அறியப்படும்.

*வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.

தமிழ் முதுகலை-- மூன்றாம் பருவம்
தாள்- கொங்குநாட்டுவரலாறும் பண்பாடும்(முதன்மைப் பாடம்)
குறியீட்டெண்: 18TAM C11

நோக்கம்:

- தமிழக நாட்டுப்பிரிவுகளில் ஒன்றான கொங்குநாட்டின் அமைப்பு மற்றும் வரலாற்றை மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- கொங்குநாட்டின் ஆட்சி மாற்றங்களையும், பிறநாட்டினர் இடையேயான உறவையும் விளக்குதல்.
- கொங்கு இலக்கியங்கள் வழி கொங்குநாட்டின் சிறப்பை எடுத்துரைத்தல்.
- விடுதலைப் போரில் கொங்குநாட்டின் பங்களிப்பை எடுத்துக்கூறி, கொங்கு நாட்டுப்புறக்கலை இலக்கியப் பண்பாடுகளை விளக்குதல்.
- தமிழ் நாட்டின் சரித்திரத்தில் கொங்குநாடு முக்கிய இடம் வகித்ததை அறியச்செய்தல்.

அலகு- 1 கொங்குநாடும் வரலாறும்

கொங்குநாடு – கொங்கு என்ற சொல் விளக்கம் – கொங்குநாடு பரப்பும் எல்லையும் – கொங்கு 24 நாடுகள் – பண்டைய கொங்கு – சங்ககாலம் – ரோமானியர் உறவு – காசுகள் – கொங்குதேச ராஜாக்கள் கூறும் வம்சாவளி – கொங்குநாட்டில் கங்கர், சோழர், பாண்டியர், பல்லவர் – கொங்குச்சோழர் – கொங்குக் கல்வெட்டுகள் – விஜயநகர ஆட்சிக் காலம் – நாயக்கர் காலம் – திப்புகல்தான் காலம் – ஆங்கில ஆட்சிக்காலம் – இருபதாம் நூற்றாண்டு.

அலகு- 2 கொங்குநாட்டு இலக்கியங்கள்

வாய்மொழி இலக்கியம் – சங்ககாலப் புலவர்கள் – பெருங்கதை – சமண இலக்கியங்கள் – அண்ணன்மாச்சாமி கதை – தக்கை இராமாயணம் – சிற்றிலக்கியங்கள் – உரையாசிரியர்கள் – பயண இலக்கியம் – சே.ப. நரசிம்மலுநாயுடு – இராவணகாவியம் – இக்கால இலக்கியங்கள் பக்தமான்மியம் – வானம்பாடி இயக்கம் – நாவல், சிறுகதை ஆசிரியர்கள் – தமிழறிஞர்கள் – வே.ரா. தெய்வசிகாமணிக் கவுண்டர் – கோவைகிழார் – ம.ரா.போ.குருசாமி – சிவக்கவிமணி – அருணாசலக்கவுண்டர் – தா.ஏ.வீராசாமி – கவிஞர்கள் – சிற்பி, புவியரசு – குலோத்துங்கன் – படைப்பாளிகள் – பெரியசாமித்தாரன் – கு. சின்னப்பபாரதி – ஆர். சண்முகசுந்தரம் – ச.து.சு. யோகி – சி.ஆர் ரவீந்திரன் – சூர்யகாந்தன் – க. ரத்தினம் – தமிழ்நாடன் – மா. நடராசன் – சுப்பரபாரதிமணியன் முதலியோர்.

அலகு- 3 கொங்குநாடும் விடுதலைப் போரும்

தீரன் சின்னமலை – சேலம் பகடால நரசிம்மலுநாயுடு – சேலம் சி. விஜயராகவாச்சாரியர் – நாமக்கல் கவிஞர் – இராஜாஜி –

பெரியார் ஈ.வெ.ரா. — சி.பி.சுப்பையா — கோவை
 சு.அய்யாமுத்து — டி.எஸ். அவிநாசிலிங்கம் — பத்மாவதி
 ஆஷர் — பி.எஸ்.சுந்தரம் — திருப்பூர் குமரன் —
 கே.பி.சுந்தரம்பாள் — என்.ஜி.இராமசாமி — ச.து.சு.யோகியார் —
 விடுதலைப்போரில் கொங்குநாட்டு விவசாயிகள் —
 திருச்செங்கோடு காந்தி ஆசிரமம் — விடுதலைப்போரில் தேசியத்
 தலைவர்கள் — சி. சுப்பிரமணியம் — T.M.காளியண்ணன்
 மற்றும் பலர்

அலகு- 4 கொங்குநாட்டுப்புறப் பண்பாடுகள்

தெய்வம் — வழிபாடு, சடங்கு, திருவிழா, நம்பிக்கை; மக்கள் —
 சாதி, தொழில், உணவு, வாழ்க்கைச் சடங்குகள்; கலை —
 இலக்கியக்கலை, கதை, பாடல், கதைப்பாடல், பழமொழி,
 விடுகதைகள்; இசை — குரல் கருவிகள், ஆடல் — ஆட்டங்கள்,
 கூத்து; வழக்குச்சொற்கள் — கொங்குநாட்டுப்புறப் பண்பாட்டு
 ஆய்வுகள்.

அலகு- 5 கொங்குநாட்டுக்கலைகள்

கோயில்கள் — பேரூர் — பண்ணாரி — சென்னிமலை —
 சிவன்மலை சிற்பங்கள் — கட்டடக்கலை — இசைக் கல்வெட்டு
 — கொங்கேழுதலங்கள் — கருவூர் — வெஞ்சமாக் கூடல் —
 கொடுமுடி — திருச்செங்கோடு — பவானி — திருமுருகன் பூண்டி —
 அவிநாசி — திருமடங்கள் வளர்த்ததமிழ் — கால் நடைவளர்ப்பு
 முதல் பல்வேறு தொழில்சார் கலைகள் — நாடகங்கள் —
 கொங்குவிளையாட்டுக்கள் — திரைக்கலைஞர்கள் — வின்சென்ட்
 — படப்பிடிப்பு நிலையங்கள் — சென்டரல் — ஜூபிடர் —
 பட்சிராஜா — மணிவண்ணன் — சிவகுமார் — ஏ.பி. நாகராஜன்
 — பாக்யராஜ் — ஆர் சுந்தராஜன் — எம்.ஜி.ஆர் — கலைஞர் —
 கண்ணதாசன் — ஆகியோரின் கொங்கு தொடர்பு — கே.பி.
 சுந்தரம்பாள் — சூர்யா — கார்த்தி — சத்யராஜ்.

பாடநூல்கள்

1. வளமார் கொங்கு — வெளியீடு என்.ஜி.எம். கல்லூரி, பொள்ளாச்சி.
2. கொங்குநாட்டு வரலாறு — கோவைகிழார்
3. கொங்குநாட்டு வரலாறு — I — மாணிக்கம்
4. கொங்குநாட்டு வரலாறு — II — மாணிக்கம்
5. கொங்குத் தமிழகவரலாறு — கா.அப்பாதுரை
6. விடுதலை வேள்வியில் தமிழகம் — த. ஸ்டாலின் குணசேகரன்

விளையும் பயன்கள்

- கொங்கு நாட்டின் வரலாற்றையும், அரசியல் முறையினையும் அறிவர்.
- கொங்கு நாட்டுப்புலவர்கள் மற்றும் அவர்களின் இலக்கியச் சிறப்புகளை அறிவர்.

- கொங்கு நாட்டில் காணப்படும் கல்வெட்டுகள் மூலம் தமிழர்களின் பழம் பெருமையை அறிந்துகொள்வர்.
- விடுதலைப்போரில் கொங்கு நாட்டவர் ஆற்றிய தொண்டினை உணர்ந்துகொள்வர்.
- கொங்கு நாட்டுப்புறப் பண்பாடுகள் மற்றும் பண்பாட்டு ஆய்வுகளை அறிந்துகொள்வர்.
- கொங்கு நாட்டுக்கலைகள் கொங்கு மக்களின் உணர்வுகளை வெளிப்படுத்தும் களமாக உள்ளதை மாணவர்கள் உணர்வர்.

***வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.**

முதுகலைத் தமிழ்-இரண்டாம் பருவம்
தாள்- 07 நாட்டுப்புறவியல் (முதன்மைப் பாடம்)
குறியீட்டெண்:18TAM C07

நோக்கம்:

- எழுத்திலக்கணங்களுக்கு மறுதலையாக அமைந்து பொது மக்களின் படைப்பிலக்கியக் களமாகப் பண்பாட்டு ஆவணமாக விளங்கும்.
- நாட்டுப்புறவியலின் அடிப்படை இயல்புகளை விளக்கி வகைகளை அறிமுகம் செய்தல்.
- நாட்டுப்புறப் படைப்புகளை அணுகுவதற்கான ஆய்வியல் கோட்பாடுகளை விளக்குதல்.
- கதைப்பாடல், புராணங்கள் எனும் இவற்றின் சிறப்பியல்புகளை விரிவாக விளக்குதல்.

அலகு - 1

நாட்டுப்புறவியல் வரையறை வரலாறு களஆய்வு

நாட்டுப்புறவியல் - சொல்வரையறை, அடிப்படைக் கருத்துகள், சிறப்பியல்புகள் - வாய்மொழிமரபு, வழிவழியாக வருதல், திரிபுடைமை, படைப்பாளி இன்மை, ஒருவாய்பாட்டுக்குள் அடங்குதல், சொல் உருவாக்கம். நாட்டுப்புறவியல் வரலாறு - தொல்காப்பியம், சங்கஇலக்கியம், காப்பியம், பக்திஇலக்கியம், சிற்றிலக்கியம் நாட்டுப்புறவியல்கூறுகள், எழுத்திலக்கியம் நாட்டுப்புற இலக்கியம் வேறுபாடுகள் - நாட்டுப்புற இலக்கியம் உழைப்புறவு, வட்டாரத் தன்மை. நுகர்வோர் கலைஞர் தளவேறுபாடு, தொழில் கலைஞர் பகுதிநேரக்கலைஞர், யதார்த்தத்தோடு நெருக்கமானதாக வாழ்வருகே நின்றல், வரலாற்றுத் தொடர்நிலைக்கூறு அதிகம் உடைமை, ஆளும் வர்க்கமுரண், சார்புத்தன்மை - கலைஞரே நுகர்வோர் (ஏற்றப் பாட்டு போல்வன), புறத்தோர் நுகர்வோர் (கதை, கூத்து போல்வன), நாட்டுப்புற மரபு - இயற்கை சங்க நிகழ்வு மறுவிளக்கம், புனைவு அடிப்படைவிளக்கம், இயற்கைச் சார்பு, புதியன ஏற்க மறுப்பு. களஆய்வு - வரையறை, அடிப்படையும் சூழலும், வழிமுறைகள், தகவலாளர்கள் தெரிவு, தகவலாளர் தொடர்பு முறை, தரவுசேகரிப்புமுறைகள் - பேட்டிமுறை, உற்றுநோக்கல் முறை, வினாநிரல் முறை தகவலாளர் அடிப்படையில், நாட்டுப்புற இலக்கியவகைமை அடிப்படையில், கருவிப் பயன்பாடு, களப்பணியில் அறவுணர்வு, சிக்கல், எச்சரிக்கை.

அலகு - 2

நாட்டுப்புறவியல் இலக்கிய வகைமை

அறிஞர்களும் வகைப்பாடும் அடிப்படைகளும் - கி.வா.ஜகன்நாதன் (1975) ஏழுவகை (சூழல், பயனாளர், பாடுபொருள், வடிவம்), அன்னகாழு (1966) பதினான்கு வகை, ஆறு.அழகப்பன் ஆறுவகை (பொருண்மை, சூழல்), மா. வரதராஜன் (1978) பத்து வகை (பாடுவோர், சூழல், பொருண்மை), சு. சண்முகசுந்தரம் ஏழு வகை

(சூழல், பாடுவோர்), நா. வானமாமலை (1977) பத்து வகை, ஆறு. இராமநாதன் எட்டு வகை (சூழல்).

வகைமை

1. பாடல்கள் - தாலாட்டு, ஒப்பாரி, தெம்மாங்கு, தொழிற் பாடல், காதல்பாடல் போல்வன.
2. கதைகள் - தெய்வக்கதை, அறிவுரைக்கதை, பொழுது போக்குக்கதை, பிறவகை - மனிதக்கதை, தெய்வக்கதை, மிருகக்கதை, மந்திரக் கதை.
3. கதைப்பாடல்- வரையறை, தோற்றம், வரலாறு, கதைப்பாடல் வகைமை - வரலாற்றுக்கதைப்பாடல், புராணக்கதைப்பாடல், சமுதாயக்கதைப் பாடல், வீரக்கதைப்பாடல்,
4. பழமொழி-உவமைத்தன்மை, பழமொழித்தன்மை.
5. மரபுத்தொடர்த் தன்மை.
6. விடுகதை - புதிர், உவமைப்புதிர், வினாடிவினா.
7. நாட்டுப்புறநம்பிக்கைகள், பழக்கவழக்கங்கள், சடங்குகள்

அலகு -- 3

நாட்டுப்புறவியல் ஆய்வுக்கோட்பாடுகள்

தொன்மவியல் கொள்கை(Mythological Theory)

கதைகளுக்குத் தொன்மம் அடிப்படை - தொன்மப்பிறப்பு ஆய்தல், சூரியத் தோற்றக்கொள்கை எனும் மாக்ஸ்முல்லர் கோட்பாடு.

புலப்பெயர்வுக்கொள்கை(Migrational Theory)

இந்தியாவில் தோன்றிய கதை பரவல், மத்தியதரைக்கடல், ஸ்பெயின் கிரேக்கம் வழி ஐரோப்பாவில் பரவியது எனும் கொள்கை.

வரலாற்று நிலவியல் ஆய்வு அணுகுமுறை(Historical Geographical Method)

ஆய்வுக்கான கதையின் பழுவடிவம் காணல், தோற்றக் காரணம் தோற்ற இடம் அறிதல், பரவலாக்கம் அறிதல்.

அமைப்பியல் கோட்பாட்டு ஆய்வுமுறை(Structural Theory)

கதைகளின் பகுதிகள், பகுதி விளக்கம், பகுதிகளுக்கு இடையிலான தொடர்பு, பகுதிகள் முழுமையோடு கொண்ட தொடர்பு. பிராப், லெவிஸ்ட்ராஸ் அணுகுமுறைகள். பிராப்-தொடர்முறை ஆய்வு(Syntagmatic Analysis) செயல்கள் கதையில் வரிசைமுறையில் அமைதலை ஆயும் ஆய்வு, லெவிஸ்ட்ராஸ்-வாய்பாட்டுஆய்வு(Paradigmatic Analysis) கட்டுடைத்தல், சிறுசிறுவாக்கியமாக்கல், வரிசைப்படுத்தல், நான்காய்ப் பிரித்தல், அவற்றிடை உள்ள கருத்தறிதல்.

வரலாற்று மீட்டுருவாக்க அணுகுமுறை(Historical Reconstruction)

நாட்டுப்புற வழக்காறுகளை ஆதாரமாகக்கொள்ளல். அவற்றின்வழி ஒருகாலகட்ட வரலாற்றை மீட்டுருவாக்கம் செய்தல். இலட்சியக் கோட்பாடு(Ideological Theory)

அரசியல் கோட்பாட்டுக்கு நாட்டுப்புறவியலைப் பயன்படுத்துதல், மண்ணின்சிறப்பு. தேசிய உணர்வுக்கு நாட்டுப்புறவியல் பயன்படுத்தம்.

உளப்பகுப்பாய்வு(Psycho Analytical Theory)

பிராய்டிய உளவியல் கோட்பாட்டு வழி ஆய்தல்.

வாய்மொழி வாய்பாட்டுக் கோட்பாடு(Oral Formualic Theory)

நாட்டுப்புறவியல் இலக்கியப் படைப்பும் அமைப்பும்,எடுத்துரைப்பவர் சொல்லும்முறை, சொல்லும் செயற்பாட்டு முறை இவற்றைச் சார்ந்தது.

செயன்முறைக்கோட்பாடு(Contextual Theory)

வழக்காறுகள், சூழல்கள் இரண்டன் உறவுச் சூழல், வழங்குவோர் கேட்போர் வழங்குமுறை கேட்கும்முறை, இருவர்தம் உணர்வுகள் அவர்தம் கருத்துகள் இவற்றைச் சேகரித்து ஆய்தல்.

அலகு – 4 நாட்டுப்புறவியல் தொழில்நுட்பமும் பயன்பாடும்
நாட்டுப்புற விளையாட்டுகள் : விளையாட்டின் தன்மைகள் - விளையாட்டின் வகைகள் - விளையாட்டால் அறியப்படும் கருத்துகள் - நாட்டுப்புற மருத்துவம்: மருத்துவ விளக்கம் சிறப்புகள் - மருத்துவக் குறிப்புகள் - வகைகள் - நாட்டுப்புற வழிபாட்டு முறைகள் கல்வித்திட்டங்களுக்கு நாட்டுப்புறவியலைப் பயன்படுத்துதல் - மக்கட்பெயர் ஆய்வு – ஊர் பெயர் ஆய்வு.

அலகு -- 5 **புராணக்கதைகள்**
தொன்மம்(Myth)பொருள், வரையறை. தொன்மம், பழமரபுக்கதை, நாட்டுப்புறக்கதை வேறுபாடுகள், புராணம் பொருள் வரையறை, வரலாறு.
மாக்ஸ்முல்லர் - மொழியும் மக்கள் எண்ணவளர்ச்சியும்,
1. அடிக்கருத்தியல் காலம், 2.கிளைமொழிக் காலம், 3. புராணக் காலம், 4. சனரஞ்சக காலம்.
புராணவியல்கோட்பாடு, புராணச்சடங்குக் கோட்பாடு, லெவிஸ்ட் ராஸின் அமைப்பியல்கோட்பாடு-வாய்பாட்டு (Paradigmatic) ஆய்வுமுறை, 1.புராணக்கதைப்புதைபொருள் தனித்தனிக் கூறுகள் இணைந்த முழுமையில் உள்ளது, 2. புராணக்கதை மொழி தனிப்பட்ட தன்மையது, 3. புராணக் கதைப்பொருள் சாதாரண மொழிப்பொருளிலிருந்து வேறுபட்டு அமைவது.

பாடநூல்கள் (அந்தந்த நூல்களில் உரிய பகுதிகள்)

“கோட்பாடுகள்”**நாட்டுப்புறவியல் கோட்பாட்டுப் பார்வைகள்**, 2003. என். பக்தவச்சலரெட்டி, ஆறு.இராமநாதன், தென்னிந்திய மொழிகளின் நாட்டுப்புறவியல்கழகம், திருவனந்தபுரம்.

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“நாட்டார்வழக்காற்றியல் ஆய்வுமுறைகள் அன்றும் இன்றும்”, 1990, பா.ரா.சுப்பிரமணியன்.நாட்டுப்புறவியல் ஆய்வுமுறைகள் ஆறு. இராமநாதன் (ப.ஆ.), தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்.

புராணவியல் கோட்பாடு, தே. லுர்து, நாட்டுப்புறவியல், தொகுதி-2,எண்1-2

பார்வைநூல்கள்

நாட்டுப்புறவியல் ஆய்வுமுறைகள், 1990. ஆறு. இராமநாதன் (ப.ஆ.), தமிழ்ப் பல்கலைக்கழகம், தஞ்சாவூர்.

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கதைப்பாடல்களின் இயல்புகள்,தே. லுர்து, நாட்டுப்புறவியல் ஆய்வு.

தமிழ்நாட்டுக் கதைப்பாடல்களின் சோக முடிவுகள், 1971. நா. வானமாமலை ஆராய்ச்சி.

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“புராணவியல் கோட்பாடு, 1984. தே. லுர்து, நாட்டுப்புறவியல், தொகுதி-2.

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விளையும் பயன்களும்

- இன்றைய இலக்கியப் படைப்பாளர்களின் கருத்துக்களுக்கு பண்டைய கால வாய்மொழி இலக்கியங்களே அடிப்படையாகும் என்பதை அறிந்தவராவர்
- நாட்டுப்புற வழக்காறுகள் பண்பாட்டைப் பேணிக்காக்கும் கருவூலங்கள் என்று உணர்ந்திருப்பர்.
- நாட்டார் வழக்காற்றியல், கலைநிகழ்ச்சிகள் வழி பண்டைத்தமிழரின் பாரம்பரியம் போற்றிக்காக்கப்படுகிறது என்பதை புரிந்திருப்பர்.

*வினாக்கள் பாடநூல்களிலிருந்து மட்டுமே அமைதல் வேண்டும்.

Paper-II FOUNDATIONS OF HUMAN BEHAVIOUR - 18RPSY02

Objectives:

- To enable the student to understand the Foundations of Human Behaviour
- To make them understand the recent advancements in the Study of Human Behaviour
- To sensitize the student on Motivational, Emotional and Other aspects of Human Behaviour

UNIT I: FOUNDATIONS OF HUMAN BEHAVIOURS

Historical antecedents of Psychology and trends in the 21st century - Psychology and scientific method - Psychology in relation to other social sciences and natural sciences- Application of Psychology to societal problems.

Development of Human Behaviour: Growth and development- Principles of development- Role of genetic and environmental factors in determining human behaviour- Influence of cultural factors in socialization- Life span development - Characteristics, development tasks, promoting psychological well-being across major stages of the life span.

UNIT II: MEANING MEAKING

Sensation: Concepts of threshold: Absolute and difference thresholds- Signal-detection and vigilance- Factors of attention. *Perception:* Biological factors in perception- Perceptual organization- Space and depth perception- size estimation and perceptual readiness- the plasticity of perception- Extrasensory perception- Culture and perception- Subliminal perception.

Learning: Behaviourists- Gestaltalist and Information processing models- the Processes of extinction- Discrimination and Generalization- Programmed learning- Probability learning- Self-instructional learning- types and the schedules of reinforcement- Escape, avoidance and punishment, modeling and social learning.

UNIT III: COGNITIVE PROCESSESS

Memory: Encoding and remembering- Short term memory- Long term memory- Sensory memory- Iconic memory- Echoic memory- the Multistore model- Levels of processing- Organization and Mnemonic techniques to improve memory- *Theories of Forgetting:* Decay- Interference and retrieval failure- Metamemory- Amnesia.

Thinking and Problem Solving: Piaget's theory of cognitive development- Concept formation processes- Information processing- Reasoning and problem solving- Facilitating and hindering factors in problem solving- *Methods of problem solving:* Creative thinking and fostering creativity- Factors influencing decision making and judgment- Recent trends.

Intelligence and Aptitude: Concept of intelligence and aptitude - Nature and theories of Intelligence – Spearman- Thurstone- Guilford Vernon- Sternberg and J.P.Das- Emotional Intelligence- Social intelligence- Measurement of Intelligence and Aptitudes- Concept of IQ- Measurement of Multiple Intelligence- Fluid Intelligence and crystallized intelligence.

Language and Communication: Human Language – Properties- Structure and Linguistic Hierarchy- Language Acquisition-Predisposition- Critical Period

Hypothesis- Theories of Language Development - Skinner and Chomsky- Process and Types of Communication.

UNIT IV: BEHAVIOURAL PROCESSES

Motivation and Emotion: Psychological and physiological basis of motivation and emotion- Measurement of motivation and emotion- Effects of motivation and emotion on behaviour- Extrinsic and intrinsic motivation- Factors influencing intrinsic motivation- Emotional competence and the related issues.

Attitudes, Values and Interests: Components of attitudes- Formation and Maintenance of Attitudes- Measurement of Attitudes- Values and Interests- Theories of Attitude Change- Strategies for Fostering Values- Formation of Stereotypes and Prejudices; Changing others behaviour- Theories of Attribution- Recent trends.

Personality: Concept of personality- *Theories of personality:* Psychoanalytical – Sociocultural- Interpersonal- Developmental- Humanistic- Behaviouristic- Trait and type approaches- *Measurement of Personality:* Projective tests - Pencil-paper test- the Indian Approach to Personality- Training for Personality Development- Latest approaches like big 5 factor theory- the Notion of self in different traditions.

UNIT V: CONTEMPORARY PSYCHOLOGY

Cyber Psychology: Computer Application in the Psychological Laboratory and Psychological Testing- Artificial Intelligence- Psych cybernetics- Study of Consciousness - Sleep - Wake Schedules- Dreams -Stimulus Deprivation- Meditation- Hypnotic/drug induced states- Extrasensory Perception- Intercessory perception Simulation studies.

Psychological well-being and Mental Disorders: Concept of health-ill health- Positive health and Well-being- Causal factors in Mental Disorders: (Anxiety disorders, mood disorders, schizophrenia and delusional disorders; personality disorders, substance abuse disorders) - Factors influencing positive health, well-being, life style and quality of life; Happiness disposition.

Therapeutic Approaches in Psychology: Psychodynamic therapies-Behaviour therapies- Client centered therapy- Cognitive therapies- Indigenous therapies (Yoga, Meditation)-Bio-feedback therapy- Prevention and Rehabilitation of the Mentally Ill- Fostering mental health.

Community Psychology: Concept of community psychology- Use of small groups in social action- Arousing community consciousness and action for handling social problems- Group decision making and leadership for social change- Effective strategies for social change.

TEXT BOOKS

Cacioppo, J., & Freberg, L. (2018). *Discovering psychology: The science of mind*. Cengage Learning.

Robert A. Baron & Girishwar Misra. (2014). *Psychology* (Indian subcontinent edition /5th Ed.) Pearson Education Limited.

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Gregory J Feist & Erika L. Rosenberg (2012). Psychology: Perspective and Connections (2nd Ed.). McGraw-Hill.

Hilgard, E.R. (1999). *Introduction to Psychology* (6th Edition). New Delhi: Oxford and IBH Publishing Co, Pvt Ltd.

Hockenbury, D. H., & Hockenbury, S. E. (2011). *Discovering psychology* (5th Ed.). Worth Publishers.

Kalat, J. W. (2016). *Introduction to psychology*. Nelson Education.

Mangal, S.K. (1999). *General psychology*. New Delhi: Surjeeth Publications.

Morgan C.T, King, R.A., Weisy, J.R, Scooper, J. (1993). *Introduction to Psychology*. New Delhi: Tata Mc-Graw Hill Publishing Company.

Robert A. Baron (2001). *Psychology*. New Delhi: Prentice Hall of India.

Robert S. Feldman. (2012). *Psychology and your Life*. TATA McGraw-Hill.

Course Outcome:

On the successful completion of the course, students will be able to.

CO No	Co Statement	Knowledge level
CO1	Understand and gain knowledge in human behavior development	K2
CO2	Insight into the concepts of sensation and perception	K3
CO3	Gain knowledge in the cognitive process such as memory, thinking, intelligence, communication, etc	K1
CO4	Analyze the behavioral process such as motivation, emotion, attitude, values, etc	K4
CO5	Gain knowledge in aspects of contemporary Psychology and its its impact on human behavior	K1

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	M	S
CO3	S	S	M	S
CO4	S	S	M	S
CO5	S	S	M	S

Course Code & Title	18DMPSO02	Advanced Sociological Theories	
Class	M.Phil. Sociology	Semester	I
Cognitive Level	K1,K2,K3,K4,K5		
Course Objectives	1. To acquaint students with advanced sociological theorists and their work. 2. To provide a historical context within which sociological theory/ideas have developed. 3. To develop critical thinking through advanced sociological theories. 4. To understand the complexity of social systems through comparing and contrasting of various sociological theory. 5. To analyze contemporary society and social issues through the application of advanced sociological perspectives.		
UNIT	Content	No. of Hours	
I	Functionalism – Intellectual background of Functionalism- Robert K. Merton's Codifications of Functional Analysis: Postulate of the functional unity of the society, Postulate of universal functionalism and Postulate of functional indispensability. Varieties of Functionalism - Functionalism as model and perspective.	16 Hours	
II	Conflict Theory – Karl Marx: The theory of Class struggle, C. Wright Mills: The Power Elite, Ralf Dahrendorf: The Rulers and Ruled, Randall Collins: The Analytic Conflict Theory, Lewis Coser: Conflict functionalism.	16 Hours	
III	Symbolic Interactionism – Charles Horton Cooley: Looking glass self, The primary group, George Herbert Mead: The coherent theory: Mind, Self and Society. The functions of self, Herbert Blumer: Symbolic Interactionism, Methodological Orientation and Society as Symbolic Interaction.	16 Hours	

IV	Modernity – What is modernity? Intensification of the process of modernity: Aspects of modernity. Anthony Giddens ; Modernity is multi-dimensional. Zygmunt Bauman : Modernity as holocaust. Jurgen Habermas : Modernity is rationality and an unfinished project. Characteristics of modernity.	16 Hours
V	Post Modern Thinkers – Jean Baudrillard : Simulation Society, Simulation and Consumerism. Michel Foucault : Madness and Civilization, The order of Things. Jean-Francois Lyotard : Scientific Narratives, Impact of Post Modern Science on Humanities.	16 Hours
References	1. Doshi, S.L., <i>Modernity, Post Modernity and Neo-Sociological Theories</i>, Rawat Publications, New Delhi, 2006. 2. Craig Calhoun et.al (Ed), <i>Contemporary Sociological Theory</i>, Blackwell Publishing Oxford, UK, 2007. 3. Francis Abraham, M, <i>Modern Sociological Theories</i>, Oxford University Press, New Delhi, 1982. 4. Charles Lemert et.al (Ed), <i>Social Theory – The multicultural and Classic Readings</i>, Rawat Publications, New Delhi, 2004. 5. Nagla, B.K., <i>Indian Sociological Thought</i>, Rawat Publications, New Delhi, 2008. 6. E.C. Cuff, W.W. Sharrock and D.W. Francis, <i>Perspectives in Sociology</i>, Routledge, London, 2009. 7. Jonathan H. Turner, <i>The Structure of Sociological Theory</i>, Rawat Publications, New Delhi, 2007. 8. Lewis Coser, <i>Masters of Sociological Thought</i>, Rawat Publications, New Delhi, 2008.. 9. Doshi, S.L. <i>Post Modern Perspectives on Indian Society</i>, Rawat Publications, New Delhi, 2008. 10. Yogendra Singh, <i>Ideology & Theory in Indian Sociology</i>, Rawat Publications, New Delhi, 2005.	
Course Outcomes	After completion of the course, the students will able to.	
CO1	Write the theoretical perspectives of functionalism with its premises and propositions.	
CO2	Explain the conflict theories with illustration and apply the same in the sociological research.	
CO3	Comprehend the nature of social exchange theories and link the same in their day to day research activities.	



PERIYAR UNIVERSITY

SALEM - 636 011, TAMIL NADU

NAAC A Grade – STATE UNIVERSITY- NIRF RANK 83

Environment and Sustainability

CORE COURSE - I

ECOLOGY AND BIODIVERSITY CONSERVATION

Paper Code	19UPEVS1C01	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives

The purpose of this course is to gain an understanding of the value of biodiversity and drivers of its loss; current efforts to conserve biodiversity on global, national and local scales; practical issues with local conservation and organizations, policies and programmes for sustainable management of bioresources.

Course Outcomes

On the successful completion of the course, students will be able to

- CO1** Understand the relationship between biodiversity and ecosystem functions
- CO2** Understand the direct and indirect values of biodiversity resources and their bioprospecting opportunities
- CO3** Assess the factors responsible for the loss of biodiversity
- CO4** Outline the main reasons for decline and threats to biodiversity worldwide
- CO5** Evaluate the pros and cons of species introductions and reintroductions
- CO6** Understand the various *in situ* and *ex situ* conservation measures and make critical judgments on the conflict between conservation and development
- CO7** Argue the case for local action to address the global loss of biodiversity
- CO8** Know more knowledge about the recent policies and programmes for sustainable management of bioresources and apply the rules and recommendations related to environmental protection

Mapping with Programme Outcomes

The mapping of course outcomes with programme outcomes is tabulated as follows:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	*							
CO2		*						
CO3	*							
CO4	*							*
CO5	*					*		*
CO6	*					*		*
CO7	*					*		*
CO8	*					*		*

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Ecology and Biodiversity	Ecology: Types of ecosystem – Terrestrial and Aquatic ecosystems - Ecological pyramids - Food Chain - Food Web - Energy flow (K1 & K2) - Types of Biodiversity: Species, Genetic and Ecosystem diversity – Alpha, beta, and gamma diversity (K1 & K2) – Biodiversity and ecosystem function (K4 & K5) – Megadiversity zones and Biodiversity Hot Spots in India (K2 & K3) – Ecologically Sensitive Areas (ESA) in India (K4 & K5) - Values of Biodiversity (K4 & K5) – Biodiversity Prospecting - Examples of biopiracy and bioprospecting (K2 & K5)	8
II	Threats to Biodiversity	Endangered and endemic species of flora and fauna in India (K1 & K2) - Biodiversity threats under Anthropocene era: Habitat loss, fragmentation and degradation – Pollution - Overexploitation (K2, K4 & K5) - Human-Animal conflict with special reference to elephants (K2, K4 & K5) – IUCN Threat Categories – Red Data Book (K2 & K4) – Climate change on species extinction - Causes and Impacts of Invasive species to biodiversity (K2, K3, K4 & K5) – Global Taxonomy Initiative to combat invasive alien species (K1 & K2)	8
III	Conservation Strategies	<i>In situ</i> conservation: Afforestation, Social Forestry, Agro-forestry, Zoos, Biosphere Reserves, National Parks, Sanctuaries, Protected Area Network, Sacred Groves and Sthalavrikshas (K1, K2 & K3) – <i>Ex situ</i> conservation: Botanical gardens, Cryopreservation, Gene Bank, Seed Bank, Pollen Bank, Sperm Bank, cDNA Bank (K1, K2 & K3) - Conservation Genomics: Environmental DNA (eDNA) for wildlife biology and biodiversity monitoring, Next Generation Sequencing (NGS) Techniques, DNA barcodes, Transcriptome and Epigenome tools, CRISPR based gene drives (K2, K4, K5 & K6)	12
IV	Sustainable Management of Bioresources	An elementary account on WTO, GAAT and TRIPS to agricultural biodiversity (K2 & K4) - National Biodiversity Authority (NBA) – Functions of State Biodiversity Board (SBB) and Biodiversity Management Committee's (BMC) – People's Biodiversity Register (PBR) (K1, K2 & K4) – Biodiversity informatics Portals (K4 & K5) - International Organizations and biodiversity conservation: Objectives and Targets 2011-2020 of Global Strategy for Plant Conservation (GSPC), WWF-India for priority and threatened species conservation, UNESCO - Man and Biosphere Programme (MAB), UNDP - Biodiversity Finance Initiative (BIOFIN) and UNEP – Global Environment Facility (GEF) for biodiversity conservation (K3, K4 & K5)	12

V	Policies, Programmes and Acts for Conservation	Salient features of Biological Diversity Act 2002 (K2 & K3) - Status and protection of species in National and International levels – Policies implemented by MoEF & CC for biodiversity conservation - Role of CITES, IUCN and Convention on Biological Diversity (CBD) in biodiversity conservation (K2, K3 & K4) – Nagoya Protocol on Access and Benefit-Sharing – Cartagena Protocol on Biosafety - The Aichi Biodiversity Targets (K3) – Monitoring the Illegal Killing of Elephants (MIKE) programme – Strategic programme 2016-2020 for The International Consortium on Combating Wildlife Crime (ICWC) – SAWEN and TRAFFIC Networks to combat illegal wildlife trade – Ramsar Strategic Plan 2016-2024 for wetland conservation (K4 & K5)	10
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2. Krishnamurthy KV (2003) An Advanced Textbook on Biodiversity – Principles and Practice, Oxford and IBH Publishing, New Delhi.

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2. Chaudhuri AB and Sarkar DD (2003) Megadiversity Conservation, Flora, Fauna and Medicinal Plants of India's Hot Spots. Daya Publishing House, New Delhi.
3. Dadhich LK and Sharma AP (2002) Biodiversity –Strategies for Conservation, APH Publishing Corporation, New Delhi.
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CORE COURSE – II

ENVIRONMENTAL CHEMISTRY

Paper Code	19UPEVS1C02	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives

The purpose of this course is to develop an understanding of environment, chemicals and their effects on the environment, to provide students with an understanding of the fundamental chemical processes and pollutants effects on environment.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Have knowledge of basic theories and problems of Environmental chemistry
CO2	Describe important chemical reactions and cyclic processes of chemical species in the atmosphere, hydrosphere and in lithosphere
CO3	Demonstrate knowledge of chemical principles of various fundamental environmental Phenomena
CO4	Apply basic chemical concepts in understanding the behavior of pollutants
CO5	To analyze chemical processes involved in air, water and soil environmental problems
CO6	Know the different types of toxic and hazardous substances and analyze their toxicological information

Mapping with Programme Outcomes

The mapping of course outcomes with programme outcomes is tabulated as follows:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	*							*
CO2		*				*		
CO3		*				*		*
CO4		*						
CO5		*	*	*		*		*
CO6						*		*

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Fundamentals of Environmental Chemistry	Definition - Concept and Scope (K1 & K2)- Preparation of Standard Solutions – Molarity, Molality, Normality, Percent and PPM (mg/l) Solutions (K3 & K4)- Stoichiometry - Gibb's energy - Chemical Potential - Chemical Equilibria - <i>Acid-base Reactions</i> : pH and pOH and Buffer Solutions - Solubility and Solubility Product - Solubility of Gases in Water - The Carbonate System - Unsaturated and Saturated Hydrocarbons – Radionuclides (K3 & K4)	10
II	Atmospheric Chemistry	Classification of Elements (K2 & K3) – Particles, Ions and Radicals (K2) - Formation of Inorganic and Organic Particulate Matter - Thermochemical and Photochemical Reactions in the Atmosphere - Oxygen and Ozone Chemistry - Chemistry of Air Pollutants (Oxides of Carbon, Nitrogen, Sulphur) (K4 & K5).	12
III	Water Chemistry	Formation of Water (K1) - Water Resources – Sources and Types (K1) - Hydrological Cycle - Unique Properties of Water (K2) - Role of Water in the Environment (K3)- Physical, Chemical and Biological Parameters of Water – Phenomenon of Eutrophication - Concept of DO, BOD, COD - Distribution of Chemical Species in Water - Organic Matter and Humic Matter in Water (K4 & K5)	12
IV	Soil Chemistry	Nature of soil – Formation and Types (K1 & K2)- <i>Mechanical, Physical and Chemical Properties of Soil</i> : Soil Structure, Texture, Temperature, Bulk Density, Permeability, Moisture, Air, pH, Cation Exchange Capacity, Macro and Micronutrients, Humus and Organic Matter, C/N Ratio (K3, K4 & K5)	12
V	Pollutant Chemistry	Chemistry of various Organic and Inorganic Compounds - Chemistry of Hydrocarbon Decay (K3)- Effects on Macro and Microorganisms (K4) – Surfactants - Cationic, anionic and non-ionic detergents, modified detergents (K1 & K5) - <i>Pesticides</i> : Classification, Degradation, Analysis - Pollution due to Pesticides – DDT and Endosulphan - <i>Heavy metals</i> - Toxic effects of Ar, Cd, Pb & Hg (K3, K4 & K5)	12

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1. De, A.K. (2007) Environmental Chemistry, Seventh Edition, New Age International Publishers.
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2. Manahan, S.E. (2010), Environmental Chemistry, Ninth Edition, CRC Press
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CORE COURSE – III**ENVIRONMENTAL MICROBIOLOGY**

Paper Code	19UPEVS1C03	Horus	L	T	P	Credit
Marks	100		3	1	-	4

Course Objectives:

1. To learn the basic knowledge about Microbiology
2. To know the role of microbes and microbial interactions in soil and other soil activities in Environmental field
3. To understand the biogeochemical cycles prevail in Environment
4. To enhance the skill on microbial analysis of Environment.

Course Outcomes

CO1	Able to understand about microbes in environmental field
CO2	Understand the role of microbes in soil fertility, biogeochemical cycles, plant growth promotion
CO3	Know about the impact of microbial air and water pollutants
CO4	Understand the microbial diseases related to environment
CO5	Apply the microbial processes to clean the environment.
CO6	To enhance the skill on microbial analysis of environment

Mapping course outcomes with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		*						
CO2		*						
CO3			*					
CO4			*					
CO5					*			
CO6				*				

ENVIRONMENTAL MICROBIOLOGY

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Introduction to Microbiology	History and scope of microbiology – General structure and functions of Bacteria, Fungi, Virus and algae – Physical and Chemical methods of Sterilization techniques used in microbiology - Preparation of media for isolation and culture of microorganisms. (K1, K2)	7
II	Geomicrobiology	Soil microflora – Factors influencing the soil microflora – Role of microorganisms in soil fertility. Microbial interactions – Mutualism, Commensalism, Competition, Amensalism, Parasitism and Predation. Interaction between microbes and plants: Rhizosphere, phyllosphere and mycorrhizae. (K1, K2)	7
III	Biogeochemical Cycles	Carbon cycle - Role of microbes in Carbon cycle - Nitrogen cycle - Mechanism of biological nitrogen fixation - Ammonification, Nitrification, Denitrification - Phosphorous cycle and Sulphur cycle - Phosphate solubilization. (K3, K4, K5)	10
IV	Air and Water-Borne Diseases	Microbial air pollutants - Bioaerosols, Aero allergens – Airborne diseases, Symptoms and preventive measures - Water pollution: Sources and nature of pollutants in water – waterborne diseases, Symptoms and preventive measures (Cholera and Typhoid). Microbial assessment of water quality - MPN technique and Biological Oxygen Demand. (K5, K6)	10
V	Applied Microbiology	Microbial conversion of solid waste to food (Mushroom, SCP), fuels (Biogas, Ethanol), Bioleaching of Ores, Biodegradation of Lignin – Bioremediation: Types and its application – Bio deterioration of paper, wood - Metal Corrosion. (K4, K5)	10

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1. Dubey and Maheshwari, 1999, A text book of Microbiology, 1/e, Chand publications, New Delhi.
2. Mohapatra P K (2008)Text Book of Environmental Microbiology, I K International Publishing House Limited

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1. SubbaRao NS (2004) Soil Microbiology. 4th Edition, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
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CORE – V

ENVIRONMENTAL POLLUTION AND CONTROL STRATEGIES

Paper Code	19UPEVS2C05	Horus	L	T	P	Credit
Marks	100		3	1	-	4

Course Objectives

The purpose of this course is to gain awareness of environmental pollution and an overview of causes and consequences to natural, economic and social systems, to understand the fundamental principles governing the interactions between transport of pollutants in the environment

Course Outcomes

CO1	Learn about the air, water and soil pollutants, sources and its effects
CO2	Have clear understanding on the air, water, noise and radiation standards and its techniques
CO3	Apply relevant techniques, skills and modern engineering tools to solve the environmental problems
CO4	Get exposed good practice of technologies and options used to remediate reduce/eliminate pollution of the environment
CO5	Understand problems in order to select control measures and techniques concerning atmospheric, water or terrestrial challenges
CO6	Understand the ill effects of pollution and Create awareness to public on Environmental pollution and its control

Mapping of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	*							*
CO2		*				*		
CO3		*				*		*
CO4		*						
CO5		*	*	*		*		*
CO6						*		*

ENVIRONMENTAL POLLUTION AND CONTROL STRATEGIES

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Fundamentals of Environmental Chemistry	Definition - Concept and Scope (K1 & K2)- Preparation of Standard Solutions – Molarity, Molality, Normality, Percent and PPM (mg/l) Solutions (K3 & K4)- Stoichiometry - Gibb's energy - Chemical Potential - Chemical Equilibria - <i>Acid-base Reactions</i> : pH and pOH and Buffer Solutions - Solubility and Solubility Product - Solubility of Gases in Water - The Carbonate System - Unsaturated and Saturated Hydrocarbons – Radionuclides (K3 & K4)	10
II	Atmospheric Chemistry	Classification of Elements (K2 & K3) – Particles, Ions and Radicals (K2) - Formation of Inorganic and Organic Particulate Matter - Thermochemical and Photochemical Reactions in the Atmosphere - Oxygen and Ozone Chemistry - Chemistry of Air Pollutants (Oxides of Carbon, Nitrogen, Sulphur) (K4 & K5).	12
III	Water Chemistry	Formation of Water (K1) - Water Resources – Sources and Types (K1) - Hydrological Cycle - Unique Properties of Water (K2) - Role of Water in the Environment (K3)- Physical, Chemical and Biological Parameters of Water – Phenomenon of Eutrophication - Concept of DO, BOD, COD - Distribution of Chemical Species in Water - Organic Matter and Humic Matter in Water (K4 & K5)	12
IV	Soil Chemistry	Nature of soil – Formation and Types (K1 & K2)- <i>Mechanical, Physical and Chemical Properties of Soil</i> : Soil Structure, Texture, Temperature, Bulk Density, Permeability, Moisture, Air, pH, Cation Exchange Capacity, Macro and Micronutrients, Humus and Organic Matter, C/N Ratio (K3, K4 & K5)	12
V	Pollutant Chemistry	Chemistry of various Organic and Inorganic Compounds - Chemistry of Hydrocarbon Decay (K3)- Effects on Macro and Microorganisms (K4) – Surfactants - Cationic, anionic and non-ionic detergents, modified detergents (K1 & K5) - <i>Pesticides</i> : Classification, Degradation, Analysis - Pollution due to Pesticides – DDT and Endosulphan - <i>Heavy metals</i> - Toxic effects of Ar, Cd, Pb & Hg (K3, K4 & K5)	12

References

Text Books

1. De, A.K. (2007) Environmental Chemistry, Seventh Edition, New Age International Publishers.
2. Sharma, B.K and H.Kaur, (1994) Environmental Chemistry, Goel Publishing House Ltd., Meerut, UP.

Reference Books

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CORE – VII

CLIMATE CHANGE AND CURRENT ISSUES

Paper Code	19UPEVS2C07	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives

The purpose of this course is to focus on improving understanding of the climate system and climate science and the impacts of climate change, mitigation and/or adaptation to climate change and related issues.

Course Outcomes

On the successful completion of the course, students will be able to

- CO1 Understand the climate and climate change processes at local to global scales
- CO2 Empower the students to think critically about climate science
- CO3 Sources and impacts of climate change due to anthropogenic activities especially energy utilization
- CO4 Understand the existing novel technologies used for measurement of climate change and weather forecasting
- CO5 Understand the recent initiatives and policy framework by UNFCCC, IPCC, CoP, MoEF&CC and other Ministries
- CO6 Evaluate the successes and failures of past National and International efforts to address climate change mitigation and adaptation
- CO7 Know how decisions about carbon emissions and other human activities might impact future climate during Anthropocene era
- CO8 Evaluate prospects for future management of climate change

Mapping of course outcomes with programme outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	*							
CO2		*						
CO3	*							
CO4	*							*
CO5	*					*		*
CO6	*					*		*
CO7	*					*		*
CO8	*					*		*

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Ecology and Biodiversity	Ecology: Types of ecosystem – Terrestrial and Aquatic ecosystems - Ecological pyramids - Food Chain - Food Web - Energy flow (K1 & K2) - Types of Biodiversity: Species, Genetic and Ecosystem diversity – Alpha, beta, and gamma diversity (K1 & K2) – Biodiversity and ecosystem function (K4 & K5) – Megadiversity zones and Biodiversity Hot Spots in India (K2 & K3) – Ecologically Sensitive Areas (ESA) in India (K4 & K5) - Values of Biodiversity (K4 & K5) – Biodiversity Prospecting - Examples of biopiracy and bioprospecting (K2 & K5)	8
II	Threats to Biodiversity	Endangered and endemic species of flora and fauna in India (K1 & K2) - Biodiversity threats under Anthropocene era: Habitat loss, fragmentation and degradation – Pollution - Overexploitation (K2, K4 & K5) - Human-Animal conflict with special reference to elephants (K2, K4 & K5) – IUCN Threat Categories – Red Data Book (K2 & K4) – Climate change on species extinction - Causes and Impacts of Invasive species to biodiversity (K2, K3, K4 & K5) – Global Taxonomy Initiative to combat invasive alien species (K1 & K2)	8
III	Conservation Strategies	<i>In situ</i> conservation: Afforestation, Social Forestry, Agro-forestry, Zoos, Biosphere Reserves, National Parks, Sanctuaries, Protected Area Network, Sacred Groves and Sthalavrikshas (K1, K2 & K3) – <i>Ex situ</i> conservation: Botanical gardens, Cryopreservation, Gene Bank, Seed Bank, Pollen Bank, Sperm Bank, cDNA Bank (K1, K2 & K3) - Conservation Genomics: Environmental DNA (eDNA) for wildlife biology and biodiversity monitoring, Next Generation Sequencing (NGS) Techniques, DNA barcodes, Transcriptome and Epigenome tools, CRISPR based gene drives (K2, K4, K5 & K6)	12
IV	Sustainable Management of Bioresources	An elementary account on WTO, GAAT and TRIPS to agricultural biodiversity (K2 & K4) - National Biodiversity Authority (NBA) – Functions of State Biodiversity Board (SBB) and Biodiversity Management Committee's (BMC) – People's Biodiversity Register (PBR) (K1, K2 & K4) – Biodiversity informatics Portals (K4 & K5) - International Organizations and biodiversity conservation: Objectives and Targets 2011-2020 of Global Strategy for Plant Conservation (GSPC), WWF-India for priority and threatened species conservation, UNESCO - Man and Biosphere Programme (MAB), UNDP - Biodiversity	12

		Finance Initiative (BIOFIN) and UNEP – Global Environment Facility (GEF) for biodiversity conservation (K3, K4 & K5)	
V	Policies, Programmes and Acts for Conservation	Salient features of Biological Diversity Act 2002 (K2 & K3) - Status and protection of species in National and International levels – Policies implemented by MoEF & CC for biodiversity conservation - Role of CITES, IUCN and Convention on Biological Diversity (CBD) in biodiversity conservation (K2, K3 & K4) – Nagoya Protocol on Access and Benefit-Sharing – Cartagena Protocol on Biosafety - The Aichi Biodiversity Targets (K3) – Monitoring the Illegal Killing of Elephants (MIKE) programme – Strategic programme 2016-2020 for The International Consortium on Combating Wildlife Crime (ICWC) – SAWEN and TRAFFIC Networks to combat illegal wildlife trade – Ramsar Strategic Plan 2016-2024 for wetland conservation (K4 & K5)	10

References

Text Books

1. Eugene P. Odum and Gary W. Barrett. (2004) Fundamentals of Ecology (5th Edition) Brooks/Cole Publishers.
2. Krishnamurthy KV (2003) An Advanced Textbook on Biodiversity – Principles and Practice, Oxford and IBH Publishing, New Delhi.

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CORE - VIII

WASTE MANAGEMENT

Paper Code	19UPEVS3C08	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives

The purpose of this course is to understand the problems of different kinds of wastes and understand the proper collection, segregation and reduction methods for municipal waste, biomedical waste, hazardous waste, e-waste, industrial waste etc., To identify waste nature and proper disposal methods for each type of wastes and identify the energy producing wastes and recovery of the energy from the wastes using different techniques.

Course Outcomes

- CO1 Understand health and environmental issues related to solid waste management; Select the appropriate method for solid waste collection, transportation, redistribution and disposal
- CO2 Become aware of Environment and health impacts solid waste mismanagement
- CO3 Understand engineering, financial and technical options for waste management and wealth from waste management techniques
- CO4 Understand industrial specific wastes and their efficient management
- CO5 Describe methods of disposal of hazardous solid waste
- CO6 Understand the energy recovery and industrial specific treatment techniques

Mappings of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1		*	*					
CO2		*					*	
CO3			*			*	*	
CO4		*				*	*	*
CO5				*		*	*	
CO6			*	*		*	*	*

WASTE MANAGEMENT

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Municipal Solid Waste Management	Wastes – Introduction, Definition, Sources and Classification (K1 & K2); Municipal Solid Wastes – Source, Types, Per Capita Generation, Global Scenario Wastes (K3); Collection and Transportation Methods, Waste Processing and Material Recovery (TMRF), (K4) Effects of Municipal Solid Wastes on Environment. Disposal Methods (Landfill, Composting, Burning, Incineration, Pyrolysis, Anaerobic Digestion) (K5 & K6)	12
II	Hazardous & Radioactive Waste Management	Hazardous waste – Introduction (K1 & K2), Characteristics (K3), Classification of Hazardous Waste (Industrial, Hospital and Domestic) – Labeling and Handling of Hazardous Solid Wastes (Segregation, Recovery of Hazardous Waste Substances) (K3 & K4) - Hazardous Waste Disposal Techniques (K5). <i>Radioactive Wastes</i> : Sources, Types (K1 & K2), Effects (K3), Control and Disposal Methods (K4 & K5)	12
III	Biomedical, Plastic & e-waste Management	Biomedical Wastes: Sources, Types of Biomedical Wastes (K1 & K2), Impacts of Biomedical Wastes on Environment (K3 & K4) - Control Measures of Biomedical Wastes (K5). <i>Plastic Wastes</i> : Sources, Types (K1 & K2), Facts & Figures of Plastic Waste Scenarios in National & International (K3 & K4), Effects of Plastic Wastes on Environment, Control Measures of Plastic Wastes (K5 & K6). <i>E-wastes</i> : Sources, Types of e-wastes (K2) – Impacts of e-wastes on Environment (K3) - Control measures of e-wastes (K4)	12
IV	Energy Recovery from Wastes	Vermicomposting, mushroom cultivation, fly ash bricks, biogas, and electricity; Bioelectro chemical systems – Microbial electrolysis cell – Microbial fuel cell - Production of methane, ethanol, electricity (K3, K4 & K5).	10
V	Industrial Waste Management	Paper and Pulp, Tanneries, Textiles, Thermal Power Plants, Mining and Ore Processing, Refineries, Iron Casting, Cement and Asbestos. Waste Sludge Dewatering and its Disposal (K3- K6).	12

References

Text Books

1. Kinnaman, T.C and Takeuchi, K. (2014). Handbook on Waste Management, Edward Elgar Publishing, UK.
2. Ramesha Chandrappa and Jeff Brown, (2012). Solid Waste Management: Principles and Practice, Springer Science and Business Media Publishers.

Reference Books

1. Basarkar Shishir, (2009) Hospital Waste Management: A Guide for Self-Assessment and Review, JAYPEEDIGITAL
2. Hieronymi, C.K, R. Kahhat, and Williams, E. (2012) E-waste Management: From waste to resource. Routledge Taylor Francis Group Publishers.
3. Bhide and Sundaresan (2000) Solid Waste Management in Developing Countries – Indian National Scientific Documentation Center, New Delhi.
4. Hester, R.E and Harrison, R.M. (2009) Electronic Waste Management, Design Analysis & Application, RSC Publishing, UK.
5. James Saling (2001) Radioactive Waste Management, CRC Press, FL, USA.
6. John Pitchel (2005) Waste Management Practices, Municipal, Hazardous, and Industrial. Taylor & Francis Group, LLC.
7. Lagrega, M.D, Buckingham, P.L and Evans, J.V. (2001) Hazardous Waste Management, McGraw Hill Int. Ed. New York.
8. Lie, D.H.F and Liptak B.G (2000) Hazardous Wastes and Solid Wastes, Lewis publishers, New York.

Journals and Documents

1. <http://www.cpeo.org/techtree/ttdescript/pyrols.htm>
2. www.satavic.org/vermicomposting.htm
3. <http://web.mit.edu/urbanupgrading/urbanenvironment/sectors/solid-waste-landfills.html>
4. www.cement.org/waste/wt_apps_radioactive.asp
5. www.ipma.co.in/recycle.asp
6. linkinghub.elsevier.com/retrieve/pii/S026974910600042X
7. www.algae.info

CORE - IX

ENVIRONMENTAL IMPACT ASSESSMENT

Paper Code	19UPEVS3C09	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives

The purpose of this course is to introduce the methodology of environmental impact assessment (EIA) as a vital tool for sound environmental management and decision-making and to provide an overview of the concepts, methods, issues and various forms and stages of the EIA process.

Course Outcomes

On the successful completion of the course, students will be able to

- CO1 Explain the major principles and components of EIA processes
- CO2 List and comply with the environmental clearance procedures in India
- CO3 Understand about the methods used for EIA studies
- CO4 Discuss the implications of current jurisdictional and institutional arrangements in relation to EIA
- CO5 Communicate both orally and in written form the key aspects of EIA
- CO6 Understand how to liaise with and the importance of stakeholders in the EIA process
- CO7 Access different case studies/examples of EIA in practice
- CO8 Summarize the EIA report with suitable environmental management plan

Mappings of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1				*				
CO2	*			*	*			
CO3				*	*			
CO4	*			*	*			*
CO5	*			*		*	*	*
CO6	*			*		*	*	*
CO7				*		*	*	*
CO8	*			*	*	*	*	*

Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Introduction to EIA	Definition – Principles of EIA – Short-term and Long-term objectives - Evolution of EIA worldwide and in India – Types of EIA - Projects subject to EIA (Category 1, 2 and 3) – Steps in EIA process – Objectives of the Standard Terms of Reference (TOR) - Stages and time frame for obtaining Environmental Clearance from MoEF & CC according to EIA notification 2006 – Merits and Demerits of EIA (K1, K2 & K3)	12

II	EIA Methodologies	Assessment of impacts: Air, water, soil, noise, biological, social, cultural, economic, and environmental factors – EIA Methodologies: Adhoc Method – Checklist Approach – Matrix Methods – Network Methods – Overlay Method (K2, K3 & K4)	10
III	Public Participation, Preparation and Review of EIA Report	Objectives of People's Participation - Advantages and Disadvantages of People's Participation - People's Participation Techniques: Public Hearing - Preparation and Review of EIA Report: EIA Reports Content - Basis and Criteria for Evaluation of EIA Reports and EIA (K2, K3 & K4)	8
IV	EIA case studies for major development projects	Major Highways Projects - Airport - River valley Projects – Mining and quarrying - Thermal and Hydroelectric Power Projects - Cement Industries (K3, K4, K5 & K6)	8
V	Environmental Management System	Environmental Management System: Core elements of EMS - Benefits of EMS - Certification body assessments of EMS - Documentation for EMS – ISO 14001 standard – PDCA (Plan-Do-Check-Act) in ISO 14001 Certification – Corporate Social Responsibility (CSR) Plan in India (K4, K5 & K6)	10

References

Text Books

1. Canter LW (1996) Environmental Impact Assessment. McGraw Hill, New York.
2. EIA Manual (2001) Ministry of Environment, Forest and Climate Change, New Delhi.

References

1. Anjaneyulu Y and Valli Manickam (2007) Environmental Impact Assessment Methodologies, 2nd Edition, B.S. Publications (ISBN: 978-81-7800-144-9).
2. Bregman JI (1999) Environmental Impact Statements. Lewis Publishers, London.
3. Eccleston CH (2000) Environmental Impact Assessment - A Comprehensive Guide to Project and Strategic Planning, John Wiley and Sons, NY.
4. Peter Wathern (2015) Environmental Impact Assessment: Theory and Practice, Taylor & Francis, London
5. Singleton R, Castle, P and Sort, D (1999) Environmental Assessment, Thomas Telford Publishing, London.
6. Whitelaw K and Butterworth (1997) ISO 14001: Environmental System Handbook.

Web Resources

1. <http://environmentclearance.nic.in/>
2. www.fao.org/docrep/V8350E/v8350e06.htm
3. <http://www.moef.nic.in/division/eia-manual>
4. <http://www.moef.nic.in/circulars>
5. <https://www.adb.org/documents/adb-environmental-assessment-guidelines>

CORE - X

ENVIRONMENTAL BIOTECHNOLOGY

Paper Code	19UPEVS3C10	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives:

The purpose of this course is to acquaint students with knowledge in environmental biotechnology for gene cloning, to apply the microorganisms for remediation of environmental pollutants, to develop skills in manipulating the microbial process for waste conversion and resource recovery, and to produce microbial bioproducts for environmental applications.

Course Outcomes:

On the successful completion of the course, students will be able to

- CO1 Understand the basic principles and technologies of DNA and its manipulation, gene cloning and PCR techniques
- CO2 Understand the basic principles and techniques of remediation of environmental pollutants
- CO3 Explain the role of microbes in degradation of environmental pollutants
- CO4 Acquire skills in manipulating the microbes for biodegradation of pollutants
- CO5 Describe biotechnological solutions to address the waste bioconversion and microbial process to produce value added products.
- CO6 Analyze reports in key areas of environmental biotechnology.
- CO7 Apply the biotechnological process to recover resources from different wastes.

Mappings of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1								
CO2								
CO3								
CO4								
CO5								
CO6								
CO7								

ENVIRONMENTAL BIOTECHNOLOGY			
Unit	Unit Title	Intended Learning Chapters (K1, K2, K3, K4, K5, K6)	Hours of Instruction
I	Structure and DNA modifying enzymes	Introduction to Biotechnology - Organization of bacterial genome - Structure of DNA – Restriction enzymes: Nomenclature - Classification - restriction and Methylation - Type II restriction endonuclease - Use of restriction endonucleases - Restriction mapping and its applications - DNA modifying enzymes - nucleases - polymerases - DNA ligases. (K1, K2, K3)	8
II	Gene Cloning and PCR Techniques	Gene Cloning - Over view, Cloning vectors – Plasmids, phages and cosmids, phagemids, Ti plasmids and viral vectors M13 - Cloning strategies, cloning and selection of individual genes – PCR - Working principle, types and applications. Environmental genome. (K1, K2, K3)	8
III	Environmental Applications Microbes	Use of microbes in environmental decontamination - Biodegradation - Biosorption - Biotransformation – Bioaugmentation - Biostimulation - Phytoremediation, Mycoremediation - Phycoremediation - Bioleaching and Biomining - MEOR - Bioremediation pollutants: Heavy metals, PAHs, VOCs - Bioindicators and biosensors for detection of pollution. (K1, K2, K3)	12
IV	Biotechnology for waste management and Resource recovery	Biotechnology for waste management and resource recovery - sewage treatment - activated sludge process - Anaerobic treatment - sludge stabilization - aerobic composting, anaerobic digestion, biogas production, algal cultivation: nutrient removal. Solid waste treatment - biocomposting - vermicomposting - Air pollution control - bioscrubber, biofilters. (K3, K4, K5, K6)	12
V	Microbial Bioproducts	Microbial bioproducts for environmental cleanup - Microbial biomass - Biosorbents - Biosurfactants - Microbial enzymes: lignocellulases, lipases, dioxygenases - Bioflocculants - Bioplastics - Biofertilizers - Biopesticides - Microbial fuels: Bioethanol, Biobutanol, and Biohydrogen. (K4, K5, K6)	10

References

Text Books

1. P.K. Mohapatra (2008) Text Book of Environmental Biotechnology. IK International Publishers Ltd
2. Thakur, I.K. (2013) Environmental Biotechnology: Basic Concepts and Applications. 2nd edition.

Reference Books

1. Alexander N. Glazer Hiroshi Nikaido (1995) Microbial Biotechnology, WH Freeman and Company, NY, USA.
2. Bernaral R. Glick and Jack J. Pastemak (1994) Molecular Biotechnogy: Principles and Applications of Recombinant DNA, ASM Press. Washington, DC USA.
3. Brown TA (1995) Gene cloning – A introduction – Chapman & Hall, London.
4. Glazer and Nikaido (1995) Microbial Biotechnology. WH Freeman & Co., New York.
5. Kreuzer and Massey (2001) rDNA & Biotechnology. A guide for Teachers, 2nd Edition, ASM Press, Washington DC, USA.
6. Old RW and Primrose SB (1994) Principles of Gene Manipulation. Blackwell Scientific Publications, Oxford, UK.
7. Primrose SB (1994) Molecular Biotechnology, 2nd edition, Blackwell Scientific Publications, UK.
8. Singh DP & SK Dwivedi (2005). Environmental Microbiology and Biotechnology. 1st Edition, New Age International (P) Ltd., Publishers, New Delhi.
9. Fulekar, M.H. (2010) Environmental Biotechnology, CRC Press.
10. Cheremisinoff, N.P. (1997) Biotechnology for Waste and Wastewater Treatment. Sciencedirect.

Web References

1. www.microbialfuelcell.org
2. www.pollutionissues.com/A-Bo/Bioremediation.html
3. www.bioreactors.net
4. <http://enhs.umn.edu/current/5103/gm/harmful.html>
5. www.wastewatertreatment.co.in/index.php
6. <http://archive.industry.gov.au/Biotechnologyonline.gov.au/enviro/environment.html>
7. <https://preventioncdnndg.org/eco-quartier/biomethanization-2/>
8. <https://www.nrel.gov/workingwithus/learning.html>
9. <https://www.epa.gov/recycle/composting-home>
10. <https://www.epa.gov/remedytech/green-remediation-best-management-practices-bioremediation>

CORE - XIII

ENVIRONMENTAL HEALTH AND SAFETY

Paper Code	19UPEVS4C13	Horus	L	T	P	Credit
Marks	100		4	1	-	5

Course Objectives

Introduction to basic principles of environmental health and safety practices and creating awareness of public and occupational health and safety requirements associated with the environment. The purpose of this course is to understand the role of environmental health, protection, safety at work, occupational health and safety, compliance and best practices.

Course Outcomes

- CO1 Knowledge in the concepts and scope, Basic requirements for healthy environment, Environmental quality, human exposure and health impact.
- CO2 Knowledge of the Industrial pollution and chemical safety in public exposure from industrial sources, Hazards by industry major chemical contaminants at workplace. Industrial environmental accidents.
- CO3 Knowledge of understand the Environmental Disease present study in Fluorosis and Allergies; Epidemiological issues.
- CO4 Knowledge of understand course will equip student with basic knowledge on safety issue related with explosion, pollutant release in water and air, and to implement measure during outbreak of flu epidemic at work place.
- CO5 Knowledge of understand of occupational Safety and Health. Principles and methods of occupational health, Health problem due to industrial dust, heat, chemicals, noise, toxic gases and metals, Health hazard in agriculture - Pesticides and environment, Pesticides and human health.

Mappings of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	*	*	*	*		*	*	
CO2		*	*		*			*
CO3	*	*	*		*		*	
CO4	*			*		*	*	*
CO5		*	*		*			
CO6	*	*	*	*	*	*	*	*

Unit	Unit Title	Intended Learning Chapters (K1, K2,K3,K4,K5,K6)	Hours of Instruction
I	Environmental Health	Concept and scope; Global and regional perspectives; Basic	8

		requirements for healthy environment; Environmental quality, human exposure and health impact – impact of environmental factors on human health (K1, K2)	
II	Industrial Pollution and Chemical Safety	Extent of industrial pollution, Public exposure from industrial sources, Hazards by industry, Major chemical contaminants at workplace, Industrial environmental accidents (K2, K3, K4)	12
III	Environmental Diseases	Asbestosis, Silicosis, Sycosis, Asthma, Fluorosis and Allergies; Epidemiological issues - Malaria and Kala –azar (K4, K5)	10
IV	Occupational Safety and Health	Occupational hygiene/ safety and disease; Principles and methods of occupational health, Health problem due to industrial dust, heat, chemicals, noise, toxic gases and metals, Health hazard in agriculture (K4) - Pesticides and environment, Pesticides and human health. (K5, K6)	10
V	Environmental Health Hazard and Risk Assessment	Hazard and risk, Biological, chemical, physical and psychological health hazard; Health risk assessment and management (K4, K5)	12

References

Text Books

1. Shaw, J. Chadwick (1998) Principles of Environmental Toxicology, Taylor & Francis Ltd
2. Annalee Yassi, Tord Kjellström, Theo de Kok, Tee Guidotti (2001). Basic Environmental Health, Oxford University Press

Reference Books

1. Environmental Health- Monroe T. Morgan (2003).
2. Handbook of Environmental Health and Safety - Koren, H. (2002).
3. Institution of Occupational Safety and Health, United Kingdom- A Practical Guide, 1993.

Journals and Documents

1. www.ehs.ucsb.edu/
2. www.ifc.org/ehsguidelines
3. www.slintec.lk/wp-content/uploads/2011/08/HealthSafetyManual.pdf

18UPESC1C03- ENERGY AUDIT AND MANAGEMENT

L	T	P	C
4	1	0	4

OBJECTIVES

- ✓ Students able to understand the basic knowledge of energy auditing role in industry
- ✓ Students will be able to use the energy audit methods learnt to identify the areas deserving tighter control to save energy expenditure
- ✓ To understand the energy utilization pattern including wastage and its management.
- ✓ Students will be able to apply the knowledge of the subject to calculate the efficiency of various thermal utilities.
- ✓ Students will be able to understand complete study of Electrical Energy Management

UNIT- I INTRODUCTION TO ROLE OF ENERGY AUDITING IN INDUSTRY

Basic elements and measurements - Mass and energy balances - Scope of energy auditing industries - Evaluation of energy conserving opportunities.

UNIT- II ENERGY AUDIT

Need of Energy audit - Types of energy audit - Energy management (audit) approach - understanding energy costs - Bench marking - Energy performance - Matching energy use to requirements - Maximizing system efficiencies - Optimizing the input energy requirements -

UNIT- III ENERGY MANAGEMENT

Design of Energy Management Programmes - Development of energy management systems - Importance - Indian need of Energy Management - Duties of Energy Manager - Preparation and presentation of energy audit reports - Some case study and potential energy savings.

UNIT- IV THERMAL ENERGY MANAGEMENT

Energy conservation in boilers - steam turbines and industrial heating systems - Application of FBC - Cogeneration and waste heat recovery - Thermal insulation - Heat exchangers and heat pumps - Building Energy Management.

UNIT- V ELECTRICAL ENERGY MANAGEMENT

Supply side Methods to minimize supply-demand gap - Renovation and modernization of power plants - Reactive power management - HVDC - FACTS - Demand side - Conservation in motors - Pumps and fan systems - Energy efficient motors.

OUTCOME

After successful completion of the course, the students should be able to

- perform energy auditing tasks in different fields & development of energy efficient systems,
- design and develop consumer products for the betterment of human kind
- Understand various aspects of energy audit such as planning, monitoring and implementation
- Manage electric and thermal energy in the industry.
- Suggest the renewable energy systems for the buildings

TEXT BOOKS

1. Energy Management: W.R.Murphy, G.Mckay, (2019)
2. Energy Economics A.V.Desai, Wilely Eastern, (1991)

REFERENCE BOOKS

1. Hamies, Energy Auditing and Conservation; Methods Measurements, Management and Case study, Hemisphere, Washington, 1980.

Mapping of course outcomes with program outcomes

Course Outcome/Program Specific outcome	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	-	H	L	-	M
CO2	H	-	M	M	-	H
CO3	L	-	L	H	-	H
CO4	L	-	M	H	-	L
CO5	L	-	H	L	-	M

18UPESC1C05 - Energy Economics & Policies

L	T	P	C
4	1	0	4

OBJECTIVE

- ✓ To explain the energy conservation Laws using a different laws
- ✓ To understand Indian energy scenario in different aspects
- ✓ To understand world energy scenario with different aspects
- ✓ To understand Indian energy policy systems through in different aspects.
- ✓ To understand world energy policy systems through in different aspects.

UNIT- I ENERGY CONSERVATION

Energy Conservation Act-2001 and its features - Electricity Act – 2003 and its features - Framework of Central Electricity Authority (CEA), Central & States Electricity Regulatory Commissions (CERC & ERCs)-Role of MoP(Ministry of Power)-BEE (Bureau of Energy Efficiency).

UNIT-II INDIAN ENERGY SCENARIO

Energy resources & Consumption-Commercial and noncommercial forms of energy- Fossil fuels- Renewable sources in India- Sector wise energy Consumption - Impact of energy on economy – Need for use of new and renewable energy sources-present status and future of nuclear and renewable energy-Energy Policy Issues related Fossil Fuels-Renewable Energy-Power sector reforms-restructuring of energy supply sector-energy strategy for future

UNIT-III GLOBAL ENERGY SCENARIO

Role of energy in economic development and social transformation - Energy and GDP - GNP and its dynamics - Energy sources, overall Energy demand and availability - Energy consumption in various sectors and its changing pattern - Depletion of energy sources and impact economics on international relations.

UNIT-IV INDIAN ENERGY POLICY

Global Energy Issues-National & State Level Energy Issues-National & State Energy Policy-Industrial Energy Policy- Energy Security-Energy Vision-Energy Pricing and Impact of Global Variations-Energy Productivity (National & Sector wise productivity).

UNIT-V GLOBAL ENERGY POLICY

International Energy Policies of G-8 Countries - G-20 Countries - OPEC Countries - EU Countries - International Energy Treaties (Rio, Montreal and Kyoto) - INDO-US Nuclear Deal- Future Energy Options-Sustainable Development-Energy Crisis-Role of International Energy Agency.

OUTCOMES

Students will have

- An exposure energy conservation with different policies and laws
- Understand the Indian Policy Issues
- Describe the key policies that will facilitate the transition and explain the economics of how the policies will introduce incentives that will support the transition
- Describe and explain the effects of TAE resources and technologies on economic growth and economic development including transition effects and those associated with moving the economy along the sustainable path
- Identify the key economic development consequences of the development of local indigenous alternative energy resources

TEXT BOOKS

1. P. Meier and M. Munasinghe: Energy Policy Analysis & Modeling, Cambridge University Press, (1993).
2. Charles E. Brown, World Energy Resources, Springer 2002.
3. Resources, Charles E. Brown, 'International Energy Outlook' - EIA annual Publication.

REFERENCE BOOKS

1. Principles of Energy Conversion: A.W. Culp (McGraw Hill International edition) BEE Reference book: no. 1/2/3/4
2. S Rao, Energy Technology, Khanna Publishers

Mapping of course outcomes with program outcomes

Course Outcome/ Program Specific outcome	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	-	H	-	-	L
CO2	H	-	M	-	-	M
CO3	L	-	L	-	-	H
CO4	M	-	M	-	-	L
CO5	L	-	L	-	-	M

18UPESC1C10 – WIND ENERGY

L	T	P	C
4	1	0	4

OBJECTIVES

- ✓ To understand the working principles of the conversion devices, limitations, cost of energy generation
- ✓ Understand the processes of generation of wind, its potential and energy extraction
- ✓ Understand the aerodynamic principles of turbine blade design
- ✓ To understand wind energy resource assessment techniques.
- ✓ To understand the principles of conversion to useful form of energy from these resources.

UNIT-I INTRODUCTION OF WIND ENERGY

Historical and recent development of Wind Energy - Wind Turbine Technology – Onshore and Offshore - Components of wind turbines - Design aspects of wind turbines - Electrical and mechanical aspects of wind turbines - Aerodynamic aspects of wind turbine - Characteristics of wind - Wind resource Assessment and techniques.

UNIT-II WIND ENERGY INSTRUMENTS & MEASUREMENTS

The Nature of the Wind - Site Selection, Wind measurements - Monitoring Stations - Wind Resource Mapping, Installation -Instrumentation and Commissioning of WMS - Met Mast and Modern Measurement Techniques - Measurement using remote sensing instruments (SODAR & LiDAR).

UNIT-III WIND RESOURCE ASSESSMENT

Latest trends in Wind Resource Assessment - Data collection - Data processing, Data Analysis Processing - Software tools for Wind data Analysis - Design and Layout - Micro siting - Wind Atlas: A Case Study - Forecasting and Wind Energy Production.

UNIT-IV WIND TURBINE TECHNOLOGY

Latest wind turbine technology - Constant / Variable Speed wind turbines – Transformers - Power electronics - Power converters – Blades - Drive train – Nacelle - Rotor hub - Control strategies (Pitch and Stall Regulation) – Gearbox – Generator – Brake - Yaw drive - Tower and foundation.

UNIT- V WIND FARMS

Wind Farm development - Pre-feasibility studies -Installation & Commissioning of wind farms - Grid Integration of wind turbines - Wind

Power Evacuation - Operation and Maintenance - SCADA & Condition monitoring - Power quality characteristic - Energy Storage - Testing and Certification of wind turbines - Small wind turbines and Hybrid systems.

OUTCOMES

Students will have

- ✓ Prepare and evaluate detailed project reports for establishing a wind farm
- ✓ Understand the operation of a wind farm and economics of power generation
- ✓ Analysis concepts of wind energy measurements
- ✓ Innovative knowledge in wind turbine design and technology
- ✓ Real fields application of wind energy farms

TEXT BOOKS

1. Thomas Ackermann, (2005), Wind Power in Power System, John Wiles & Son Ltd.
2. Ray Hunter, (19970, Wind Energy Conversion: From Theory to Practice, John Wiley and Son Ltd.

REFERENCE BOOKS

1. Gary L.Johnson, (1985), Wind Energy Systems, Prentice-Hall Inc., New Jersey.
2. Desire Le Gouriers, (1982), Wind Power Plants: Theory and Design, Pergamon Press.

Mapping of course outcomes with program outcomes

Course Outcome/ Program Specific outcome	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	M		M	L
CO2	L	M	M		L	L
CO3	M	L	M	L	H	M
CO4	M		H	M	L	L
CO5	M		M		M	M

19UPESC2C04 ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

OBJECTIVES

- To impart knowledge on the atmosphere and its present condition and, global warming.
- To detail on the sources of water pollution and possible solutions for mitigating their degradation.
- To detail on the sources of air pollution and possible solutions for mitigating their degradation.
- To detail on the sources of solid waste and possible ways to dispose them safely.
- To impart knowledge on hazardous waste management.

UNIT I INTRODUCTION

Man & Environment – Types of Pollution – Global Environmental issues – Environmental Impact Assessment – Global Warming Issues –CO₂ Mitigation – Basic definition of Pollution Indicators – Noise Pollution

UNIT II WATER POLLUTION

Pollutants in Water & Wastewater – Physical and Chemical Treatment Methods – (An Overview) Neutralization – Aeration –Colour / Odour Removal - Sludge dewatering – Biological Treatment including Aerobic & Anaerobic Treatment

UNIT III AIR POLLUTION

Sources – Ambient Air Quality Standards – Emission Limits – Equipment for Ambient Air & Stack Monitoring – Principles of operation of Particulate Control Equipment (ESPs, Bag Filters, Cyclone Separators etc.,) – Vehicular Pollution and its Control.

UNIT IV SOLID & HAZARDOUS WASTE MANAGEMEN

Types & Sources – Types (Municipal, Biomedical, Industrial, Hazardous etc.,) – Waste Generation – Composition – Physical / Chemical / Biological Properties – Transformation Technologies for Waste Treatment – Landfill Management – Leachate Generation – e Waste Disposal

UNIT V GLOBAL WARMING & CLIMATE CHANGE

Impact of Global Warming / Climate Change on various sectors – Green House Gases & Effect– Carbon Cycle – CDM – Carbon Trading – Carbon Sequestration – Carbon Capture & Storage– UNFCCC – IPCC Protocols

OUTCOMES

Upon completion of this course, the students will be able to:

- Types and effects of each type of pollution on man – earth will be made known.
- Technical aspects of Global Warming will make them understand the impact they have on climate
- Technologies that are available for reduction of pollutants dumped into the atmosphere
- Cursory / superficial formation - the students – had in Hazardous waste, waste disposal hitherto will be deep & sensible enough after studying this subject
- Comprehend the different techniques available for safe disposal of hazardous waste

REFERENCES

1. Peavy, H.S. and D.R. Rowe, G.Tchobanoglous: Environmental Engineering - McGraw Hill Book Company, New York, 1985
2. G. Masters: Introduction to Environmental Engineering and Science, Prentice Hall of India Pvt Ltd, New Delhi, 2003
3. Ludwig, H. W.Evans: Manual of Environmental Technology in Developing Countries, International Book Company, Absecon Highlands, N.J, 1991
4. Arcadio P Sincero and G. A. Sincero, Environmental Engineering – A Design Approach, Prentice Hall of India Pvt Ltd, New Delhi, 2002

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	M	L	L	L	L	L	L	-	-	-	-	-	L	-	-
2	M	L	L	L	L	-	L	-	-	-	-	-	L	-	L
3	H	L	M	L	L	-	M	-	-	-	-	-	L	H	L
4	M	L	L	L	L	-	M	-	-	-	-	-	L	L	L
5	L	L	M	M	H	-	-	-	-	-	-	-	-	-	H

19UPESC2C05

ENERGY AUDITING AND MANAGEMENT

OBJECTIVES

- To learn the process of forecasting energy utilization and energy loss rates.
- To acclimatize with power quality issues in energy management.
- To learn sufficient knowledge on energy monitoring methods and optimal regulations.

UNIT I INTRODUCTION

Types & Forms of Energy - Primary / Secondary Energy Sources –Energy Conservation Act 2001-Electricity Act 2003 - Energy Auditing: Types, classifications, deliverables, barriers – Benchmarking - Roles & Responsibility of Energy Managers-Matching Energy Usage to Requirements-Fuel and Energy Substitution-Optimizing input energy requirements.

UNIT II ENERGY COSTING, MONITORING & TARGETING

Data & Information Analysis – Cost / Energy Share Diagram – Data Graphing – Electricity Billing : Components & Costs – kVA – Need & Control – Determination of kVA demand & Consumption – Time of Day Tariff – Power Factor Basics – Penalty Concept for PF – PF Correction – Wheeling and Banking - Demand Side Management – comparison on unit cost of power cost from various sources – steam cost from different sources-noneconomic factors

UNIT III METERING FOR ENERGY MANAGEMENT & POWER QUALITY ANALYSES

Instruments Used in Energy systems: Load and power factor measuring equipment, Wattmeter, flue gas analysis, Temperature and thermal loss measurements, air quality analysis etc. Relationships between parameters-Units of measure-Typical cost factors- Utility meters – Timing of meter disc for kilowatt measurement - Demand meters - Paralleling of current transformers - Instrument transformer burdens-Multitasking solid-state meters - Metering location vs. requirements – Net metering - Metering techniques and practical examples.

UNIT IV LIGHTING SYSTEMS & COGENERATION

Concept of lighting systems - The task and the working space - Light sources - Ballasts - Luminaries - Lighting controls - Optimizing lighting energy - Power factor and effect of harmonics on power quality - Cost analysis techniques - Lighting and energy standards Cogeneration: Forms of cogeneration - feasibility of cogeneration- extraction turbines and steam cycle of cogeneration- Electrical interconnection.

UNIT V ECONOMICS

Energy Economics – Depreciation - Financial Analysis Techniques – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing – ESCO concept - CUSUM Technique – ESCO Concept – ESCO Contracts-life cycle costing, case flow in power projects-energy market analysis.

OUTCOMES

Upon completion of this course, the students will be able to:

- Familiarized about the energy sources, energy acts, and energy auditing and energy management methods.
- Eligible to perform micro and macroeconomic forecasting of energy consumption and utilization.
- Involve in energy extraction and efficiency rate improvement through incorporation of hybrid systems.
- Adopt energy standards based on various acts officially established for qualitative and quantitative improvement in energy utilization.
- To acquired a knowledge about energy in economic view.

REFERENCES:

1. Energy Manager Training Manual (4Volumes) available at www.energymanagertraining.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India.2004.
2. Barney L. Capehart, Wayne C. Turner, and William J. Kennedy, Guide to Energy Management, Fifth Edition, The Fairmont Press, Inc., 2006
3. L.C. Witte, P.S. Schmidt, D.R. Brown, "Industrial Energy Management and Utilisation" Hemisphere Publ, Washington, 1988.
4. Callaghn, P.W. "Design and Management for Energy Conservation", Pergamon Press, Oxford, 1981.
5. I.G.C. Dryden, "The Efficient Use of Energy" Butterworths, London, 1982
6. W.C. turner, "Energy Management Hand book" Wiley, New York, 1982
7. W.R. Murphy and G. McKay "Energy Management" Butterworths, London 1987
8. UrsalaEicker, "Solar Technologies for buildings", Wiley publications, 2003
9. Eastop T.D & Croft D.R, Energy Efficiency for Engineers and Technologists,.Logman Scientific & Technical, ISBN-0-582-03184, 1990.
10. Doty, Steve, and Wayne C. Turner. Energy management handbook. Crc Press, 2004.
11. Beggs, Clive. Energy: management, supply and conservation. Routledge, 2012.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	L	L	H	H	H	M	H	H	M	H	H	M	H	H	M
2	L	L	M	H	M	M	M	M	L	M	M	M	H	H	M
3	M	M	M	M	M	M	M	M	L	L	H	L	M	M	M
4	-	-	-	M	M	M	M	M	M	L	L	L	M	M	L
5	-	-	-	M	M	M	L	L	-	-	H	-	L	M	-

19UPESC2C07 ENERGY CONSERVATION IN INDUSTRIAL UTILITIES

OBJECTIVES

- To understand the types of fuels used in Industries and their characteristics
- To Know the techniques adopted for performance evaluation of thermal utilities
- To Learn and appreciate the working principle employed in VCRS and VAM systems
- To list the parameters considered in electricity billing and the losses associated with a motor
- To Comprehend the techniques available for energy conservation in electrical utilities

UNIT – I BOILERS

Types - Performances evaluation via direct and indirect method – energy conservation avenues. Properties of steam - Assessment of steam distribution losses - Steam trapping - Condensate and flash steam recovery system - Opportunities for energy saving in steam consumption systems

UNIT – II FURNACES AND THERMIC FLUID HEATERS

Furnaces and Thermic Fluid Heaters : Types - Performances evaluation via direct and indirect method – energy conservation avenues. Insulation and Refractory : types and application

UNIT – III HVAC AND WASTE HEAT RECOVERY

VCRS – performance assessment – energy savings opportunities – VAM: working, types, benefits, comparison with vapor compression system. WHR systems: Classification – Benefits - Commercial waste heat recovery devices: recuperator, regenerator, heat pipe, heat exchangers (Plate, Shell & Tube), heat pumps, thermocompressor. CHP – Polygeneration

UNIT – IV ELECTRICAL SYSTEMS AND INDUCTION MOTORS

Electricity billing - Demand side management - Power factor improvement transformer losses – Harmonics induction Motors : Types – Losses – performance assessment adopting direct and indirect method - Factors affecting motor performance - energy efficient motors

UNIT – V ENERGY CONSERVATION IN ELECTRICAL UTILITIES

Performance assessment and energy conservation avenues in : fans - blowers – pumps – air compressors - illumination systems - cooling towers

OUTCOMES

Upon completion of this course, the students will be able to:

- Compute stoichiometric air for any given fuel and suggest measures for efficient combustion
- Diagnose the cause for under performance of thermal utilities and suggest suitable remedial measures thereof
- Analyse the factors affecting the COP of a VCR and VAR system
- Evaluate the performance of induction motors and transformers
- Perform energy audit in an Industry

REFERENCES:

1. Energy Manager Training Manual(4 Volumes) available at www.energymanagertraining.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India.2004.
2. Hamies, Energy Auditing and Conservation; Methods Measurements, Management and Case study, Hemisphere, Washington, 1980
3. Trivedi, PR, Jolka KR, Energy Management, Commonwealth Publication, New Delhi, 1997
4. Write, Larry C, Industrial Energy Management and Utilization, Hemisphere Publishers, Washington, 1988
5. Handbook on Energy Efficiency, TERI, New Delhi, 2001

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	H	M	M	M	M	-	L	-	L	-	M	M	M	H	-
2	H	M	M	M	M	-	L	-	L	-	M	M	M	H	-
3	H	M	M	M	M	-	L	-	L	-	M	M	M	H	-
4	H	M	M	M	M	-	L	-	L	-	M	M	M	H	-
5	H	M	M	M	M	-	L	-	L	-	M	M	M	H	-

19UPESC2C08

ENERGY EFFICIENT BUILDINGS DESIGN

OBJECTIVES

- To learn the green buildings concepts applicable to alternate design
- To be familiar with basic terminologies related to buildings
- To learn the building (air) conditioning techniques
- To know the methods to evaluate the performance of buildings
- To incorporate Renewable energy systems in buildings

UNIT I INTRODUCTION

Conventional versus Energy Efficient buildings – Historical perspective - Water – Energy – IAQ requirement analysis – Future building design aspects – Criticality of resources and needs of modern living

UNIT II LANDSCAPE AND BUILDING ENVELOPES

Energy efficient Landscape design - Micro-climates – various methods – Shading, water bodies-Building envelope: Building materials, Envelope heat loss and heat gain and its evaluation, paints, Insulation, Design methods and tools.

UNIT III HEATING, VENTILATION AND AIR-CONDITIONING

Natural Ventilation, Passive cooling and heating - Application of wind, water and earth for cooling, evaporative cooling, radiant cooling – Hybrid Methods – Energy Conservation measures, Thermal Storage integration in buildings

UNIT IV HEAT TRANSMISSION IN BUILDINGS

Surface co-efficient: air cavity, internal and external surfaces, overall thermal transmittance, wall and windows; Heat transfer due to ventilation/infiltration, internal heat transfer; Solar temperature; Decrement factor; Phase lag. Design of daylighting; Estimation of building loads: Steady state method, network method, numerical method, correlations; Computer packages for carrying out thermal design of buildings and predicting performance.

UNIT V PASSIVE COOLING & RENEWABLE ENERGY IN BUILDINGS

Passive cooling concepts: Evaporative cooling, radiative cooling; Application of wind, water and earth for cooling; Shading, paints and cavity walls for cooling; Roof radiation traps; Earth air-tunnel. Introduction of renewable sources in buildings, Solar water heating, small wind turbines, stand-alone PV systems, Hybrid system – Economics.

OUTCOMES

Upon completion of this course, the students will able to

- Will be familiar with climate responsive building design and basic concepts
- Will Know the basic terminologies related to buildings
- Will Know the passive (air) conditioning techniques
- Will be able to evaluate the performance of buildings
- Gets acquainted with Renewable energy systems in buildings

REFERENCES:

1. Clarke, Joseph. Energy simulation in building design. Routledge, 2007.
2. Krishan, Arvind, ed. Climate responsive architecture: a design handbook for energy efficient buildings. Tata McGraw-Hill Education, 2001.
3. Krieder, J and Rabi, A., Heating and Cooling of buildings : Design for Efficiency, McGraw Hill, 1994.
4. UrsalaEicker, "Solar Technologies for buildings", Wiley publications, 2003.
5. Guide book for National Certification Examination for Energy Managers and Energy Auditors (Could be downloaded from www.energymanagertraining.com)
6. Patrick Waterfield "The Energy Efficient Home: A Complete Guide"- The Crowood Press Ltd; New edition (16 May 2011)

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	H	H	L	L	M	M	H	L	M	L	-	-	H	L	-
2	H	H	H	L	L	-	H	-	-	-	-	L	L	-	-
3	H	L	H	-	L	M	H	-	L	-	-	M	M	L	-
4	H	H	H	M	M	M	H	-	-	-	M	M	L	L	H
5	H	M	H	-	H	L	H	-	M	-	M	M	M	L	H

Elective Courses

18UPCHE1E02 ENVIRONMENTAL CHEMISTRY

Hours	L	T	P	C
72	4	0	0	4

Course Objectives

1. To understand the fundamentals of environmental chemistry
2. To study water, soil and hazards waste

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the fundamental concepts of different polymers	K1
CO2	To understand the impact of pollutant in water	K2
CO3	To study the impact of chemical composition in atmosphere	K2
CO4	To understand the impact of chemical component & pollutant in soil	K2
CO5	To know the detailed issues of hazards chemicals in environmental	K2, K3

UNIT I Fundamentals

Concept and Scope of Environmental Chemistry; Origin and development of elements; Natural Cycles – Hydrological Cycle, Carbon Cycle, Oxygen Cycle, Nitrogen Cycle, Phosphorus Cycle, Sulphur Cycle; Natural and Man-made Disasters – Recent Natural Disasters; Anthropogenic Effects.

UNIT II Water Chemistry

Water chemistry- properties of water, nature of metal ions in water, solubility of gases in water, occurrence of chelating agents in water; Redox potential, Significance of redox equilibria in natural and waste water; microorganisms; The catalyst of aquatic chemical reactions, water pollution and its effects, eutrophication concept of DO, BOD, COD, Sedimentation. Coagulation and filtration. Sampling techniques for water.

UNIT III Atmospheric Chemistry

Atmosphere- Nature and composition of atmosphere, chemical and photochemical, reactions in the atmosphere – OZONE and PAN ions and radicals in the atmosphere; gaseous organic and inorganic pollutions in the atmosphere; Global warming and effects of CO, SO₂, NO_x. sampling techniques for air.

UNIT IV Soil Chemistry

Soil chemistry- inorganic and organic components of soil, Nitrogen pathways. NPK in soils; Toxic chemicals in the environment pesticides and their toxicity; biochemical aspects of arsenic, cadmium, lead & mercury. Sampling techniques for soil.

UNIT V Hazardous Wastes

Environmental chemistry of hazardous wastes- hazardous wastes in hydrosphere, geosphere and atmosphere; industrial production of hazardous wastes; Health effects of hazardous wastes. Nuclear, Radioactive Wastes, Anthropogenic Sources and Effects of Radioactive Pollution, Preventive Measurements. Energy from Wastes - Water-Based Biomass, Solid Wastes, Biogas,

Text Books:

1. Sharma and Kaur, **Environmental Chemistry**, Krishna Publishers, New Delhi, 2000.
2. A.K. De, **Environmental Chemistry**, Wiley Eastern Ltd, New Delhi, 2014.
3. S.E Manahan, **Environmental Chemistry**, Lewis Publishers, London, 2001.
4. S.K. Banerji, **Environmental Chemistry**, Prentice Hall of India, New Delhi, 2005.
5. S.C.Bhatia, **Environmental Chemistry**, CBS Publishers, 2003.

Reference Books:

1. J.Rose, **Environmental Toxicology**, Gordon and Breach Science Publication, New York, 1998.
2. S.Ladsberger and Creatchman (Ed.), **Elemental Analysis of Airborne Particles**, Gordon and Breach Science Publication New York, 1998.
3. S.M. Khopkar, **Environmental Pollution analysis**, Wiley Eastern, New Delhi, 1994.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
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C01	M	M	S	M	M
C02	M	M	S	M	S
C03	M	M	S	M	M
C04	M	M	S	M	S
C05	M	M	S	M	S

MBT 103: PLANT BIOTECHNOLOGY

Credits: 5

Hours: 5/Wk

Course objectives:

This course aims to help the students to gain an advanced level of understanding in the comprehensive components of plant biotechnology. The content of the course contributes for food security and human health towards sustainable agriculture. On top of technical insights into plant breeding, tissue culture, plant genes and genetic modification (GM), will have the overview of GM crops in the market and pipeline for their various applications like improved food quality and medicine. They will also gain a good knowledge on global regulation framework on GM crops and product as well as intellectual property rights related to plant biotechnology. The course will also help student careers in plant related research, government regulatory bodies, education, food industry and other plant-based product development and related businesses.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Plant Kingdom	Lower plants-Algae–food and its industrial applications	Economic important of Angiosperms: Food crops, Cash crops and Medicinal plants	10
II	Plant Tissue Culture	Totipotency, cytodifferentiation, callus culture, cell suspension culture, micropropagation, organogenesis, somatic embryogenesis, protoplast culture	Somaclonal variation Production of haploids: Bulbosum technique and its uses. Seed terminator technology	15
III	Plant Molecular Biology	Plant genome organization: Nuclear, Plastid and Mitochondrial.	Tools for stress induced gene identification-mRNA differential display and SSH analysis. Molecular markers: RAPD, AFLP, RFLP, SSR and SNP.	20
IV	Plant Transformation	Vectors – Agrobacterium mediated transformation, particle bombardment.	Confirmation of transgene expression by Molecular Techniques-PCR, Northern, Southern and Western blot analyses, Gene silencing by antisense and RNAi technology in plants	20
V	Biotechnological Applications	Application of genetic manipulation in crop improvement: Herbicide, insecticide and disease resistance. IPR, Plant breeders and Farmers Right	Techniques for industrial and pharmaceutical products: Edible vaccines.	10

Recommended Books

- Adrian Slater, Nigel Scott, and Mark Fowler, 2008, Plant Biotechnology, 2nd edition, Oxford university press, USA.
- Paul Christou, Harry Klee, 2010, Handbook of Plant Biotechnology, Vol-I & Vol-II, Wiley publishers, USA.

- ☞ Roberta H. Smith, 2013. Plant Tissue culture, Techniques and Experiments 2nd edition, Academic Press, USA.
- ☞ Kalyan Kumar De, 2013. Plant Tissue Culture 2nd Edn. New Central Book Agency, Calcutta.
- ☞ Purohit S.S .2010. Plant Tissue Culture , Axis books, Jodhpur.
- ☞ Palmiro Poltronieri, Yiguo Hong, 2015. Applied Plant Genomics and Biotechnology ,1st Edition, Elsevier- Woodhead Publishing. Cambridge.
- ☞ Tamara Thompson, 2015. Genetically Modified Food, Greenhaven Press. USA
- ☞ Colin J. Sanderson, 2007. Understanding Genes and Gmos, World Scientific publishers, Australia.
- ☞ Sheldon Krinsky Jeremy Gruber Ralph Nader, 2014. The GMO Deception, Skyhorse Publishing, New York.

Web sources

- ☞ <https://plant-biotech.net/>
- ☞ <https://onlinelibrary.wiley.com>
- ☞ www.nipgr.res.in › library_web › free_online_res

Course learning outcome:

Upon successfully completing this course, the students could be able to:

- Understand the basic principles of plant kingdom and their economic importance.
- Explain the basics, methodology and applications of plant tissue culture.
- Design experiments for functional characterization of plant genes and to identify those suitable for creating agronomically important traits.
- Conceptualize plant transformation, selection of desirable genes for crop improvement, design binary vector and procedure for generating GM crops.
- Describe what GM crops and products are in the market and pipeline, and their contributions towards food security, sustainable environment and medicine.
- Evaluate critically the safety issues of GM crops and products in the society.
- Summarize various forms of IP rights related to GM crops and formulate suitable IP strategy for a selected plant biotechnology projects/products.

ELECTIVE PAPER

MBTEA 104: Vermiculture and Sericulture

Course objectives:

This paper aims to learn basic concepts of Vermiculture and Sericulture. The content of the paper is covered with the biology of the vermicomposting and ecology of the earthworms. Students will be able to understand the source of organic waste vermicomposting methods and factors affecting vermicomposting and to try establishing vermicomposting in a limited space. Concept of origin, growth and study of the sericulture as science. To understand the scientific approach of mulberry. Cultivation, silkworm rearing and silk reeling. To have a better understanding about the status, classification, season of occurrence and the life cycle of pests infesting mulberry and silkworm. They also throw light on the management of pests and diseases of mulberry and silkworm with special reference to integrated approaches. This paper will help those students in her/his careers because this is useful for self employment/setting up farm related business.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Biology of Earthworms	<i>Eudrilus eugeniae</i> and <i>Lampito mauritii</i> . Ecological groups of earthworms: Epigeic, anecic, endogeic earthworm	earthworm casts- An outline of their importance in agriculture	10
II	Vermiculture	Sources of organic wastes: Problems in traditional composting- vermicomposting; Definition and methods - pit method, heap method and indoor method	Factors affecting vermicomposting: pH, moisture, temperature and nutritional value of feed	15
III	Application of Vermiculture	Advantages of vermicomposting Application of vermicompost in agricultural and horticultural farms.	Economics of Vermiculture and marketing	10
IV	Biology of Silkworm	Silkworm: Morphology- life cycle. Rearing programme- hatching, feeding, cleaning and spacing care at mounting- environmental conditions:	Leaf quality- rearing early age silkworms- rearing late age silkworms- mounting and harvesting	15
V	Processing and Application of Sericulture	Bacterial diseases: Viral diseases- fungal diseases- enemies of silk worm	Process of stifling; Reeling techniques- process of reeling- methods of collection of silk.	10

Recommended Books

- ☞ Jawaid Ahsan and Subhash Prasad Sinha, 2010. A handbook of economic zoology. S. Chand & Co. Ltd. India.

- 🌀 Edwards, C.A.Hendrix P.F., and Arancon N.Q., 4th edition 2019. Biology and ecology of earthworms, , Springer Publications. United States.
- 🌀 Katsumi Maenaka, Enoch Y. Park 2018 Silkworm Biofactory: Silk to Biology. CRC Press. United States.
- 🌀 G Ganga J Sulochana Chetty, **2019** Introduction to Sericulture. Oxford & Ibh Publishing Co Pvt Ltd. India.
- 🌀 Tv Sathe, Ad Jadhav, 2012 Sericulture & Pest Management Daya Publishing House . India.
- 🌀 Karaca, Ayten 2011 Biology of Earthworms Springer-Verlag Berlin Heidelberg. United States.

Web sources

- 🌀 <http://www.nzdl.org/cgi-bin/library.cgi>
- 🌀 <https://www.biotecharticles.com/Agriculture-Article/Vermiculture-Types-of-Earthworms-and-Applications-3133.html>
- 🌀 http://agritech.tnau.ac.in/org_farm/orgfarm_vermicompost.html
- 🌀 <http://silks.csb.gov.in/bandipore/techniques-of-rearing-silkworm/>
- 🌀 http://agritech.tnau.ac.in/sericulture/seri_silkworm4_lateage%20rearing.html

Course learning outcome:

The completely read the Vermiculture and sericulture paper, students able to understand following knowledge:

- Understand the basic knowledge about the biology of the composting using earthworms like *Eudrilus eugeniae* and *Lampito maurtii*.
- Clearly to know the source of organic waste and problems in traditional composting. Also able to understand different types of vermicomposting methods with problems in vermicomposting.
- Understand the value of vermicomposting and vermicompost importance in modern agriculture.
- Describe the basic concept of sericulture, morphology and biology of the silk worm.
- The learner will understand about methods of rearing, collecting silk, microbial pathogens and their disease.
- Vermiculture and sericulture paper will be useful to students in setting up farm related business.

ELECTIVE PAPER

MBTEB 104: ECOTECHNOLOGY

Credits: 4

Hours: 4/Wk

Course objectives:

This course will give the student an understanding of the basic principles of technologies adopted in various aspects of biotechnology. This course will elaborate the latest trends and applications in the field of Biofuels, Eco-friendly polymers, Biofertilizers, Biopesticides and Biostimulants. The student will understand the critical issues in waste management. Student will acquire knowledge about these modern eco technologies as a resource for further technological processing and application.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Biofuel	Introduction to Biofuel, Bioenergy sources – Sugar waste, Starch waste, Lignocellulosic waste, livestock waste	Categories- Biodiesel: Source & production Biogas : Source & production Bioethanol : Source & production	10
II	Biopolymers	Introduction to Biopolymers ; Sources – natural sources, microbial polysaccharides, poly hydroxyl alkaonates	Biosynthesis of polymers, Production- fermentation, enzymatic synthesis, characterization and analysis of biopolymers, Applications	10
III	Biopesticides	History, Principles & scope of Biological control, Principles of classical Biological control, Microbial control – definition & concept.	Role of insect pathogenic Virus, Bacteria, Fungi, nematodes and their mode of action. Mass production and application of biopesticides	15
IV	Biofertilizers	Definition & types, Importance of Biofertilizers in Agriculture, Commercial Biofertilizers – Rhizobium, Azatobacter, Acetobacter, Blue Green Algae	Organisms for Nitrogen fixation, Phosphate solubilization, sulphur reduction, Mass production and formulation of Biofertilizers, Nano Biofertilizers	15
V	Biostimulants	Definition & categories – Humic Acid, Protein hydrolysate, Sea weed extract, Inorganic compounds, Microbial Innoulants	Regulation of Plant Biostimulants Formulation & Applications of Biostimulants in Agriculture and Horticulture	10

Recommended Books

- ☞ John Love, Bryant. A. J. 2017. Biofuels and Bioenergy. Wiley Blackwell. UK.
- ☞ Shakeel Ahmed, Suvardhan Kanchi., Gopalakrishnan Kumar. 2019. Handbook of Biopolymers advances and multifaceted applications. Pan Stanford Publishing Pte. Ltd. New York.
- ☞ Leo M. L. Nollet., Hamir Singh Rathore. 2015. Biopesticides handbook. CRC Press. USA.
- ☞ Arshad Anwer. Md. 2017. Biopesticides and Bioagents: Novel tools for pest management. Apple Academic press. USA.
- ☞ Kaushik. B.D. Deepak Kumar. Shamim. Md. 2019. Biofertilizers and Biopesticides in Sustainable Agriculture. 1st Edition. Apple Academic Press. USA.
- ☞ Aneesa Padiniakkara. Aparna Thankappan, Fernando Gomes Souza. Jr. Sabu Thomas. 2018. Biopolymers and Biomaterials. CRC press, USA.
- ☞ Damian Price. 2017. Biodiesel Production Processes and Technologies. Larsen and Keller Education. USA.
- ☞ Alemayehu Gashaw. Solomon Libsu. 2016. Biodiesel, Bio-Ethanol and Biogas as an Alternative Fuels. American Academic Press. USA.

Web sources

- ☞ <http://agricen.com/agricultural-biostimulants>.
- ☞ <https://www.britannica.com/science/nitrogen-fixation>.

Course learning outcome:

Completely read this paper student will learn following knowledge:

- This paper provides an in-depth scope and significance of various ecotechnological applications.
- The student will gain knowledge in utilization of the commonly available resources for commercial application.
- The student will get an idea about the exploitation of readily available resources and issues associated with product development, which will be useful for developing entrepreneurship skills.

MBT 203: MICROBIOLOGY AND INDUSTRIAL BIOTECHNOLOGY

Credits: 5

Hours: 5/Wk

Course objectives:

The objectives of this course are to introduce the students to the field of microbiology and application of microbes on industry. To train the students about microbial growth, methods for fermentation technology, effluent treatment and enzyme immobilization. To prepare and sensitize the students to scope for research, the increasing for skilled scientific manpower with an understanding of research, industrials applications and microbiology ethics.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Basics of microbes	Introduction to bacteria - Cell wall, cell membrane, flagella and cell inclusions. Introduction to bacterial, plant and animal viruses: Lytic cycle and lysogeny. DNA and RNA viruses. Viroids and prions	Staining: principle and types, Fungi and Bacteria.	15
II	Microbial Growth and Metabolism	Microbial growth: Growth curve, factors affecting growth. Culture media. Sterilization. Isolation of pure culture, streak, spread and pour-plate methods. Culture collection and preservation.	Microbial metabolism - an overview. Photosynthesis in microbes. methanogenesis and acetogenesis	15
III	Bioprocess Engineering	Isolation and screening of industrially important microbes.	Bioreactors: Fermentation -Downstream processing: Solid-liquid separation, release of intracellular compartments, concentration of biological products, purification. Industrial production of ethanol, citric acid, penicillin and amino acids	15
IV	Bioremediation	Bioleaching: Use of microorganisms in ores of gold, aluminum and iron. Introduction to phytoremediation. Addition of Uranium Deletion of Renewable resources	Wastewater treatment: Physical, chemical and biological treatment processes. Effluent treatment: Bioremediation and oil spill clean-up	15
V	Industrial Biotechnology	Immobilization of enzymes: Methods, and applications	. Use of enzymes in detergents, textiles, leather and food industries. Methods of food preservation: canning and packing. Industrial production of wine and beer.	15

Recommended Books

- 🔗 Peter F. Stanbury, Allan Whitaker, Stephen J. Hall. 2016. Principles of Fermentation Technology. 3rd Edn. Elsevier Science Ltd. Netherlands.
- 🔗 Joanne Willey, Linda Sherwood, Christopher J. Woolverton. 2016. Prescott's

- Microbiology. 10th Edn. McGraw-Hill Education. United States
- 🔗 Maheshwari D K, _Dubey R C 2013. A Textbook of Microbiology.4th Edn S Chand Publishing India.
 - 🔗 Christoph Wittmann , James C. Liao , Sang Yup Lee 2017.1st Edn Wiley VCH. Germany
 - 🔗 Nduka Okafor. 2017. Modern Industrial Microbiology & Biotechnology 2th Edn. CRC press. Taylor and Francis group. United Kingdom
 - 🔗 Peppler H. J. and Perlman. D. 2014. Microbial Technology. Vol. 1&2. 2th Edn Academic Press. United States
 - 🔗 Casida L. E. and John Jr. 2015. Industrial Microbiology. 2th Edn Wiley and Sons Inc. United States

Web Source

- 🔗 <https://aem.asm.org/content/77/5/1907>
- 🔗 <http://www.biologydiscussion.com/biotechnology/downstream-processing/stages-in-downstream-processing-5-stages/10160>

Course learning outcome:

A student passing this module will be able:

- To show the main microbial processes, methods, cultivation, preservation, metabolism and synthesis activity.↵
- To explain about the microorganisms (Bacteria, Fungi, Algae, Protozoa and viruses) type's specifics in principals and applications of animal and plants.↵
- To understand the bioprocess engineering, basic techniques, methods, functions and industrial products.↵
- To explain the waste water physical, chemical and biological properties, bioremediation and energy sources.↵
- To know the different microorganisms and their products (enzymes, polymers, metabolites, etc.) that are used in the biotech industry.↵



ELECTIVE PAPER

MBTEC 304: ENVIRONMENTAL BIOTECHNOLOGY

Credits: 4

Hours: 4/Wk

Course objectives:

Students will understand the various fields of the Environmental biotechnology, i.e. Ecosystems, Biodiversity, Threats and policy. Sources for environmental pollution and its remedial measures, Toxic chemicals and their impact on environment and human health, Role of microbes in remediation of environmental pollutants, applications of bio-products in society.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		K1 and K2	K3, K4 and K5	
I	Ecosystem Diversity	Components, types, structure and function. Biodiversity: Types, values, threats, hotspots, IUCN redlisted flora and fauna and their conservation. Environmental impact assessment (EIA), Environmental Policy and Ethics.	Global warming, greenhouse effect and climate change.	12
II	Air Pollution and its management	Major air pollutions and their sources. Air pollution and disasters. Effects of air pollution on human, plant, animal and environment.	Formation of fog, photochemical smog and acid rain. Monitoring of air pollution. Control on release of particulate matter using different control devices.	12
III	Water Pollution and its management	Major water pollutions and their sources. water pollution and disasters. Effects of water pollution on human, plant, animal and environment.	Treatment methods and controlled release of effluents.	12
IV	Soil pollution and its management	Concepts of soil pollution, soil acidity, saline soil alkaline soil. Causes of soil salinity.	Physical, chemical and biological methods of soil reclamation. Chemical and metallic pollution of agriculture soil. Control of soil pollution.	12
V	Waste Management	Concept of solid waste, Types of solid waste (Industrial, Domestic, Agricultural, Municipal) Effect of solid waste on health and environment.	Waste management strategies for organic, biomedical, plastic and hazardous wastes.	12

Recommended Books

- ☞ Sharma. P.D. 2017. Environmental Biology. 13th Edn. Rastogi Publishers.
- ☞ Chatterjee A.K. 2011 3th Edn. Introduction to Environmental Biotechnology. Printice- Hall, India.
- ☞ Bharat Raj Singh and Onkar Singh. 2012. Study of impacts of global warming on climate change: Rise in Sea level and disaster frequency. DOI: 10.5772/50464.

- 🔗 Mark Brusseau, Ian Pepper, Charles Gerba. 2019. Environmental and Pollution Science 3rd Edition. Academic Press. USA.
- 🔗 Philip Wexler. 2014. Encyclopedia of Toxicology 3rd Edition. ISBN: 9780123864543 Academic Press.
- 🔗 Rodríguez-Eugenio, N., McLaughlin, M. and Pennock, D. 2018. Soil Pollution: a hidden reality. Rome, FAO. 142.
- 🔗 Vasile Stoleru and Vincenzo Michele Sellitto. 2016. Pest control in organic systems. DOI: 10.5772/644457.

Web sources

- 🔗 <https://openoregon.pressbooks.pub/envirobiology/chapter/10-4-climate-change/>
- 🔗 <http://www.ddegjust.ac.in/studymaterial/pgdem/pgdem-03.pdf>
- 🔗 <https://niphm.gov.in/Recruitments/ASO-Pathology.pdf>

Course learning outcome:

By the end of the course, the student should be able to

- Understanding the various types of ecosystems, biodiversity components, environmental threats and Policy.
- Studying the impact of environmental pollution and its remediation measures.
- Role of Toxic chemicals in the environment and their associated health issues in humans.
- Explaining the role of microbes in remediation of various products, i.e. pesticides, heavy metals, plastics and oil spills.
- Getting sound knowledge for application of several bio-products in the betterment of society.

Semester I
Core Course – I
Plant Diversity I: Algae, Fungi, Lichens and
Bryophytes

Paper Code	18PBOTCT01
Marks	25 + 75= 100
Credits	04
Hours/Week	04

Course Outcomes:

At the end of the course, students will be able to

- Provide the students with the knowledge of Thallophytes.
- Get acquainted with the basic understanding about evolution of plants.
- Acquire History and development of Phycology, Mycology, Lichenology and Bryology.
- Develop an understanding of Classification, Nomenclature, Occurrence and Distribution, Ultra structure of cell components.
- Understand the life cycle patterns and economic importance.

Unit -I

Phycology – History and Development of Phycology – Modern Phycology – Classification of algae (F.E. Fritch) – Criteria for algal classification - Occurrence and Distribution– range of thallus structure – Ultra structure (Flagella, Chloroplast, Pyrenoids, Photosynthetic pigments and Eyespot) – Ecology (Habit and Habitat), cytology, reproduction, life cycles and economic importance of algae - molecular phylogeny of algae.

Unit-II

Nomenclature – Significant features – Occurrence - Cell structure - Thallus organisation – Reproduction and broad classification – Life cycles – Economic importance of Cyanophyta, Xanthophyta, Bacillariophyta, Dinophyta, Chlorophyta, Phaeophyta, Cryptophyta and Rhodophyta and their comparative account.

Unit-III

Mycology – Introduction – Systematics of fungi (Ainsworth) – Evolution of fungi – Ecology of fungi (Habit and Habitat) – Reproduction and life cycles – Chemistry of Fungal cell – Growth – Nutrition – Metabolism and regulation of metabolism – Diagnostic characters of Myxomycota, Oomycota, Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota and Deutromycota – Economic importance of Fungi.

Unit-IV

Lichens – Components of lichens – Occurrence – Classification – Morphology and anatomy of thallus – Different types of reproduction in lichens – Recent developments in lichen's research - Economic importance of lichens – Phycobionts (Photobionts) – Mycobionts.

Unit-V

Bryology – Introduction – Definition – Origin of Bryophytes – Evolutionary and Ecological significance – Classification of Bryophytes - Reproduction in Bryophytes – Chemical constituents of Bryophytes – Bryophytes as indicators of Pollution – Role of bryophytes in global climate regulation (Carbon concentration and sequestration)- Diagnostic characters of Liverworts, Mosses, Hornworts – Life histories of *Sphagnum*, *Marchantia* and *Anthoceros*.

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ALGAE

1. Ahluwalia, A.S. (Ed.). Phycology: Principles, Processes and Applications. Daya Publishing, House, New Delhi. 2003.
2. Kumar, H.D. Introductory Phycology. 2nd Ed. Affiliated East-West Press, New Delhi. 651 pp. 1999.
3. Lee, R.E. Phycology. 4th Ed. Cambridge University Press, London. 2008.
4. Chapman, V.J. and D.J. Chapman. The Algae. ELBS and Macmillan , NY. 1977.

5. Fritsch, F.E. The Structure and Reproduction of Algae (Vol. I and II). Vikas Publishing House Pvt., Ltd., New Delhi. 1979.
6. Grahm, L.E. and L.W. Wilcox. Algae. Prentice Hall, U.S.A. 2000.
7. Grahm, L.J. and L. Wilcox. Algae. 2nd Ed. Benjamin Cummings (Pearson), San Francisco, CA. 720 pp. 2009.

FUNGI

1. Alexopolous, C.J., C.W. Mims and M. Blackwell. Introductory Mycology. 4 th Ed. John Wiley & Sons, New York. 880 pp. 2007.
2. Bilgrami, K.S. and R.N. Verma. Physiology of Fungi. 2nd Ed. Vikas Publication House, New Delhi. 8
3. Moore, D., Robson, G.D. and Trinci, A.P.J. 21st Century Guide book of Fungi, Cambridge University Press, N.Y. 2011.
4. Webster, C.J. Introduction to Fungi. 3 rd., Cambridge University Press, Cambridge. 841 pp. 2007.
5. Sharma, P.D. The Fungi . 2 nd Ed. Rastogi Publications, Meerut. 2004.

LICHENS

1. BRYOPHYTES AND LICHENS IN A CHANGING ENVIRONMENT. Bates, J. W., and A. M. Farmer, eds. Oxford: Clarendon, 1992.

BRYOLOGY

1. Chopra, R.N. and P. K. Kumar. Biology of Bryophytes. Wiley Eastern Ltd., New Delhi. 350 pp. 1988.
2. Rashid, A. An Introduction to Bryophyta. 1st Ed. Vikas Publishing House Pvt. Ltd., New Delhi. 298 pp. 1998.
3. Chopra, R.S. and S.S. Kumar. Mosses of Western Himalayas and adjacent Plains. Chronica Botanica, New Delhi. 142 pp. 1981.
4. Dyer, A. F. and J. G. Duckett. (Eds.). The Experimental Biology of Bryophytes. Academic press, London. 281 pp. 1984.
5. Goffinet, B. and A.J. Shaw. Bryophyte Biology. 2 nd Ed. Cambridge Univ. Press, Cambridge. 580 pp. 2009.

6. Kashyap, S.R.. Liverworts of Western Himalayas and the Punjab plains. Vols I II. Researchco Publications, New Delhi. 1932
7. Kumar, S.S. An approach towards Phylogenetic Classification of Mosses. Jour. Hattori Bot. Lab. Nichinan , Japan. 1984.

Semester II
Core Course – VII
Plant Ecology and Phytogeography

Paper Code	18PBOTCT05
Marks	25 + 75 = 100
Credits	04
Hours/Week	04

Course Outcomes:

The course will enable students to understand how environment influence the life of different organisms and vice versa.

Unit I

Basic ecological principles: definition of ecology and environment - components and characters of ecosystem – homeostasis. Ecosystem - structure and function. Factors affecting environment – Abiotic- Edaphic, Climatic, Topographic. Biotic – Allelopathy. Biotic and Abiotic interaction, Population Ecology, Curve, r and k Selection, meta population, species interaction, interspecific competition.

Unit II

Ecosystem – types – aquatic, terrestrial, desert and forest ecosystem. Estuarine and mangrove ecosystem – adaptations. Studying vegetation – types – list and count quadrat methods - density abundance frequency, Ecological niche, ecotone, edge effect. Flow of energy in ecological system, quality of energy, Primary and secondary foundation species enhance biodiversity. Non Conventional Sources of Energy (Solar, Hydro, Wind, Biogas, Geothermal, Ocean thermal, Tidal energy).

Unit III

Ecological succession – Seral and Climax communities – Hydrosere, Xerosere. Bog succession, sand dune succession. Ecosystem components – energy flow, food chain, food web and ecological pyramids. Biogeochemical cycle – water cycle, carbon cycle and nitrogen cycle.

Unit IV

Pollution : types – Pollutants, air, water, soil, thermal, radiation and noise pollution and their impact in environment and control measures. Global environmental changes; biodiversity status, monitoring and documentation; major drivers of biodiversity change; - biodiversity management approaches; Green house effect and its consequences. Waste recycling. Environmental Impact Assessment (EIA). Disaster management: Floods, earthquake, Cyclone and landslides and Tsunami – Ozone depletion – Invasive species – Global warming and glaciers.

Unit V

Phytogeography – major biome in world and India. Continental drift - hypothesis - Gondwana land factors involved in distribution., Introduction to IUCN criteria - Red data, rare, endangered species Endemism - Age and Area hypothesis. Hot spots, Plant exploration. Invasion and introduction. Remote sensing-introduction and its principle

References: `

Text Books:

- Anathakrishnan, T.N. (1982)-Bioresource Ecology-Oxford & IBH Publ.Co.,Inc.,Belmont.
- Ambasht, R.S. (1974) - A text book of plant ecology (3rd Edn.) Students' Friends. & Co., Varanasi, India. • Agarwal, K.C. (1987) - Environmental biology- Agro-botanical publications, India.
- Chawla, S. 2011. A text book of Environment & Ecology. Tata Mc Graw-Hill, New Delhi.

Reference Books:

- Billings, W.B.(1965)- Plants and the ecosystem - Wardsworth Publ.Co.,Inc., Belmont.
- Conard, H.S. Plant Ecology - Iowa state Press., Iowa.
- Odum E.P. Gray, W. Barrelet 2004. Fundamentals of Ecology. 15th edition. Thomas Asia Pvt. Ltd.

- Chapman, J.L. and Reiss, M.J. 1999. Ecology; Principles and Applications. II Ed. Cambridge University Press. New York.
- Putman, R.J. and S.D. Wratten. 1984. Principles of Ecology. University of California Press, Berkeley and Los Angeles.
- Schulze, E.D., Beck, E. And K. Muller-Hohenstein. 2005. Plant Ecology. Springer. New York.
- Odum, E.P. 1978. Basic principles of ecology.
- Polunin, N. 1992 Principles of Plant Geography.
- Velentin. 1978. Taxonomy, Phytogeography and Evolution.

Semester III
Core Course – XIV
Plant Biotechnology and Genetic Engineering

Paper Code	18PBOTCT10
Marks	25 + 75 = 100
Credits	04
Hours/Week	06

Course Outcomes:

The subject provides knowledge about different techniques of biology and Gene level.

Unit I

Biotechnology as Inter and Multidisciplinary approach -Plant Tissue Culture – Introduction - Objectives and Goals – Laboratory organisation – Nutrient medium – Sterilization Techniques – Types of Cultures (seed, embryo, Root, callus, organ, cell, protoplast and axillary bud cultures) – Cell suspension culture, types and in-vitro secondary metabolites production and application - Plant micropropagation - Somatic embryogenesis and organogenesis – Protoplast Isolation and Fusion.

Unit II

Application of tissue culture in agriculture, horticulture, forestry and Conservation of plant genetic resources – Application in development of Genetically Modified Crops (Fruits, Vegetables, Crops and Cereals) – recent trends in Genomics and Genetics of *Arabidopsis thaliana* – Biofertilizers – Cultivation and applications of Biofertilizers (Nitrogenous and phosphatic biofertilizers) – Organic farming (Vermicompost)

Unit III

Intellectual Property (IP) - Definition – Intellectual Property Rights (IPR) – Intellectual Property Protection – Plant Genetic Resources – Patent Systems –

Sources of patent Information – Patenting Methods – Patenting of higher plants, genes and DNA sequences – Plant Breeders Rights and Farmers Rights – A brief account on Geographical Indication (GI).

Unit IV

Tools of Genetic engineering – Restriction Enzymes (Exo and Endo nucleases) –Enzymes used in Genetic engineering (Methylase, SI nuclease, Ligase, Alkaline Phosphatase, Reverse transcriptase, T4 kinase, Terminal transferase, adaptors and Linkers) – Vectors and their types – Plasmid (pBR 322, pUC Vectors), *Agrobacterium* based Plasmids, Bacteriophage vectors, Cosmids, Phagemids, YAC, CaMV, Gemini Virus, Shuttle and Expression vectors.

Unit V

Gene transfer methods - Cloning Strategies – rDNA technology – Genomic and cDNA library construction – Hybridization techniques – Labeling methods – Nucleotide sequencing methods – Application of genetic engineering in various fields.

References:

- Dubey, R.C. 2008. A Textbook of Biotechnology. S.Chand Company Pvt. Ltd. New Delhi.
- Singh, B.D. 1998. Biotechnology. Kalyani publishers, Ludhiana.
- Primrose, S, R. Twynman and P.Old. 2005. Principles of gene manipulation. Blackwell Science Ltd., New Delhi.
- Smith, R.H. 2000. Plant tissue Culture – techniques and Experiments. Academic Press, New York.
- Dwivedi, P. 2004. Plant Tissue culture. Scientific publishers, New Delhi.
- Reinert, J, Bajaj, Y.P.S. 1997. Plant Cell and Organ Culture. Narosa publishing House, New Delhi.

- Chawla, H.S. 2000. Introduction to biotechnology. Oxford and IBH publishing Co., New Delhi.
- Harry Levine. 2006. Genetic Engineering: A Reference Hand book. ABC – CLIO, Inc, California.
- Arie altman and Paulmichael hasegawa, 2012. Plant biotechnology and agriculture prospects for the 21 st century, Academic Press.
- C.M. Govil, Ashok Aggarwal and Jitender Sharma. 2017. Plant Biotechnology and Genetic Engineering, PHI Learning Pvt. Ltd.
- Suresh Kumar Gahlawat, Raj Kumar Salar, Priyanka Siwach, Joginder Singh Duhan, Suresh Kumar, Pawan Kaur. 2017. Plant Biotechnology: Recent Advancements and Developments Springer.
- C. Neal Stewart, Jr. 2016. Plant Biotechnology and Genetics: Principles, Techniques, and Applications John Wiley & Sons.
- Isil Aksan Kurnaz, 2015. Techniques in Genetic Engineering. CRC Press.
- Huang .P.C., 2012. Genetic Engineering Techniques: Recent Developments. Elsevier.

Semester III
Core Course – XIV
Plant Biotechnology and Genetic Engineering

Paper Code	18PBOTCT10
Marks	25 + 75 = 100
Credits	04
Hours/Week	06

Course Outcomes:

The subject provides knowledge about different techniques of biology and Gene level.

Unit I

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- Dubey, R.C. 2008. A Textbook of Biotechnology. S.Chand Company Pvt. Ltd. New Delhi.
- Singh, B.D. 1998. Biotechnology. Kalyani publishers, Ludhiana.
- Primrose, S, R. Twynman and P.Old. 2005. Principles of gene manipulation. Blackwell Science Ltd., New Delhi.
- Smith, R.H. 2000. Plant tissue Culture – techniques and Experiments. Academic Press, New York.
- Dwivedi, P. 2004. Plant Tissue culture. Scientific publishers, New Delhi.
- Reinert, J, Bajaj, Y.P.S. 1997. Plant Cell and Organ Culture. Narosa publishing House, New Delhi.

- Chawla, H.S. 2000. Introduction to biotechnology. Oxford and IBH publishing Co., New Delhi.
- Harry Levine. 2006. Genetic Engineering: A Reference Hand book. ABC – CLIO, Inc, California.
- Arie altman and Paulmichael hasegawa, 2012. Plant biotechnology and agriculture prospects for the 21 st century, Academic Press.
- C.M. Govil, Ashok Aggarwal and Jitender Sharma. 2017. Plant Biotechnology and Genetic Engineering, PHI Learning Pvt. Ltd.
- Suresh Kumar Gahlawat, Raj Kumar Salar, Priyanka Siwach, Joginder Singh Duhan, Suresh Kumar, Pawan Kaur. 2017. Plant Biotechnology: Recent Advancements and Developments Springer.
- C. Neal Stewart, Jr. 2016. Plant Biotechnology and Genetics: Principles, Techniques, and Applications John Wiley & Sons.
- Isil Aksan Kurnaz, 2015. Techniques in Genetic Engineering. CRC Press.
- Huang .P.C., 2012. Genetic Engineering Techniques: Recent Developments. Elsevier.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level	Order
CO1	Gain theoretical knowledge on fiscal measures	K1, K2	LO
CO2	Understand the financial position of a country	K3	IO
CO3	Identify appropriate measures to solve fiscal crisis	K4,K5, K6	HO

Mapping of course outcomes with programme objectives

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	L	L	L	L	L	L	L	-	L	L	L	L
CO2	M	-	M	-	M	M	M	-	M	M	-	M
CO3	S	S	S	S	-	S	-	S	-	S	S	S

L – Low; M – Medium; S- Strong

18ECO C12– ENVIRONMENTAL ECONOMICS

Course Objectives

1. Understanding the various environmental issues, environmental protection policy of the Government of India and the importance of environmental protection for the attainment of sustainable development.
2. Demonstrating an active understanding of the following elements of economic theory as it relates to natural resource and environmental economics.
3. Knowledge about the key concepts of environmental economics and their relevance in the business settings.
4. Design regulation this corrects market failures, deal the various economic valuation methods for analyze the environmental quality and policy responses to environmental problems.

Unit – I: Introduction

Environment – Eco-system – Principle of material balance –Trade off between economic growth and Sustainable Development – Limits to growth — Environmental issues in different economic systems.

Unit – II: Environmental Analysis

Environmental pollution – Sources and Causes of pollution - Types of pollution – Climate Change - Pareto Optimality – problem of second best – Private Vs Social Cost - Environmental Impact Analysis – Cost Effective Analysis - Cost-Benefit Analysis – Environmental Costs of Economic Growth.

Unit – III: Externalities and Environmental Monitoring

Environmental externalities – Common Property Resources - Command and Control Strategy - Pigouvian taxes and subsidies, pollution permits and mixed instruments (The Charges and Standards Approach), Coase bargaining solution and collective action; Informal regulation and the new model of pollution control, monitoring and enforcement of environmental regulations- - Political Theories and Environmental Conflict.

Unit – IV: Methods of Valuation

Environmental Valuation methods -User values and non-use values (direct value, indirect value, option value, bequest value and existence value) – Direct methods – contingent valuation method – methods based on response to hypothetical markets – Indirect method. Hedonic Approach - Methods based on observed market behavior, household production function approach – Travel Cost Method.

Unit – V: Environment Policy

Policy measures: Basic approaches to environmental policy – Regulation and Effluent Fees – A comparison – Distributive effects of environmental policy – International environmental policy – India's environmental policy – Law on environmental protection and pollution control in India.

Text Book

Shankar U (2001) "Environmental Economics", Oxford University Press, New Delhi

References

1. Karpagam M: Environmental Economics Sterling Publishers 2000
2. Bhattacharya : Environmental Economics – OUP, 2002 .
3. Karpagam M and R Geetha: Green Management _ Theory and Practice, and Book House, 2010.
4. Tan Hodge,(1995): Environmental Economics Macmillan Press.
5. Sankar U (2000)" Environmental Economics", Oxford University Press.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level	Order
CO1	Understand the subject of environmental economics and the theoretical frameworks	K1, K2	LO
CO2	Apply economic theories in to the environmental problems to solve the social issues and economics of climate change	K3	IO
CO3	Analyze the various economic valuation methods and environmental problems Evaluate and critically assess economic support documents for policy decisions	K4, K5, K6	HO

Mapping of course outcomes with programme objectives

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	L	L	L	L	L	L	L	-	L	L	-	-
CO2	-	M	M	-	M	-	M	-	M	M	M	M
CO3	S	S	S	S	S	S	-	S	-	S	S	S

L – Low; M – Medium; S- Strong

Course Name	Food Packaging Technology	Programme Name	M.Sc. Food Science, Technology and Nutrition
Course Code	18FSTNE01	Academic Year Introduced	2018 - 2019
Type of Course	Theory	Semester	I

COURSE OUTCOMES

On completion of the course, the students will be able to												
CO1:	recall the history, functions and requirements of packaging											
CO2:	classify types of packaging materials, define its properties and apply the concept in food industry											
CO3:	select and design specific packaging material for specific food products											
CO4:	test the different packaging material using standard methods and compare the results with packaging standards											
CO5:	apply the recent trends in food packaging systems and equipments for packaging of food products											
Mapping of COs with POs, PSOs												
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3	PSO4
CO1	3	1	1	1	1	1	1	2	3	1	1	3
CO2	3	1	1	1	1	1	1	2	3	1	1	3
CO3	3	1	1	1	1	1	1	2	3	1	1	3
CO4	3	1	1	1	1	1	1	2	3	1	1	3
CO5	3	1	1	1	1	1	1	2	3	1	1	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
History, Functions and Requirements of Packaging	To understand the historical development, basic functions and need for a food package	10+3+1=14
Types of Packaging Materials	To familiarize with different types of packaging materials and its applications	10+3+1=14
Package Design for Different Food Products	To learn the concepts in designing packaging materials suitable for various food products	10+3+1=14
Testing Procedures for Food Packaging Materials/Packaged Foods and Laws and Regulations	To gain knowledge and skills about the testing procedures and comparison standards of packaging materials	7+6+1=14
Packaging Equipments and Systems	To acquire professional knowledge about packaging equipments and recent trends in food packaging systems	10+3+3=16
Total Hours of Instruction		72 (18x4)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended Learning Chapters	CO(s) Mapped	Cognitive Level/KD	Psychomotor domain activities	Psychomotor domain level
UNIT I: History, Functions and Requirements of Packaging					
1.	Historical background	CO1	K1, F	List the packaging materials used in ancient times	K3, S3
2.	Importance and scope of food packaging	CO1	K2, F	Enlist the scope of food packaging	K4, S3
3.	Functions of food packaging	CO1	K3, C	Infograph the functions of food packaging	K5, S4
4.	Requirements for effective food packaging	CO1	K2, C	Identify the requirements for an effective food package	K6, S1
	Graphics, Package Design	CO1	K3, F	Apply a graphic design for any one food package	K3, S1
	Printing and Labelling	CO1	K2, F	Point out the FSSAI mandatory requirements of labelling	K3, S1
	Main printing processes	CO1	K3, F	Report on the various printing methods applied on a food package	K4, S4
	Printing inks, varnishes	CO1	K3, C	Picturize the inks and varnishes used in food packaging	K5, S3
	Adhesives and labels	CO1	K2, F	Explicit the types of adhesives in sticking a label on the food package	K5, S1
UNIT II: Types of Packaging Materials					
5.	Paper and paper-based materials - Corrugated fiber board (CFB), Injection molding and blow molding	CO2	K1, F	Collect and discuss the different paper-based packaging materials in use	K4, S1
6.	Plastics: types of plastics and their properties, co-extrusion, lamination,	CO2	K2, P	Differentiate degradable, non degradable and edible plastics with examples	K5, S1

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	biodegradable plastics and edible packaging and its bio-composites				
7.	Environmental concerns - recycling and disposal of packaging waste	CO2	K2, C	Discuss the salient features of FSSAI regulations on environmental concern on food package by each industry	K5, S1
8.	Metals: Tinplate, tinning process, components of tinplate, tin free can (TFC), types of can metallic films, lacquers	CO2	K2, C	Exemplify the different metals used in food market	K5, S1
9.	Glass: composition, properties, methods of bottle making, types of closures	CO2	K2, C	Exhibit the type of food packed in glass containers with different type of closures	K3, S1
UNIT III: Package Design for Different Food Products					
10.	Package design for fresh horticultural produce	CO3	K2, C	Summarize the type of package applied for packaging the fresh horticultural produce	K4, S3
11.	Package design for dry foods	CO3	K2, C	Demonstrate the dry food packages	K5, S4
12.	Package design for animal foods	CO3	K1, F	Justify the package design applied for packing animal foods	K6, S1
13.	Package design for moisture sensitive foods	CO3	K1, F	Discuss the qualities of package used to pack moisture sensitive foods	K3, S1
14.	Package design for frozen foods	CO3	K1, F	Illustrate the packages used to pack frozen foods	K3, S1
15.	Package design for fats and oils	CO3	K2, P	Sketch the mandatory specifications for selecting a package for fats and oils	K4, S1
16.	Package design for thermally processed foods	CO3	K1, F	Describe the salient features of any one package used to pack RTC foods	K4, S4
17.	Package design for carbonated beverages and non-carbonated beverages	CO3	K2, P	Pictographically represent the packages for beverages exist in the market	K5, S4
UNIT IV: Testing Procedures for Food Packaging Materials, Packaged Foods and Laws and Regulations					
18.	Testing Procedures for Packaging Materials - thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, CO2 permeability, oxygen permeability, and grease resistance	CO4	K1, F	Define and demonstrate the testing procedure for any one food packaging material	K4, S2
19.	Testing procedures for packaged foods	CO4	K1, F	Mention any two agencies involved in testing of packed foods	K5, S3
20.	Compatibility and shelf life studies	CO4	K1, F	Design the protocol to test the compatibility and shelf stability of a packed food product	K6, S2
21.	Evaluation of transport worthiness of filled packages	CO4	K2, F	Identify the methods used to evaluate the worthiness of any one food package during transportation	K5, S4
22.	Food Packaging Laws and Regulations	CO4	K2, C	Discuss the salient features of FSSAI packaging regulations	K2, S1
UNIT V: Packaging Equipments and Systems					
23.	Packaging equipments - bottling machines, cartooning systems, seal and shrink-packaging machine, form, fill and sealing machine (FFS)	CO5	K1, F	Capture and present the video on operation of any four equipments used in packaging of food in a food industry	K4, S1
24.	Packaging Systems - vacuum packaging systems, controlled and modified atmosphere packaging systems, aseptic packaging systems, retort packaging, active and intelligent packaging systems	CO5	K1, F	Distinguish the various types of food packaging systems with suitable infographics	K6, S1

REFERENCES

TEXTBOOKS	
1	Robertson G.L, (2012), Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group.
2	Paine F.A and Paine H.Y, (1992), A Handbook of Food Packaging, Blackie Academic and Professional, New York.
3	Coles R, McDowell D, and Kirwan MJ (2003), Food Packaging Technology, Blackwell Publishers, USA.
REFERENCE BOOKS	
1	Eiri, (2005), Handbook of Food Packaging Technology, Engineers India Research Institute, New Delhi.
2	Kit L.Y and Dong S.L, (2012), Emerging Food Packaging Technologies – Principles and Practices, Woodhead Publishers, USA.
3	Han J.H, (2014), Innovations in Food Packaging, Second Edition, Academic Press, UK.
4	Ahvenainen, R. (Ed.). (2003), Novel Food Packaging Techniques. Elsevier.
5	Cerqueira, M. A. P. R., Pereira, R. N. C., da Silva Ramos, O. L., Teixeira, J. A. C., & Vicente, A. A. (2017), Edible food packaging: Materials and processing technologies. CRC Press.
JOURNALS AND DOCUMENTS	
1	Journal of Food Science and Technology, AFSTI Publication
2	Annals. Food Science and Technology, Valahia University Press
3	Food Science and Human Wellness, Beijing Academy of Food Sciences

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 - Creating
Knowledge Dimension: F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain: S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

4	Journal of Food, Agriculture and Environment, WFL Publisher Ltd.
5	Natural Products and Bioprospecting, Springer.

18AGC011– APPLIED HYDROGEOLOGY

Course Objectives

- To learn the fundamental components of hydrological cycle and distribution of fresh and salt water of the Earth.
- To impart theoretical, practical and field knowledge pertaining to Hydrogeological domain.
- To understand the physical, chemical and biological characteristics of water with special emphasis on pollution and contamination.
- To understand the relationship in between water and rock interaction and salt water intrusion and its remedial measures in the coastal aquifers.
- An ability to ethical, social, health and sustainable consumption of water resources.

Course Outcomes

- Capable of understanding the impact of water conservation methods in regional and national context.
- An ability to understand the importance of groundwater augmentation strategies.
- To perform socio economic analysis to evaluate the intangible benefits of artificial structures.
- Formulate and solve deterministic and optimization models for water resources.
- To get familiarization of principles and applications of various groundwater exploration techniques.

Unit I

Hydrogeology: Hydrologic cycle and its components, Origin and age of groundwater, Occurrence of groundwater, Global distribution of fresh water. Vertical distribution of groundwater. *Aquifers:* Types of aquifers. *Springs:* Types of springs. *Hydrologic properties of rocks:* Porosity, Permeability, Specific yield, Specific retention, Hydraulic conductivity, Transmissivity and Storage coefficient.

Unit II

Groundwater movements: Sub surface movement, Base flow, Effluent flow and influent flow. Darcy's law, Reynold's number, Laminar flow and turbulence flow. *Water level fluctuation:* Water table and Piezometric surface and its fluctuations. *Pumping test:* objectives, layout of the test and measurements.

Unit III

Water well technology: Well types, drilling methods, construction of well, design of well, development and maintenance of wells. *Artificial recharge of groundwater:* Concept and methods. *Saline water intrusion in aquifers:* Saline water intrusion, Ghyben–Herzberg relation between fresh and saline water, Prevention and control of salt water intrusion in the coastal aquifers.

Unit IV

Groundwater quality: Chemical composition of groundwater, major cations and anions, trace elements and their sources. *Water quality measurements:* physical, chemical and biological parameters. *Graphical representation of hydrochemical data:* Piper's facies analysis. *Groundwater Contaminations and Pollutions:*

Problems related to arsenic and fluoride contamination, radio isotopes in hydrogeological studies. Trace element and health hazards, Impact of urbanization. Hydrogeochemical provinces of India.

Unit V

Groundwater exploration techniques: Surface investigation of groundwater-Geologic method, electrical resistivity method, seismic method, gravity and magnetic method. *Subsurface investigation of groundwater:* test drilling, water level measurements. Application of Geophysical logging in Groundwater exploration. Groundwater provinces of India.

Text / Reference Books

1. Alley, W.M., (1993), Regional Groundwater Quality-VNR, New York
2. Davies, S.N. and De Wiest, D.R., (1966), Hydrogeology-John Wiley & sons, Inc, New York, 463p.
3. Fetter, C.W., (1990), Applied Hydrogeology-Mc Graw Hill, Publisher, New Delhi.
4. Freeze, R.A. and John, A., (1979), Groundwater, Cherry, Prentice Hall, Inc, 604p.
5. Handa, O.P (1984), Groundwater Drilling, Oxford & I.B.H. Publishing Co.
6. Hiscock, K., (2005), Hydrogeology, Principles and Practice, Blackwell Publishing, 389p.
7. Karanth, K.R., (1987), Groundwater Assessment, Development and Management-Tata McGraw Hill New Delhi 720p.
8. Kazmann, (1973), Modern Hydrology, Harper and sons Publishers, New Delhi.
9. Manning, J.C., (2007), Applied Principles of Hydrology, CBS Publishers and Distributors, New Delhi.
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11. Raghunath, H.M., (2007), Groundwater 3rd edition, New Age International Publishers, 520p.
12. Reddy and Rami, J.P., (2008), A Textbook of Hydrology, University Science Press, Bangalore.
13. Schwartz, F.W and Zhang, H., (2003), Fundamentals of groundwater, John Wiley & sons, Inc, New York, 583p.
14. Shaw, E.M., (1994), Hydrology in Practice, 3rd edition, Chapman and Hall, London, 569p.
15. Subramaniam, V., (2000), Water-Kingston Publ. London.
16. Todd, D.K., (1980), Groundwater Hydrology-John Wiley & Sons Publishers, New York, 535p.
17. Tolman, C. (1972), Groundwater, McGraw Hill Book Company.
18. Walton, W.C. (1970). Groundwater Resource Evaluation, McGraw Hill Book Company.
19. Venkateswaran, S (2010) Groundwater exploration techniques, TNBH publishers, Chennai, Tamilnadu. ISBN 978-81-9234-992-3.

Outcome Mapping

POs & PSOs/COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	2	2	3	3	3	1	2	3	2	2	1
CO 2	3	3	2	2	3	3	3	2	2	2	1	1
CO 3	3	2	2	2	3	3	2	2	3	1	1	1
CO 4	3	3	2	2	3	3	2	2	2	1	2	2
CO 5	3	2	2	1	3	3	2	2	3	2	2	1

Note: POs-Program Outcomes , PSOs -Program Specific Outcomes and CO-Course Objective & Cognitive level: K1- Remembering, K2- Understanding , K3- Applying.

18AGC012 – ADVANCED REMOTE SENSING AND GIS

Course Objectives

- To learn basic of aerial remote sensing and its applications.
- To understand the physics of electromagnetic spectrum and learn satellite remote sensing.
- To get exposure of the theory and applications of digital image processing.
- To have training in GIS components, models and applications.

Course Outcomes

- Develop knowledge in basic of remote sensing, interpretation keys and applications.
- Formulate the relationship between EMR and Satellite remote sensing.
- Implement Digital image processing technique in geological applications.
- Operate GIS data model.
- Demonstrate GIS and GPS techniques for varies applications.
- To have basic knowledge in GPS.

Unit I

Remote sensing

Definition Types of aerial photographs. Scale of photographs. Panchromatic, colour and infra-red films. Colour and infra-red films. Elements of photo interpretation: tone, texture, pattern, drainage pattern and lineaments. Applications: Structural mapping and lithological mapping, groundwater exploration.

Unit II

Satellite Remote sensing

Electromagnetic Radiation, EMR spectrum, EMR interaction with atmosphere, EMR interaction with earth features. Atmospheric windows, Resolutions (Spectral, spatial, Temporal and Radiometric) Platforms and Sensors, Multi-spectral remote sensing data. Remote sensing satellites: Landsat, SPOT and IRS series of satellite data. Introduction to Hyperspectral remote sensing. Remote sensing Application in mineral exploration.

Unit III

Digital Image Processing- Digital Image- Digital Data Format- Image Processing Techniques-Radiometric Correction -Geometric Correction -Image Enhancement Techniques-Principal Component Analysis-Supervised Classification-Unsupervised Classification.

Unit IV

GIS data model

Geographic Information System (GIS): Introduction, Definition, GIS Components. Data models: Vector Data model, Topology and Non-Topology models. Raster Data: Quad tree model, Run-length encoding. Raster and vector data conversion. Database management.

Unit V

GIS data analysis

Spatial Data analysis: Data editing, Data query, Logical operation, arithmetic operations. Map overlaying, DEM and uses. GIS application in Natural resource mapping. GPS principles and applications

Text / Reference Books

1. Anji Reddy, M. (2001), Text Book of Remote Sensing and Geographical Information Systems, BS Publication, Hyderabad .
2. Chandra A.M & S.K. Ghosh (2006), Remote Sensing & Geographical Information System, Narosa Publishing House, Chennai.
3. Curran,B (1985): Principles of Remote Sensing, Longman,London.Inc.
4. Drury, S.A. (1987). Image interpretation in Geology. Chapman and Hall.
5. Gupta, R.P. (2000) Remote Sensing Geology. Springer-Verlag. 356pp.
6. Ian Heywood, Sarah Cornelius and Steve Carver Parson, (2003), An Introduction to Geographical Information Systems (Edn) Singapore.
7. J. B. (1996) Introduction to Remote Sensing.622pp.
8. Jensen.J.R. (2005) Introductory Digital Image Processing-A Remote Sensing Perspective 3rd edition,pension prentice Hall, NJ,USA.
9. John Wiley., Pandey, S.N. (1987). Principles and applications of photogeology. Wiley Eastern, New Delhi.,
10. Lillesand, Thomas Kiefes (1979), Remote Sensing and Image Interpretation, John Wiley and sons
11. Sabins,F.F.Jr (1978):Remote sensing Principles and Interpretation, Freeman, Sanfrancisco sons, New York.
12. Shiv.N.Pandey (1987), Principles & Applications of Photo geology, Wiley Eastern Ltd.,

Outcome Mapping

POs& PSOs/COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	3	2	2	3	3	2	2	3	2	2	1
CO 2	3	3	2	2	3	3	2	2	3	2	2	1
CO 3	3	3	2	2	3	3	2	2	3	2	2	1
CO 4	3	3	2	2	3	3	2	2	3	2	2	1
CO 5	3	1	2	2	2	3	2	2	3	2	2	1

Note: POs-Program Outcomes , PSOs -Program Specific Outcomes and CO-Course Objective & Cognitive level: K1- Remembering, K2- Understanding , K3- Applying..

SUPPORTIVE COURSES

18GS01 - EARTH SYSTEM SCIENCE

Course Objectives

- To explore the fundamental interactions of the geosphere, hydrosphere, atmosphere and biosphere.
- The unit is designed to provide a strong scientific foundation for understanding and contextualizing studies of the environment, human impacts and sustainable practice and management of resources.

Course Outcomes

- The interaction between the Earth's spheres, relevant processes and environmental changes.
- Knowledge and understanding Recapitulate processes in the different spheres
- Describe the connections and feedback between the Earth's spheres Explain the connection between Earth System processes and global environmental changes
- A basic understanding of the Earth as an holistic system knowledge of the main components of the Earth system and their interactions
- The interactions between biological, chemical, and physical processes that shape and define the Earth System.

Unit I

Space Science

Introduction to various branches of Earth Sciences. Solar System, Age of the Earth, Origin of Solar system. Meteors and Meteorites. Earth Dynamics : Interior of the Earth, Composition of the Earth, Seismic waves, Seismograph, Plate Tectonics, Basics of Earthquake Engineering, Landslides, Volcanoes.

Unit II

Geological Oceanography:

Sea waves, Tides, Ocean currents, Geological work of seas and oceans, Tsunami and its causes, Warning system and mitigation.

Unit III

Hydrogeology

Hydrogeology: Water table- Aquifer- Groundwater fluctuations and groundwater composition, Hydrological cycle. Glaciology: Glacier types, Different type of glaciers, Landforms formed by glacier. Petrology - Geological bodies and their structures: Rock, mineral, batholiths, dyke, sill, fold fault, joint, unconformity.

Unit IV**Earth's Atmosphere :**

Structure and composition of atmosphere, Atmospheric circulation, Geological work of wind, Greenhouse effect and global warming, Carbon dioxide sequestration. Steps to maintain clean and pollution free atmosphere with governing laws, precautionary measures against disasters.

Unit V**Biosphere:**

Origin of life, Evolution of life through ages, Geological time scale, biodiversity and its conservation. Natural Resources: Renewable and non-renewable resources, Mineral and fossil fuel resources and their geological setting, mining of minerals and conservation, effect of mining on surface environment

Text / Reference Books

1. Holme's Principles of Physical Geology. (1992). Chapman & Hall.
2. Emiliani, C, (1992). Planet Earth, Cosmology, Geology and the Evolution of Life and Environment. Cambridge University Press

Outcome Mapping

POs& PSOs/COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	2	1	1	2	3	2	1	2	2	2	1
CO 2	3	1	1	1	2	3	2	2	2	2	2	1
CO 3	3	1	1	1	2	3	2	2	2	1	1	1
CO 4	3	2	1	1	2	3	2	2	3	1	1	1
CO 5	3	2	1	1	2	3	2	2	2	1	2	1

Note: POs-Program Outcomes , PSOs -Program Specific Outcomes and CO-Course Objective & Cognitive level: K1- Remembering, K2- Understanding , K3- Applying

18AGS02 – WATER RESOURCES MANAGEMENT

Course Objectives

- To know about the nature and occurrence of water, its spatial and temporal variability, quantity and quality considerations and human influence.
- To define the water resources endowment on which development and use of water resources must be planned.
- To develop a sound foundation on dynamics of water in the nature and human interferences.
- To develop wider perspectives on integrated water resources management.

Course Outcomes

- Appreciate the circulation of water in earth-atmosphere system and the hydrologic processes over a river basin and emerging quality and quantity concerns thereto.
- Quantify the occurrence and variability of rainfall, runoff, flood and sediment transport processes.
- Quantify the occurrence and distribution of groundwater to plan potential groundwater usage.
- Analyze the human interferences on hydrologic processes and the resulting consequences in terms of quantity and quality.

Unit I

Introduction: Definition, concepts of watershed, major objectives of watershed management, effects of watershed on community, ecosystem, Monitoring and evaluation of watershed.

Unit II

Principles of watershed management: Delineating the watershed. natural processes at work in watershed, common elements of watershed management, multidisciplinary approach in watershed management, participatory resources mapping and appraisal, benefits of watershed approach.

Unit III

Degradation agents in watershed: Flood, drought, fire, wind storms, erosion and deposition. Climate change. Glacial movement, Tectonic activity. Volcanic eruption. Human-induced changes. Impact of the degradation of watersheds in hydrology.

Unit IV

Engineering measures for soil conservation: Rainfall parameters. Types of soil erosion. contour bunding, Surplussing structures contour and straggled trenching, gully control structures, graded bunding, bench terracing, land leveling and grading.

Unit V

Water Conservation and Harvesting: Water conservation methods for crop land, Treatment of catchments. **Rainwater harvesting structures:** Check dam, farm pond, percolation tank, basin, ditch and furrow, channel, flooding, irrigation, subsurface dyke, Nalla bund and pit methods. Conjunctive use of surface and groundwater.

Text / Reference Books

1. Rajora,R.,(1998), Integrated Watershed Management, Rewat Publications, New Delhi.
2. Tideman.E.M., (1996), Watershed Management: Guideline for Indian Conditions, Omega, Scientific Publishers,372p. New Delhi
3. Lal.S., (2004), Watershed, Development, Management and Technology, Mangal Deep Publications,358p.
4. Paranjape,S.et.al.,(1998), Watershed Based Development: A Source Book, Bharat Gyan Vigyan Samathi, New Delhi.
5. Suresh,R.,(2002), Soil and Water Conservation Engineering, Standard Publishers and Distributors, Delhi.
6. Kakade,B.K.,(2002), Soil and Water Conservation Structures in Watershed Development Programs ,BAIF Development Research Foundation, Pune.

Outcome Mapping

POs& PSOs/COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	2	1	1	2	3	2	1	2	2	1	1
CO 2	3	2	1	1	2	3	2	1	2	2	1	1
CO 3	3	2	1	1	2	3	2	2	3	2	2	1
CO 4	3	2	1	1	2	3	1	2	2	2	1	1
CO 5	3	2	1	1	2	3	2	2	2	1	2	1

Note: POs-Program Outcomes, PSOs -Program Specific Outcomes and CO-Course Objective & Cognitive level: K1- Remembering, K2- Understanding , K3- Applying

genomics and proteomics of microbial infections. Springer-Verlag publications.

Web References

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2. [https://en.wikipedia.org/wiki/Characterization_\(materials_science\)](https://en.wikipedia.org/wiki/Characterization_(materials_science))
3. https://www.ttu.ee/public/m/Mehaanikateaduskond/.../Lecture11_Synthesis.pdf
4. www.e-ijaet.org/media/23124-IJAET0723754-v7-iss6-1806-1811.pdf
5. <https://onlinelibrary.wiley.com/doi/full/10.1002/pen.24595>
6. <http://crnano.org/whatis.htm>
7. www.mdpi.com/1422-0067/11/33/6/7149.
8. <http://www.nanotech-now.com/>
9. www.nanotechnologyfordummies.com
10. www.nanobotblogspot.com
11. www.microbiologyprocedure.com/genetics/microbial-genetics/microbial-genetics.htm
12. www.web-books.com/MoBio/
13. <http://www.nature.com/nrmicro/focus/metagenomics/index.html>

CORE - IX: FOOD, SOIL AND ENVIRONMENTAL MICROBIOLOGY

Course Code: 18MBC09

Hours: L + T + P = C

Marks: 100

4 1 0 5

Course Objectives

This course aims to communicate the students with basic principles of microbiology and their applications to soil, food, dairy and environment. It also prepares the student to address pressing environmental challenges by developing a fundamental understanding of the microbial communities and processes in natural and built environments. It lays and builds upon the foundation of basic microbiology, microbial energetics and diversity to applying the tools provided by microbiology ranging from traditional to state of art for addressing relevant environmental concerns. It provides an in depth exploration of the diverse role of microbes and microbial communities in each sector.

Course Outcome

1. By the end of the course, the students will be able to know about the significance of the microbes in soil, food, dairy and environment.

2. The students will clearly get in-depth information about the harmful effects and beneficial role of microbes in each sector.
3. This course provides in depth knowledge on water and waste water treatment to tackle the current environmental problems.
4. The course will also provide meticulous thoughts on the task of microbes in waste water treatment and solid waste management.
5. After the study, the course contents will give several opportunities for the students to develop as a researcher in food, dairy, agriculture and conservation sectors.

Unit	Unit Title	Intended Learning Chapters		Hours of Instruction
		(K1, K2)	(K3, K4 & K5)	
I	Food microbiology	Food as a substrate for microorganisms. Sources of contamination of microorganisms in foods, Factors influencing microbial growth in foods. Food borne diseases. Spoilage of fruits, vegetables, meat, poultry, fish and seafoods. Methods of food preservation: Traditional, physical and chemical methods.	Applications of food microbiology: Beneficial uses of microorganisms in food, Intestinal beneficial bacteria, Probiotics, Prebiotics – Definition, functional foods, types, importance and economic values, Recombinant foods, Biosensors in food industry.	15
II	Dairy microbiology	Microflora of milk and milk products, Fermented milk and milk products:	Preservation of milk and milk products. Sanitation of dairy processing plant, food control agencies and	15

		Sauerkraut, Buttermilk, Cream, Yogurt, Cheese, Kafir and kumiss. Microbes involved in fermentation: Starter lactic acid cultures. Spoilage of milk and milk products, Milk borne diseases, Milk quality testing.	their regulations.	
III	Soil microbiology	Distribution of microorganisms in soil, Factors influencing the soil microflora	Biogeochemical cycles: Carbon, Nitrogen, Phosphorus and Sulfur, Interactions among microorganisms: Mutualism, commensalism, ammensalism, synergism, parasitism, predation and competition. Interaction of microbes with plants: Rhizosphere, phyllosphere, mycorrhizae. Nitrogen fixation: Symbiotic and asymbiotic. Soil reclamation.	15
IV	Microbiology of air and water	Composition of air, Number and types of microorganisms in air, Distribution and sources of air borne organisms, Aerosol, Airborne	Extremophiles – Thermophiles, mesophiles, psychrophiles, Deep sea, Desert, Acidophilic, Alkalophilic and	15

		diseases, Assessment of air borne microbes, Air sanitation - Physical and chemical methods. Microbiology of water: Physico-chemical properties of water, Microbial assessment of water. Aquatic micro flora and fauna of lake, ponds, river, estuary, mangrove and sea.	Halophilic microorganisms. Impact of environmental factors on the aquatic biota.	
V	Environmental Microbiology	Microbes and environment, Classification of wastes. Waste treatment - Types and characterization of solid and liquid wastes. Treatment of solid wastes - composting, vermiform composting, silage, pyrolysis and saccharifications. Treatment of liquid wastes - Primary, secondary (anaerobic and aerobic) - trickling, activated sludge, oxidation pond and oxidation ditch-tertiary - disinfection.	Xenobiotic compounds and their degradation: Crude oil, hydrocarbon, pesticides and heavy metals. Bioaccumulation of heavy metals, Biofouling, Bioleaching and Bioremediation. Bioluminescence and microbes. Biodegradation of natural substances - Cellulose, xylan, hemicellulose, starch, fructose, mannan, pectin and lignin.	15

References

1. Diana Marco (2019). *Microbial Ecology: Current Advances from Genomics, Metagenomics and Other Omics*, Publisher: Caister Academic Press, ISBN: 978-1-912530-03-8
2. Larry L. Barton, Robert J. C. McLean (2019). *Environmental Microbiology and Microbial Ecology*, 1st edition, Publisher: Wiley-Blackwell, ISBN-13: 978-1118966266.
3. Vijaya Ramesh, K. (2014)*Food Microbiology*, Neha Publishers & Distributors. ISBN10: 8180940194.
4. Kamal Duggal, (2011) *Introduction to food Microbiology*, The publication house of Cyber Tech Publication, Publisher: Neha Publishers & Distributors.
5. William, Frazier, C., Dennis, Westhoff, C. and Vanitha, N.M. (2013)*Food Microbiology*, ISBN: 1259062511.
6. Frazier, W.C. and Westhoff, D.C. (1988)*Food Microbiology*. Tata McGraw Hill Pub Comp. New Delhi.
7. Singh, K. (2011)*Dairy Microbiology*, Neha Publishers & Distributors. ISBN: 9350300699.
8. Alexander, M. (1977)*Introduction to Soil Microbiology*. John Wiley and Sons New York.
9. Subba Rao, N.S. (1995) *Soil Microorganisms and plant growth*, Oxford and IBH, New York.
10. Brock, T.D. and Madigan (1999)*Biology of Microorganisms*. Prentice Hall Int. Inc. Michel R.(ed). *Introduction to Environmental Microbiology*.
11. Bimla Singh (2011)*An Introduction to Environmental Microbiology*. Neha Publishers & Distributors. ISBN: 9380239602.

Web References

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2. http://ssu.ac.ir/cms/fileadmin/user_upload/Daneshkadaha/dbehdasht/behdasht_imani/book/Microbiology_Handbook__Dairy_Products.pdf
3. <http://www.bookhut.net/applied-dairy-microbiology-pdf/>
4. http://www6.zetatalk.com/docs/Soil/Principles_Of_Soil_Microbiology_Waksman_1927.pdf
5. <http://www.textbooksonline.tn.nic.in/books/11/std11-microbio-em.pdf>
6. [http://197.14.51.10:81/pmb/AGROALIMENTAIRE/Lait%20et%20derives/Dairy%20Science%20and%20Technology%20\(CRC%202005\).pdf](http://197.14.51.10:81/pmb/AGROALIMENTAIRE/Lait%20et%20derives/Dairy%20Science%20and%20Technology%20(CRC%202005).pdf)
7. http://site.iugaza.edu.ps/tbashiti/files/2010/02/Environmental_Microbiology.pdf
8. <http://trishul.sci.gu.edu.au/courses/bbs3728/lecture1.pdf>

9. <https://www.kobo.com/us/en/ebook/microbial-ecology-2>
10. <https://www.pdfdrive.com/principles-and-applications-of-soil-microbiology-d8264286.html>

PRACTICAL - V

PRACTICAL EXAM: 7 HRS / DAY: 2 CONSECUTIVE DAYS
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CORE PRACTICAL - V: MOLECULAR BIOLOGY AND BIOTECHNOLOGY (18MBCP06)

Course Objectives

The contents for above practicals are designed to impart hand on experimental knowledge on the various techniques in molecular biology and biotechnological experiments. This would enable them to design experiment for the production of recombinant products using above molecular techniques.

Coarse Outcome

At the end of the course, learners will be able to

1. Isolate plasmid, chromosomal DNA from the bacteria.
2. Became skillful in the inserting foreign DNA in to various vectors and transform.
3. Express foreign DNA in *E.coli* and other system.
4. Evaluate the presence of recombinant DNA in the different host used in the cloning
5. Isolate mutants from normal organisms.

List of Experiments

1. Isolation and quantification of DNA and RNA
2. Isolation of plasmid DNA from bacteria
3. Restriction digestion of plasmid
4. Determination of molecular weight of DNA
5. Cloning of fragment in plasmid
6. Preparation of competent *E.coli* cells
7. Transformation of plasmid DNA to the *E.coli* cells
8. Screening for transformants - Blue white selection
9. PCR amplification of DNA fragment
10. Screening for recombinant proteins by SDS - PAGE
11. Screening by TLC
12. Isolation of auxotrophic mutants

AVERAGE PERCENTAGE OF COURSES HAVING FOCUS ON ENTREPRENEURSHIP

Course Code & Title	18UPCND1A01- Food Service Management		
Class	I M.Sc.	Semester	I
Cognitive Level	K-1, K-2, K-3, K-4& K-5		
Course Objectives	The Course aims • To develop core knowledge in key areas of various Food Service Systems, its development and also in administration. • To gain efficacy in principles of management. • To progress in food production, standardisation and serving techniques.		

Unit	Content	Number of Hours
I	Food service Institutions and management - History and development - Definition and importance - Factors affecting development of Food Service institutions - Principles, tools and functions of organizations - Recent trends in food service institutions Various types of food service institutions - Commercial and Non-commercial - Various institutions catering needs to different types of handicapped personnel - Various approaches in the management of Food service Institutions. - traditional- systems approach-MBO and TQM	13
II	Food Service Unit Layout and Design - Steps and different types of Planning, - Various Phases of layout and Various factors influencing layout design - Pointing work centers - Work pattern. Equipments - Classification, Selection and Design - Factors influencing selection of various equipments - Base materials and finishes in food industries - Installation and operation - Care and maintenance of equipments.	10
III	Food production & service - Type of menu, techniques of menu writing - Importance, principles of Menu Planning in Food Service institutions	

	c) Procedures and techniques used in Institutional and Commercial Food Production d) Standardization of recipe, food cost and portion control e) Principles involved in large Scale Cooking and utilization of left over foods in food service institutions. f) Food Service - Formal and informal types - Styles of food services - Centralized and decentralized system of service	12
IV	Material management a) Principles of quantity food purchase - Selection, Methods of buying and Receiving - Methods of delivery and accounting of different foods b) Inventory management - Assessing requirements and Receiving and release of stocks c) Types of Storage, maintenance of food quality in Storage and store record maintenance d) Marketing – definition, function, marketing mix, sales promotion, selling techniques and advertisement Personnel management a) Definition, development and policies b) Sources of recruitment, Selection, Induction, training, development, promotion, motivation and leadership c) Wages and other welfare benefits for personnel d) Labor laws and other legal aspects	13
V	Financial management a) Types of budget, Records for purchase, Receiving, Storage and Production b) Service and income and expenditure record. c) Costing and cost control- - Factors affecting cost control - Importance and Components of Costing - Breakeven Analysis - Determining Selling Price of Food - Checklist for Cost Control Hygiene and sanitation in preparation and serving area a) Personal hygiene b) Types and sources of contamination c) Prevention and safety measures d) Methods of controlling infestation. e) Methods of dish washing	12
	Total Hours	60

Course Outcomes	On completion of the course, students should be able to CO1: Differentiate and contrast the types of foodservice offered in a variety of foodservice settings. CO2: Relate food services technology to design layout and operate industry equipment. CO3: Apply nutritional standards as expected in Food Service Management Fields. CO4: Demonstrate an understanding of human resource management, financial management, and quality control.
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	CO5: Perform essential food production and cost control skills.
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References

Text Books:

- West, B. B. and Wood, L. - Food Service in Institutions, 1979, John Wiley, New York
- Wood, C; Kluge, E, Annssem, P. E- The Anatomy of Food Service Design, 1978, C. B. I. Publishing Co Inc.
- Sethi, M; Malhan, S. - Catering Management; An integrated approach, 1997, New Age International.

Reference Books:

- Livingston, G.E. -Food Service Systems-Analysis, Design and Implementation, 1979, Academic press
- Powers, T. F. and Powers, T. M. - Food Service Operations Planning and Control, 1984, John Wiley & Sons.
- Buchanan, R. D- The Anatomy of Food Service Design, 1975, CAHNERS Publ. Co. Inc.
- Boella, M. J. - Personnel Management in the Hotel and Catering Industry, 1983, Hutchinson, London.
- T. Ramaswamy - Principles of Management, 2014, Himalaya publishing house.
- Hitchcock, M. J - Food Service Systems Administration, 1980, Prentice Hall.

Web Resources:

- <https://theicn.org/management-and/inventory-tracking-and-managment-guide.pdf>
- <https://www.scribd.com/document/119449120/History-of-Food-Service-Industry>
- cte.sfasu.edu › Hospitality and Tourism › Practicum in Culinary Arts

Course Code & Title	18UPCND1A02- Nutrition for Sports and Exercise		
Class	I M.Sc.	Semester	II
Cognitive Level	K-1, K-2, K-3& K-4		
Course Objectives	The Course aims • To enable the students to understand the special nutritional requirements for physical activities related to sports and exercise • To apply the nutritional knowledge on sports to improve the performance of sports persons. • To acquaint with different types of ergogenic aids.		

CORE PAPER - 7 SUSTAINABLE DEVELOPMENT FOR TEXTILES

Course Code: 18UPTAD1C07

Marks: 75 Marks

Course Description:

This course updates the students about the sustainable development and its goals, Eco-friendly processing, Eco-labelling and Eco- standards of textiles, organic method of manufacturing fibres, recycling and up cycling of textiles, ethical manufacturing and corporate social responsibility in fashion and apparel industry.

Course Learning Outcomes (CLOs)

By the End of the Course, Students will be able to

S. No	Outcomes	Domains of Learning
		Cognitive
CLO1	Discuss the concepts of sustainability, Eco friendly chemical processing, Eco Labelling and standards, Organic and sustainable textiles, recycling and up cycling textiles and Corporate Social responsibility in fashion and apparel industry	K2
CLO2	Describe the Raw materials and Waste management for sustainable textiles & clothing	K2
CLO3	Classify : Red listed textile chemicals, their sources and remedies, Eco-friendly dyes and their methods of dyeing	K3
CLO4	Compare: Enzymes and Natural dyes, Chemical and Green manufacturing process	K4
CLO5	Differentiate Organic and recycled textiles with respect to production, process and innovation of fibres	K4
CLO6	Review the latest journals and books for Current information of ethical and environmental issues relating to the textile and fashion industry and report the sustainable practices	K5

Course Learning Outcomes (CLOs)	Programme Outcomes (POs)											
	A.Knowledge & Understanding				B.Practical Skills			C.Transferable Skills				
	A1	A2	A3	A4	B1	B2	B3	C1	C2	C3	C4	C5
CLO1	✓	✓	✓	✓			✓	✓	✓	✓	✓	
CLO2	✓		✓						✓		✓	
CLO3	✓	✓							✓		✓	
CLO4	✓	✓							✓		✓	
CLO5	✓	✓							✓		✓	
CLO6	✓	✓	✓	✓						✓	✓	✓

Unit	Unit Title	Learning Chapters
I	An overview of sustainable development	Introduction: The basic concepts of Sustainable Development; Agreement on sustainable development and governance among UN member countries; Difference between chemical

		&green process in manufacturing, rules/ recommendations for using chemicals, raw materials & waste management for sustainable textiles & clothing
II	Eco-friendly processing, Eco-labelling and Eco- standards	Eco- friendly chemical processing: Modern approaches to eco-friendly wet processing of woven and knitted clothing. Red listed textile chemicals, their sources and remedies. Eco-friendly dyes and their method of dyeing; Energy efficient production methods and processing techniques. Eco- labeling and various eco- standards, enzymes and natural dyes; Energy saving production systems, methods and products;
III	Organic and sustainable textiles	Organic and Sustainable textile: Organic fibre production & Processes; Organic cotton, wool, silk, bamboo, Regenerated fibres- Lyocell, PLA, Recycled fibres- PET. Reduction of carbon footprints in textile processing and finishing;
IV	Recycling and up cycling of textiles	Introduction and importance of recycling and up cycling for growing source of innovative design in the fashion and accessories, processing, production and their applications.
V	Ethical manufacturing and corporate social responsibility	Ethical Manufacturing: Ethical and environmental issues relating to textile and fashion industry. Ethical, Standard practices for sourcing of sustainable fashion clothing and accessory. Corporate Social responsibility in fashion and apparel industry

READING LISTS AND RESOURCES	
Compulsory ★ ★ ★	
1.	Textiles for Sustainable Development Rajesh D. Anandjiwala Nova Publishers, 2007
2.	Ecotextiles: The Way Forward for Sustainable Development in Textiles M Miraftab, A. Richard Horrocks Elsevier, 30-Jan-2007
3.	Sustainable Textiles: Life Cycle and Environmental Impact Richard Blackburn Elsevier, 19-Oct-2009
4.	Handbook of Sustainable Textile Production Marion I Tobler-Rohr Elsevier, 27-Jun-2011
Highly Recommended, not Compulsory ★ ★	
5.	Water Recycling in Textile wet processing, Skelly J. K., Wood head publishing Ltd, UK, 2003.
6.	Handbook of Environmental laws, Acts, Guidelines, Compliances and standards, Vol.1, Trivedi R.K., Enviro Media, India, 1996
Good for Students who have Future Interests ★	
7.	https://ec.europa.eu/europeaid/case-studies/sustainable-textiles-sustainable-development_en
8.	https://www.1millionwomen.com.au/blog/a-z-glossary-of-sustainable-fibres/
9.	https://www.sustainablefashionmatterz.com/what-is-sustainable-fashion
10.	https://smallbusiness.chron.com/legal-ethical-issues-manufacturing-companies-74890.html
11.	http://www.indiantextilejournal.com/articles/FAdetails.asp?id=5518
12.	https://www.un.org/sustainabledevelopment/sustainable-development-goals/
13.	http://www.sulphurdyes.com/Eco%20Friendly%20Chemical%20processing%20of%20Textile%20&%20Environmental%20Management.pdf

PERIYARUNIVERSITY, SALEM
Department of Zoology
M.Sc. Zoology Course - SEMESTER-III

(This syllabus is applicable to the students who are admitted on or after 2020-2021 academic year onwards)

ENVIRONMENTAL BIOLOGY

Course Objectives:

- To understand how interactions between organisms and their physical environment drive the dynamics of individuals, populations, communities, and ecosystems.
- To understand the importance of ecology to issues regarding human welfare.
- To learn about the significance of endemic biodiversity and the need for its conservation.

Course Outcomes:

On successful completion of this course, the student will be able to:

- Understand core concepts and methods from ecological science and its application in environmental problem-solving.
- Understand the importance of ecology to issues regarding human well-being.
- See the connectivity and relevance of ecology to other fields of study.

UNIT I

The Environment: Physical environment; biotic environment; biotic and abiotic interactions. Concept of habitat and niche; fundamental and realized niche; resource partitioning; character displacement. **Ecosystem:** Structure and function; energy flow and mineral cycling (CNP); primary production and decomposition; structure and function of some Indian ecosystems: terrestrial (forest, grassland) and aquatic (fresh water, marine, eustarine).

UNIT II

Pollution: Air pollution: Source, pollutants and effects of CFC, ozone, acid rain - global warming, emission standards, monitoring and control of pollution. **Water pollution:** Sources, effects - sewage and industrial wastes - BOD, COD. Waste water treatment - eutrophication. - biomagnifications. **Oil pollution:** Coastal pollution - Oil Slicks and Spills, Post-gulf war effects. **Land pollution:** Solid waste accumulation, hospital waste and management.

UNIT III

Population and Community Ecology: Characteristics of a population; population growth curves; population regulation; life history strategies (*r* and *K* selection). **Species interactions:** Types of interactions, interspecific competition, herbivory, carnivory, pollination, symbiosis. **Communities:** Nature of communities; community structure and attributes; levels of species diversity and its measurement; edges and ecotones. **Ecological succession:** Types; mechanisms; changes involved in succession; concept of climax.

UNIT IV

Biogeography: Major terrestrial biomes; theory of island biogeography; biogeographical zones of India. **Biodiversity and Conservation biology:** Importance of biodiversity, diversity hot spots, endemic and endangered species - Diversity measurements - Principles of

conservation, major approaches to management, Indian case studies on conservation/management strategy (Project Tiger, Biosphere reserves).

UNIT V

Environmental Stress and Management: Major classes of contaminants. Uptake, biotransformation, detoxification, elimination and accumulation of toxicants. Impact of chemicals on biodiversity. Bioindicators and biomarkers of environmental health. **Disaster Management:** Natural Disasters – Earthquakes, Volcanic Eruption, Landslides, Cyclones, Tsunamis and Droughts. Man Made Disasters- Fires and Forest Fires. Nuclear, Biological and Chemical disaster.

Correlation of Programme objectives with course outcomes

COURSE OUTCOME	PO1	PO2	PO3	PO4	PO5
• To become an ecologist and an environmentalist	✓	✓	✓	✓	
• To become forest conservator	✓	✓	✓	✓	
• To work in pollution control board	✓	✓	✓	✓	

Unit wise programme specific qualification attributes

Unit	Unit Title	Intended Learning Chapters (K1, K2)	Hours of Instruction
I	The Environment	K1, K2	14.4
II	Pollution	K1, K2, K6	14.4
III	Population and Community Ecology	K1, K2, K3, K4, K5	14.4
IV	Biogeography	K1, K2, K3, K4, K5	14.4
V	Environmental Stress and Management	K1, K2, K3, K4, K5	14.4

REFERENCE BOOKS:

- 1) Copsey, J.A. and Black, S.A. 2018. Species Conservation: Lessons from Islands (Ecology, Biodiversity and Conservation). Cambridge University Press.
- 2) Sharma, B.K. 2015. Environmental chemistry. 11th edition, Goel Publishing House, Meerut.
- 3) Dhawan, N.G. and Khan, A.S. 2014. Disaster Management and Preparedness. (Based on the syllabus prescribed by UGC for Disaster Management Education). CBS Publishers. New Delhi.
- 4) Morin, P.J. 2011. Community Ecology. 2nd edition, Wiley-Blackwell Publishers.
- 5) Odum, E. and Barrett, G.W. 2005. Fundamentals of Ecology. 5th Edition, Cengage Publishers.
- 6) Asthana, D.K. and Meera, A. 2001. Environment – Problems and Solution. S. Chand and Company, New Delhi.
- 7) Sharma, B.K. and Kaur, H. 1997. An Introduction to Environmental Pollution. Goel Publishing House, Meerut.
- 8) Edward, I.N. 1996. Applied Ecology and Environmental Management. Wiley-Blackwell Publishers.
- 9) Sinha, R.K. 1996. Biodiversity - Global Concerns. Common Wealth Publishers.

PERIYARUNIVERSITY, SALEM

Department of Zoology

M.Sc. Zoology Course - SEMESTER-III

(This syllabus is applicable to the students who are admitted on or after 2020-2021 academic year onwards)

AQUACULTURE AND FISHERY BIOLOGY

Objectives:

- ❖ Main objective is to provide basic knowledge on cultivation of aquatic animals
- ❖ to provide advanced knowledge about establishment of aquaculture industry.

Outcome:

- ❖ Our stake holders will become the best entrepreneur in the field of aquaculture and fishery industry. Further our students will become a fisher biologist to cultivate genetically engineered fishes in the form of food and ornamental organisms.

UNIT - I

Historical background and present status of aquaculture: purpose and importance of aquaculture. Types of culture systems: Traditional, extensive, semi-intensive, intensive, super-intensive. Characteristic features of cultivable species (Indian major carps, murrels, catfish and tilapia). Selection criteria of cultivable species.

UNIT - II

Types of aquaculture: Freshwater aquaculture, brackish water aquaculture and mariculture, merits and demerits, Design, construction and management of ponds, types of ponds. Control of aquatic weeds and predators.

UNIT - III

Composite fish culture: Mono sex culture, culture of air-breathing fishes, sewage fed fish culture, Fish-cum duck culture: induced breeding of carps: Broodstock management.

UNIT - IV

Fish diseases: Parasitic, protozoan, bacterial, fungal and viral diseases and their control measures. Fish processing and preservation, fishery by-products.

UNIT - V

Inland fisheries: Freshwater, riverine, reservoir, pond and cold-water fisheries. Estuarine and brackish water fisheries and their economics. Fish gears and crafts used in South Indian Fisheries. Marine Fisheries: Sardine, Mackerel, Bombay duck, Sciaenids, Ribbonfish, Silver bellies, Pomfrets, Carangids, Sharks, Shrimps, Prawns, Crabs, Lobsters and Molluscs (Mussels, clams and scallops).

Correlation of Programme objectives with course outcomes

COURSE OUTCOME	PO1	PO2	PO3	PO4	PO5
• To develop aquaculture industry	✓	✓	✓	✓	
• To become researcher in fishery biology	✓	✓	✓	✓	
• Entrepreneur in pearl culture	✓	✓	✓	✓	

Unit wise programme specific qualification attributes

Unit	Unit Title	Intended Learning Chapters (K1, K2)	Hours of Instruction
I	Historical background and present status	K1, K2, K3	14.4
II	Types of aquaculture	K1, K2, K3	14.4
III	Composite fish culture Technique	K1, K2, K3	14.4
IV	Fish diseases & Control	K1, K2, K3, K4, K5	14.4
V	Inland fisheries	K1, K2, K3, K4, K5	14.4

REFERENCE BOOKS:

1. Mikkola H (2017), Fisheries and Aquaculture In The Modern World. Intech publisher
2. Sandra E. Shumway and G. Jay Parsons (2016), Scallops: Biology, Ecology, Aquaculture, and Fisheries (Developments in Aquaculture and Fisheries Science) (3 Ed) Elsevier Science
3. Khanna SS and Singh HR (2014). A Text Book of Fish Biology & Fisheries, 2nd Edition, Publisher: Narendra Publishing House, New Delhi.
4. John E. Bardach, John H. Ryther, William O. Mclarney (2013). Aquaculture: The Farming and Husbandry of Freshwater and Marine Organisms (1st Ed), Wiley India Pvt Ltd.
5. Swain SK (2012), Fisheries and Aquaculture Technology, Swastik Publishers and distributors
6. Moyle PB and Joseph J (2011), Fishes: An Introduction to Ichthyology (5th Ed), Prentice Hall India Learning P. Ltd.
7. Pillay TVR and Kutty MN (2011), Aquaculture: Principles and Practices (2nd Ed), Wiley India Pvt Ltd.
8. Rath RK (2011), Freshwater Aquaculture (3rd Ed), Scientific Publishers Journals Dept.
9. Srivastava C B L and Sushma (2006), A Text Book of Fishery Science and Indian Fisheries, Kitab Mahal, New Delhi.

Hours	L	T	P	C
72	4	0	0	4

Course Objectives

1. To understand the fundamentals and principles of green chemistry.
2. To understand the concepts, principles and reactions of green synthesis
3. To understand the theory and principles of green synthesis techniques.
4. To understand the basic concepts of and principles of treatment methods
5. To explore the green chemistry techniques to various fields

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals and principles of green chemistry.	K2
CO2	Understand the concepts, principles and reactions of green synthesis	K3
CO3	Understand the theory and usage of green synthesis techniques.	K3
CO4	Understand the principles of treatment methods	K3
CO5	Explore the green synthesis techniques to various fields	K2

Unit I Introduction

The need for green chemistry – Twelve principles – Atom economy – Scope for green chemistry – Inception and awards.

Unit II Solvent free reactions

Exploration of solvent free reactions – Microwave assisted organic synthesis – Functional group transformations – Protection and deprotection reactions, Condensation reactions, reduction and oxidation.

Ionic liquids – Synthesis of ionic liquids – Applications in organic synthesis.

Unit III Eco-friendly green Techniques

Biocatalysts – Modified biocatalysts – Transition metal catalysts – Supported metal catalysts.

Eco-friendly synthesis and reactions of unsaturated nitroalkanes.

Heterogenised reactions – Mineral solid catalysed reactions – Solid supported catalysts – Super critical fluids.

Unit IV Alternative Treatment Technologies

Oxidation at ambient conditions for wastewater treatment – Photocatalytic reactions – Electrocatalytic reactions – Fentons chemistry – Hybrid processes. Chemical methods for dye removal – Oxidative processes – physical treatments – Biological treatments.

Unit V Exploration of Green Chemistry

Trace element speciation by hyphenated techniques – tools for analytical speciation.
Green chemicals – Prospects and future in designing new drugs.
Designing of next generation agrochemicals from nature.

REFERENCE BOOKS:

1. Rashmi Sanghi and M.M.Srivastava (Eds.), **Green Chemistry – Environment friendly alternatives**, Narosa Publishing house, New Delhi, 2003.
2. P.T.Anastas and J.C.Warner, **Green Chemistry: Theory and Practice**, Oxford Science Publications, Oxford, 1998.
3. P.Tundo and P.T.Anastas(Eds.) **Green Chemistry: Challenging Perspectives**, Oxford University Press, Oxford, 2000.
4. P.T.Anastas and T.C.Williamson(Eds.) **Green Chemistry: Frontiers in Chemical Synthesis and processes**, Oxford University Press, Oxford, 1985.
5. A.S.Matlach, **Introduction to Green Chemistry**, Marcel Decker Inc.. New York,

2001.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	S	M
CO2	S	S	S	M
CO3	S	S	S	M
CO4	S	S	S	S
CO5	S	S	S	M

S- Strong; M-Medium.

PAPER- II - ENERGY RESOURCES AND CONVERSION TECHNIQUES

OBJECTIVES

1. To study the energy scenario.
2. To study the various energy conversion system.
3. To learn about various solar energy conversion techniques.
4. To learn wind energy systems.
5. To know about other renewable energy sources.

UNIT I –GLOBAL AND INDIAN ENERGY SCENARIO

Role of energy in economic development and social transformation - Energy sources - overall Energy demand and availability - Energy consumption in various sectors and its changing pattern - Depletion of energy sources

Energy resources & Consumption-Commercial and noncommercial forms of energy- fossil fuels- renewable sources in India- Sector wise energy Consumption - impact of energy on economy – Need for use of new and renewable energy sources-present status and future of nuclear and renewable energy -Renewable Energy-Power sector reforms-restructuring of energy supply sector-energy strategy for future.

UNIT- II ENERGY CONVERSION SYSTEM

Conventional energy conversion cycles - Reversible and irreversible cycles – Thermodynamics analysis of Carnot – Stirling – Ericsson – Otto – Diesel – Dual – Lenoir – Atkinson – Brayton – Rankine-Thermoelectric Converters – Thermionic converters – MHD – Ferro electric converter – Nernst effect generator

UNIT-III SOLAR ENERGY

Solar radiation at the earth's surface – solar radiation measurements – estimation of average solar radiation - solar thermal flat plate collectors - concentrating collectors – solar thermal applications - heating, cooling, desalination, drying, cooking– solar thermal electric power plant - principle of photovoltaic conversion of solar energy-types of solar cells - Photovoltaic applications: battery charger, domestic lighting, street lighting, water pumping-solar PV power plant – Net metering concept.

UNIT-IV WIND ENERGY

Nature of the wind – power in the wind – factors influencing wind – wind data and energy estimation - wind speed monitoring - wind resource assessment - Betz limit - site selection - wind energy conversion devices - classification, characteristics, applications – offshore wind energy - Hybrid systems - safety and environmental aspects – wind energy potential and installation in India - Repowering concept.

UNIT IV - OTHER TYPES OF ENERGY

Biomass resources and their classification - Biomass conversion processes – thermo-chemical conversion- bio diesel production – urban waste to energy conversion -

ocean energy resources - principle of ocean thermal energy conversion (OTEC) - ocean thermal power plants - ocean wave energy conversion - tidal energy conversion – small hydro - geothermal energy - geothermal power plants – hydrogen production and storage - Fuel cell – principle of working - various types - construction and applications.

Outcomes

Upon completion of this course, the students will be able to,

1. Understand the current energy scenario of global as well as India.
2. Knowing various methods of energy conversion techniques.
3. Understand solar energy and conversion techniques.
4. Aware about wind energy systems.
5. Understand the various renewable energy sources.

REFERENCES:

1. J. Goldemberg, T.B. Johansson, A.K.N. Reddy and R.H. Williams: Energy for a Sustainable World, Wiley Eastern, 1990.
2. World Energy Resources : Charles E. Brown, Springer, 2002.
3. Sukhatme, S.P., Solar Energy, Tata McGraw Hill, 1984.
4. Twidell, J.W. and Weir, A., Renewable Energy Sources, EFN Spon Ltd., 1986.
5. Kishore VVN, Renewable Energy Engineering and Technology, Teri Press, New Delhi, 2012.
6. Peter Gevorkian, Sustainable Energy Systems Engineering, McGraw Hill, 2007.
7. Kreith, F and Kreider, J. F., Principles of Solar Engineering, McGraw Hill, 1978.
8. Godfrey Boyle, Renewable Energy, Power for a Sustainable Future, Oxford University Press, U.K, 1996.
9. Veziroglu, T.N., Alternative Energy Sources, Vol 5 and 6, McGraw Hill, 1990.
10. Anthony San Pietro, Biochemical and Photosynthetic aspects of Energy Production, Academic Press, 1980.
11. Bridgwater, A.V., Thermochemical processing of Biomass, Academic Press, 1981.
12. Bent Sorensen, Renewable Energy, Elsevier, Academic Press, 2011.

CO	PO										PSO				
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
1	H	L	-	-	-	M	M	M	L	M	-	-	M	L	M
2	M	L	-	L	M	L	L	-	M	-	-	-	H	-	L
3	H	L	M	L	L	H	-	-	L	-	-	-	H	L	-
4	M	-	-	-	M	-	L	L	L	-	-	-	M	M	M
5	M	L	L	L	L	H	L	-	-	-	-	-	M	L	L

Paper II

ADVANCES IN ENVIRONMENTAL SCIENCE

Course code: 18MPDEVS02

4 Credits

Course Objectives:

The purpose of this course is to equip students the advanced concepts of Environmental Science such as toxicology risk assessment techniques, global environmental issues, natural resource management and ethical policies.

Course Outcomes

On the successful completion of the course, students will be able to

- CO1** Understand the advancement and recent developments in the field of Environmental Science.
- CO2** Know global environmental issues and methods for their mitigation
- CO3** Understand the significance of natural resources and their conservation
- CO4** Know various strategies for environmental remediation
- CO5** Know the principles of environmental ethics and policies.
- CO6** Think about intellectual properties rights (IPR) and patents
- CO7** Practice conservation of natural resources
- CO8** Understand the Advanced GIS environmental applications

Mappings of course outcomes with programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	*	*	*	*	*	*	*	*
CO2		*	*	*		*	*	*
CO3		*		*	*	*	*	*
CO4			*	*		*	*	*
CO5	*			*		*	*	*
CO6	*		*	*		*	*	*
CO7		*				*	*	*
CO8		*				*	*	*

UNIT I - Environmental Toxicology and Risk Assessment

Toxicoinformatics – Biomonitoring of environmental contaminants - *Caenorhabditis elegans* as bioindicator of environmental pollutants – Aquatic Toxicology - Pesticides, heavy metals, hydrocarbons, Volatile organic compounds and radiation – Molecular Oncology and Carcinogenesis - Reproductive and Endocrine Toxicology – Xenobiotics – Risk Assessment Procedures.

UNIT II - Global Environmental Issues and Impact Assessment

Climate change, Natural hazards and disasters - Environmental Impact Assessment (EIA) - General guidelines for the preparation of Environmental Impact Statement (EIS) - Scope and types of environmental audit - Environmental Management Plan (EMP) - Environmental quality assessment – ISO standards and certification - Environmental Policies in India - International Conventions, Protocols and Treaties - *International Organizations for Conservations of Environment*: UNEP, WWF, UNESCO, IGBP, IUCN, GEF.

UNIT III - Environmental Contaminants and Remediation Technologies

Organic and inorganic environmental pollutants – Soil and water quality parameters – Physical, chemical and biological remediation technologies – Bioremediation – Mycorrhizoremediation – Phytotechnologies used for remediation of contaminated terrestrial and aquatic environments – Advantages and Limitations of remediation technologies

UNIT IV - Natural Resources and Management

Status and exploitation of water, land, forest, mineral, energy and wild life resources - Sustainable use of resources – CO₂ sequestration - Renewable and non-renewable energy resources - Energy recovery from wastes, Energy conservation policies - Energy balance and energy audit - Principles of remote sensing, GIS and its environmental applications.

UNIT V - Environmental Ethics and Intellectual Property Rights

Composition of Institutional evaluation Ethical Committee (IEC) – GM crops and its environmental issues - *Environmental ethics*: Stewardship ethics and Lifeboat ethics of Garret Hardin - *Intellectual Property Right (IPR)*: Definition – *Types of Intellectual Property Right (IPR)*: Patents, Copyrights, Industrial Design Rights, Trademarks, Trade Dress and Trade secrets - Case studies of patents with special reference to basmati rice, turmeric and neem – Ecomark – Patent procedure in India

Reference Books

1. Amiard-Triquet C, Amiard J-C and Rainbow PS (2013) Ecological Bio markers – Indicators of Ecotoxicological Effects, CRC Press, Boca Raton, FL, USA
2. Aswathanarayana U (2012) Natural Resources: Technology, Economics and Policy, Taylor and Francis, UK.
3. Botkin DB and Keller EA (2012) Environmental Science, 8th edition, Wiley India Pvt. Ltd., New Delhi
4. Brenner S, The genetics of *Caenorhabditis elegans*. Genetics, 1974; 77: 71-94. [PubMed:4366476]
5. Dannreuther R and Ostrowski W (2013) Global Resources Conflict and Cooperation, Palgrave Macmillan, USA.
6. Grebner DL, Bettinger P and Siry A (2013) Introduction to Forestry and Natural Resources, Academic Press, UK.
7. Kreipe M (2010) Genetically Modified Food - Trade Regulation in view of Environmental Policy Objectives, Diplomica Verlag, GmbH, Germany
8. Ostrom LT and Wilhelmsen CA (2012) Risk Assessment – Tools, Techniques and their Applications, John Wiley & Sons Inc., NJ, USA.
9. Steinberg P (2013) High-Throughput Screening Methods in Toxicity Testing, John Wiley & Sons Inc., USA
10. Thomson JA (2006) GM Crops – The Impact and Potential, CSIRO Publishing, Australia.
11. Venkateswar Rao G (2012) Intellectual Property Rights: Patent Laws in India, SSDN Publishers & Distributors, New Delhi.
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13. Wu Y, Carroll JJ and Du Z (2011) Carbon Dioxide Sequestration and Related Technologies, John Wiley & Sons Inc., USA.
14. Yoe C (2012) Principles of Risk Analysis – Decision making under uncertainty, CRC Press, Boca Raton, FL, USA.

Web References

1. <http://www.thegef.org/gef/>
2. <http://envfor.nic.in/divisions/iass/eia/Cover.htm>
3. <http://www.eia.gov/>
4. <http://www.epa.gov/compliance/nepa/eisdata.html>
5. <http://moef.gov.in/citizen/specinfo/emp.html>
6. http://www.nou.edu.ng/noun/NOUN_OCL/pdf/pdf2/ESM%20341.pdf
7. <http://www.cf.ac.uk/biosi/staffinfo/kille/Lecturers/molbiol1.pdf>
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PAPER – II: ADVANCES IN MICROBIOLOGY

Course Objectives

The course contents are designed to gain knowledge about the various advances that have been made in the field of microbiology with regard to the instrumentation used in research and advanced science knowledge with regard to microbial technology, secondary metabolites, clinical microbiology and microbial pharmaceuticals.

Course Outcome

At the ends of the course, learners will be able to

1. Gain knowledge to the advanced microbial techniques and effectively learn the applications of the instruments.
2. Acquire knowledge of the various secondary metabolites production and their biological applications.
3. Understanding the importance of various emerging diseases and its diagnostic methods.
4. The students will be able to know about the advanced developments in Microbiology.

UNIT - I

Introduction – Development of microbiology and the early discoveries - Isolation of different types of bacteria – fungi – actinobacteria – cyanobacteria. Microbial taxonomy: Definition, systematics, Nomenclature rules and identification, Microbial respiration and fermentative pathway - respiratory metabolism, Fermentation of carbohydrates - homo and hetero lactic fermentation. Bioenergetics, Cell division - endospore - structure and properties.

UNIT - II

Current trends: Exploration of bioactive compounds from extremophiles. Bioremediation, Biosensors, Biofuel, Biofilms. Remote sensing microbiology, Microbial communication - Quorum Sensing. Barcoding of microbes - application in clinical and industrial fields, Microbial techniques: Confocal microscopy, DNA Microarray for comparative and Evolutionary genomics: Flow cytometry, Atomic flame photometry, Plasma emission spectroscopy, Infra-red spectrophotometry. Tandem mass spectroscopy, Electron Spin Resonance spectroscopy, MOLDI-TOF mass spectrometry.

UNIT - III

Microbes and Health: GLP, laboratory and hospital acquired infection. Emergence of MDR and XDR microbes. Harmful microbes and biological weapons. Automated diagnostic method. Recombinant vaccines. Environmental aspects of emerging diseases. Microbial pharmaceuticals and biotechniques: Drug discovery and design, British and Indian Pharmacopoeia, Marine microbial antibiotics, Microbial therapeutic enzymes, Microbial pigments, Single cell proteins. Microbial Products and their bioprocesses.

UNIT - IV

Pharmacokinetics and pharmacodynamics - Routes of drug administration- volume of distribution - biotransformation - Phase I and Phase II reactions - bioavailability - excretion of drugs and their metabolites as defined by Hendersson Hassle Batch equation. Adverse drug reactions. Principles of toxicity, evaluation and determination of LD50, ED50 and therapeutic Index.

UNIT - V

Microbial Technology: Microbes in nanotechnology, Nanoscience in biomedical application: Nanosensors in diagnosis - Nanorobotics in surgery Nanotechnology in tissue regeneration - Nanotechnology drug targeted delivery. Applications in tissue engineering and therapeutics. Biopolymers, Biosurfactants, Biofertilizers, Biopesticides, Bioluminescence, Genetically modified organisms. Gene silencing - Gene knockouts and gene therapies, antisense technologies. Gene therapy, Stem cell therapy. Carbon sequestration by microbes.

References

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4. Chakraborty, P. (2003) *A text book of Microbiology*, 2nd Edition, Published by New central book agency (P) Ltd., Kolkata.
5. Glick, B.R. (2003) *Molecular Biotechnology - Principles and Applications of Recombinant DNA*, 3rd Edition, ASM Press, Washington DC.
6. Joginand, S.N. (2004) *Gene Biotechnology*, Himalaya Publishing house, Mumbai.
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2. http://www.dli.gov.in/rawdataupload/upload/insa/INSA_1/2000c4de_31.pdf
3. http://www.gonda.ucla.edu/bri_core/confocal.htm
4. <http://www.biosci.ohio-state.edu/-mgonzalez/micro521.html>
5. <http://bioweb.uwlax.edu/Genweb/Microbiology/General/general.html>

6. <http://www.medunich.edu/TAMC/LINKS.HTML>

7. <http://acs.ucalgary.ca/-browder/transgeni.html>.

Course Outcomes

On the Successful completion of the course students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Gain knowledge to the advanced microbial techniques and effectively learn the applications of the instruments.	K1, K2 & K3
CO2	Acquire knowledge of the various secondary metabolites production and their biological applications.	K4
CO3	Understanding the importance of various emerging diseases and its diagnostic methods.	K4
CO4	The students will be able to know about the advanced developments in Microbiology.	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	S	S	S	S
CO3	M	S	S	S	S
CO4	S	M	S	S	S

S – Strong; M- Medium

Course Code & Title	18UPCND2C02 - ADVANCES IN CLINICAL NUTRITION AND DIETETICS
Cognitive Level	K-1, K-2, K-3, K-4, K-5 &K-6.
Course Objectives	The Course aims • To enable the students to understand formal nutrition care process along with overview of nutrigenomics. • To acquire skill on Clinical assessment techniques and enhance the quality of health. • To relate the diet and drug interactions for sustainable nutritional status.

UNITS	Topics Details
UNIT I	Nutrigenetic and nutrigenomics a) The human genome projects-introduction, clinical applications b) Geno type and nutrition assessment c) Genetic fundamentals-nutrigenetic and nutrigenomics, genetic basics, mode of inheritance and penetrance-mendelian inheritance, mitochondrial inheritance d) Disease at chromosomal level-epigenetics and genomic imprinting e) Disease at molecular level-genetic metabolic disorders, sex-linked disorder f) Disease at mitochondrial level g) Genetics and nutrition therapy -nutritional genomic influences on metabolic process, nutritional genomic influences on gene expression, genetic variability.
UNIT II	Screening of dietary and clinical data a) Nutritional imbalance, b) Nutritional screening, c) Nutritional assessment- Medical History, Social history, Medication history, Diet history, Nutrient intake analysis, Anthropometry d) Nutrition focused physical examinations -Physical signs, immune function, hand grip dynamometry, biochemical analysis e) Classifying malnutrition
UNIT III	Assessment of laboratory data a) Definitions and usefulness of nutrition laboratory data- specimen types, assay types b) Nutrition and interpretation of routine medical laboratory test-clinical chemistry panels, complete blood count, urine analysis c) Assessment of hydration status d) Assessment for protein calorie malnutrition-hormonal and cell mediated response to stress, nitrogen balance, hepatic transport proteins, c-reactive proteins, creatinine, immunocompetences e) Laboratory data for nutritional anaemia- classifications of anaemia, iron deficiency anaemia, macrocytic anaemia associated with B-vitamin deficiencies f) Markers of malabsorption-fecal fat, fat soluble vitamins g) Chronic disease risk assessment -lipid indices of cardiovascular risk, inflammation, indices of oxidative stress, antioxidant status, markers of oxidative stress.

UNIT IV	Effects of food and drug interactions - Pharmacological aspects of food drug interactions -pharmaco dynamics - Risk factors for food drug interactions-phamaco-genomics - Effects of food on drug therapy -drug absorption, medical entral nutrition interactions, drug distributions, drug metabolism and drug excretion - Effects of drug on food and nutrition-nutrient absorption, nutrient metabolism, nutrient excretion - Modification of drug action by food and nutrients - Effects on drug on nutritional status -oral, taste and smell, GI effects, appetite changes, organ system toxicity, glucose levels - Excipients and food drug interactions - Medical nutrition therapy
UNIT V	Nutrition for sports and exercise performance - Energy production-ATP, aerobic and anaerobic pathway, energy continuum - Fuel for contracting muscles- sources of fuel, intensity, duration, effects of training - Nutritional requirements of exercise - Weight management - Macronutrients -carbohydrate, protein, fat - Micronutrients -vitamins and minerals - Fluids -fluid balance, daily fluid needs, fluid replacements, fluid absorption - Other considerations -alcohol, caffeine - Ergogenic aids

Course Outcomes	On completion of the course, students should be able to CO1: Elucidate the relationship between gene and nutrition. CO2: Acquaint on nutritional screening techniques and their purposes. CO3: Describe the diagnostic test. CO4: Appraise on food and drug interactions CO5: Apply the art and science of sports nutrition for the wellness of sports personnel.
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COs Consistency with POs and PSOs

CO/PO/PSO	PO							PSO			
	1	2	3	4	5	6	7	1	2	3	4
CO1	S	S	S	S	L	M	M	S	S	S	S
CO2	S	S	S	S	L	L	M	S	S	S	S
CO3	S	S	S	S	S	L	M	S	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	S	S	L	S	S	S	S	S

*S- Strong Correlation, M- Medium Correlation, L- Low correlation, N- No correlation

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	5	5	10	10
Apply	10	10	15	15
Analyse	10	10	10	10
Evaluate	10	10	10	10
Create	10	10	20	20
Total	50	50	75	75

References

Text Books:

- Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 2001, Oxford Publishing Company.
- Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco
- B. Srilakshmi- Dietetics, 2019, 8th Edn, New Age International Pvt. Ltd. New Delhi.

Reference Books:

- Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 10th Edition, 2001, W.B. Saunders Company London.
- Passmore P. And M.A. East Wood - Human Nutrition and Dietetics, Churchill Living Stone.
- Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics , 3 edition 2009, Sterling Publishers Pvt. Ltd
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, And A.E., Carwick: Normal And Therapeutic Nutrition, 17th Edn, Macmillan Publishing Company.
- Shills and Young- Modern Nutrition In Health And Disease, 2012, Lippincott Williams and Wilkins.
- Bennion M.: Clinical Nutrition, John Wiley & Sons.
- Whitney, E. N. and C. B. Cataldo, Understanding Normal and Clinical Nutrition, 1983, West Pub.
- Williams S. R. Essentials of Nutrition and Diet Therapy, 4th edn, 1986, Mosby College Pub. S. Louis.

Web Resources:

- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>
- krishikosh.egranth.ac.in

18COMC16	E-Commerce	Category	L	T	P	Credit
		Core		---		4

Preamble: The students can understand the way of doing business through computers and its advantages.

Course Outcome: The students can apply and use online and social networking advantages to fulfill the objectives their business

CO Number	CO Statement	Knowledge Level
CO1	To know the basics of E-Commerce	
CO2	To know about Online and Social Networking	
CO3	To learn E-Commerce Business Models	
CO4	To recognize about Electronic Payment Systems	
CO5	To know legal and societal issues in E-Commerce	

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	M	M	M	M	M
CO3	M	M	S	S	M
CO4	S	S	S	S	S
CO5	M	M	M	M	M

S-Strong M-Medium L-Low

E-COMMERCE – 18COMC16

Unit I – To know the basics of E-Commerce

Introduction to E-Commerce- Framework, Architecture, Benefits and impact of e-commerce, the anatomy of e-commerce applications – e-commerce consumer applications – e-commerce organisational applications – e-commerce in India – prospects of e-commerce – e-advertising & marketing in India.

Unit II – To know about Online and Social Networking

Multi-media & E-commerce, push-pull technologies, alternatives methods of customer communication. Online auctions – e-commerce portals – social network and online communities environment of e-commerce

Unit III – To learn E-Commerce Business Models

E-commerce business models – major business to consumer(B2C) business models, major Business to Business (B2B) business model, business models in emerging e-commerce areas, how the internet and the web change business: strategy, structure and process – The internet technology background – The internet today – The future infrastructure – The world wide web – The internet and the web: Features.

Unit IV – To recognize about Electronic Payment Systems

Electronic payment system: special feature required in payment system for e-commerce, types of e-payment system – e-cash & Currency servers – e-cheques – credit cards – smart cards – electronic purses & debit cards – electronic billing presentment and payment.

Unit V – To know legal and societal issues in E-Commerce

Legal, ethical and tax issues – legal environment, use and protection – online crime – ethical issue – security issue in e-commerce – security risks of e-commerce –exposure of resources – types of threats – source of threats – security tools risk – management approach – transaction security.

Note: Question Papers Consists of 50% theory, 50% Practical.

Suggested Readings:

1. E-Commerce :Business, Technology, Society, Kenneth C.Laudon, 4th edition, Pearson
2. E-Commerce: an Indian perspectives, S.J.Joseph, PHI
3. Jeffrey F.Rayport& Bernard J.Jaworski: Introduction to E-commerce, TMH, 2003.
4. Kalakota& Winston: Frontiers of E-commerce, Pearson Education, Mumbai, 2002.
5. David Whiteley: E-Commerce- Strategy technologies and Applications, Tata Mac-Graw Hill, New Delhi, 2000.
6. C.S.V.Murthy: E-Commerce-Concepts, Models & Strategies, Himalaya Publishing house, Mumbai, 2003

Practical

1. E-Trading
2. Electronic business transaction
3. E-Mail communication
4. Electronic payments
5. Uses of Gateways

Course Name	Food Processing I	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC02	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	II

COURSE OUTCOMES:

On completion of the course, the students will be able to

CO1:	Summarize and understand the processing techniques available for food items and utilization of by-products
CO2:	Differentiate milling techniques and describe fermented products
CO3:	Describe the extraction methods and identify the uses of hydrogenated products
CO4:	Interpret microencapsulation techniques

Mapping of COs with POs, PSOs

COs / Pos&PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	3	2	3	3	3	3
CO2	3	2	3	2	3	3	2	3	3	3	3
CO3	3	2	3	2	3	3	2	3	3	3	3
CO4	3	2	3	2	3	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Cereals	To identify the processing techniques and utilization of by products	10
Millets	To distinguish the milling methods	10
Pulses and Legumes	To recall the utilization of fermented food products	12
Nuts and oilseeds	To interpret the usage of by products	10
Spices and Condiments	To understand the manufacturing of spice oil and its utilization	12
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN:

S. No.	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
UNIT I –Cereals					
1.	Paddy and its handling – cleaning, drying and equilibrium moisture content	CO1	K2, F	Visit any rice processing industry and submit the report	K2, S2
2.	Rice – milling, parboiling, polishing and ageing	CO1	K2, C		
3.	Byproducts of milling and grades of rice	CO1	K2, C		
4.	Rice products – quick cooking rice, parched rice, instant rice, canned and frozen rice, puffed rice and extruded rice, shredded rice	CO1	K2, F	Visit to a super market and gather information on the availability of rice products and present the data	K4,S2
5.	Baby foods, rice cake, rice crispies and rice starch	CO1	K1, F		
6.	Wheat – milling, by-products of milling – atta,	CO1		Collect pictures or	K1, S1

	maida, rava, bran and germ		K2, C	videos about milling of wheat and display it in the class room	
7.	Wheat products – bread, biscuits, cookies, pasta and noodles	CO1	K2, F	Visit to a super market and gather information on the availability of wheat products and present the data	K4, S2
8.	Corn, oats and barley – milling, by-products and flaked products	CO1	K2, F		
9.	Malting of cereals	CO1	K2, C		
	UNIT II – Millets				
10.	Millets – milling	CO1	K2, C	Conduct a survey on the awareness and utilization of millets in your locality	K4, S3
11.	By-products of milling	CO1	K2, C		
12.	Processed products from millets	CO1	K2, C		
	UNIT – III Pulses and Legumes				
13.	Milling – wet & dry milling; commercial milling	CO2	K2, C	Pictorial representation of milling techniques	K1, S1
14.	Dehulling – methods; pretreatment – wet treatment, soaking, chemical treatment, dry treatment, oil and heat treatment	CO2	K2, C		
15.	Germination, fermentation, roasting, parching, extrusion, parboiling, agglomeration	CO2	K2, C		
16.	Fermented products – idli, dosa, soya curd, textured vegetable protein, soya sauce, tempeh, natto and miso; quick dhal and instant dhal	CO2	K2, C	Assess the frequency of purchase of fermented products in your house	K4, S2
	UNIT – IV Nuts and oilseeds				
17.	Post harvest technology – handling, drying, storage, grading, pretreatments – cleaning, dehulling, size reduction and flaking, heat treatment	CO3	K2, C	Industrial visit to oil processing mill and collect data on modern milling techniques and traditional milling techniques	K4, S1
18.	Oil extraction- rendering, traditional methods – ghani, power ghani, hydraulic press, expellers	CO3	K2, C		
19.	Solvent extraction – principle, pretreatment, extraction and desolventisation	CO3	K2, C		
20.	Refining of oil – degumming, neutralization, bleaching, filtration, deodorization and winterization	CO3	K2, C	Conduct a survey in the housing area or your college or dept to assess consumer's awareness on by products and its utilization	K4, S2
21.	Hydrogenation and products based on hydrogenation	CO3	K2, C		
22.	High protein products – oilseed cakes, protein concentrated and isolates	CO3	K2, C		
	UNIT – V Spices and Condiments				
23.	Cleaning, grading and milling of spices	CO1	K2, C	Visit a market and collect pictures of spice products. Identify the uses of spice oil in Indian cookery	K5, S4
24.	Preparation of spice powders and spice oil	CO1	K2, C		
25.	Oleoresins and microencapsulated products	CO4	K2, C		

Note: Content beyond syllabus if any may be included.

REFERENCES

TEXTBOOKS	
1	Srilakshmi B, Food Science, New Age International P Limited Publishers, New Delhi, 2018
2	Chakraverty, Post Harvest Technology of Cereals, Pulses and Oilseeds, Oxford and lbh Publishing, 2019
3	Avanita Sharma, Textbook of Food Science and Technology, CBS Publication, 2017
REFERENCE BOOKS	
1	The Complete Book on Spices and Condiments (with Cultivation, Processing and Uses), Asia Pacific Business Press Inc. 2013
2	Richard P Hamilton and Wolf Hamm, Edible Oil Processing, Oxford University Press, 2004
JOURNALS AND DOCUMENTS	
1	Journal of Food Processing and Preservation,
2	International Journal of Food Properties
3	Journal of Spices and Aromatic Crops
4	Ecoursesonline.iasri.res.in
5	www.fao.org

Course Name	Core III - Food Processing II (Technology Of Fruits And Vegetables, Sugar And Salt)	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC03	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1:	Recognize Moisture content during processing and minimally processed product
CO2:	Distinguish the types, preservation in various methods and SOP
CO3:	Differentiate the types and standard methods
CO4:	Identify the chemicals, methods and products
CO5:	Distinguish the types and preparation of sugar products
CO6:	Distinguish the types, role and preparation of salt

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3
CO5	3	3	2	3	2	3	2	3	3	3	3
CO6	3	3	2	3	2	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Fruits and Vegetables	To know about the moisture content, methods, processing of the products.	4+0+1=05
Preservation Methods	To know about the Canning and preservation techniques used by the varies Temperature	6+1+1=08
Preservation by Drying and Dehydration	To identify the types, methods and Differentiate by drying and Dehydration	7+1+1=09
Preservation by Sugars	To study about the Quality, types, methods and preparation by using the Standards	9+1+2=12
Preservation by Chemicals, Salts and Acids	To know about the permitted chemicals, types and methods of the products	8+1+2=11
Sugar	To identify the types and preparation methods of sugar and its products	4+1+0=05
Salt	To differentiate the types and composition of Brine solution	3+0+1=04
Total Hours of Instruction		54 (18x3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /	Psychomotor domain activity	Psychomotor domain level
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			KD		
UNIT 1: Fruits and Vegetable Processing					
1.	Water activity and fruit spoilage	CO1	K1, F	Exemplify the water content and Water activity of foods in our routine diet	K5, S1
2.	Intermediate moisture fruits and vegetables – principle, methods and products.	CO1	K1, F	List out the Intermediate moisture fruits and vegetables	K5, S1
3.	Minimally processed fruits and vegetables-Selection criteria, Temperature, Storage Period	CO1	K2, P	Display Minimally processed fruits and vegetables and determine its Selection criteria, Temperature and Storage Period	K3, S1
UNIT 2: Preservation Methods					
4.	Preservation by use of high temperature- Pasteurization, sterilization, canning – principles, steps involved and advantages, defects in canning and spoilage of canned foods.	CO2	K2, C	Prepare a scrap book of Preservation process by using high temperature	K6, S3
5.	Preservation by use of low temperature - Refrigeration – principles, refrigerants, changes in refrigerated food, factors affecting the quality of refrigerated products, spoilage of refrigerated products and maintenance of refrigerator.	CO2	K2, C	Prepare a scrap book of Preservation process by using low temperature	K6, S3
6.	Preservation by use of very low temperature- Freezing – principle and steps in freezing, methods and types of freezing, advantages and disadvantages, frozen products.	CO2	K2, C	Prepare a scrap book of Preservation process by using very low temperature	K6, S3
UNIT 3: Preservation by Drying and Dehydration					
7.	Preservation by drying and dehydration – difference between drying and dehydration,	CO2	K2, C	Differentiate drying and dehydration of the products	K4, S2
8.	preparation of food for drying, methods of drying, types of drier, methods of dehydration,			Prepare dried or dehydrated product using fruits and vegetables	K4, S2
9.	Dried and dehydrated products.			Exemplify the dried foods in our routine diet	K5, S1
UNIT 4: Preservation by Sugars					
10.	Preservation by sugar – principle of gel formation, method of preparation, FSSAI,	CO3	K2, P	Differentiate the Preservation of sugar products by using various	K4, S2

	AGMARK, and ISO standards for Jam, Jelly, marmalade, candy, preserve,			standards	
11.	Unfermented fruit beverages – Squash, RTS beverages, cordial, syrup, fruit Juice concentrate.	CO3	K2, P	Design the pamphlet for preparation methods of Unfermented fruit beverages	K5, S4
UNIT 5: Preservation by Chemicals, Salts and Acids					
12.	Preservation by chemicals – principle, permitted chemical preservative in food processing, clarification of fruit Juices	CO4	K2, P	Systematic literature review presentation on permitted chemical preservative in food processing	K2, S2
13.	Application in value added fruits and vegetable products.	CO4	K2, P	Criticize on different value added fruits and vegetable products.	K4, S4
14.	Preservation by salts and acids – principle, pickle, sauce and ketch up.	CO4	K2, P	Sketch the types of pickle, pickle, sauce and ketch up available in the market	K3, S1
Unit-6: Sugar					
10.	Sugars- types and sources	CO5	K1, F	Tabulate the kinds of sugar as per its sources	K3, S3
11.	Methods of preparation of sugars, jaggery, khandsari, raw and refined sugar, principles of sugar cookery.	CO5	K2, P	Differentiate the methods of sugar	K4, S2
12.	Confectionery - history, types, classification, role of sugar in confectionery, role of chemical additives in confectionery.	CO5	K1, F	Differentiate the role of sugar in confectionery, role of chemical additives in confectionery	K4, S2
13.	Preparation of caramel, toffee, candy, chewing gum, bubble gum and chocolates.	CO5	K2, P	Infer about the crystalline and non-crystalline candies in the market	K4, S3
Unit-7: Salt					
14.	Types of salt, uses of salt	CO6	K1, C	Interpret on each type of salt	K5, S4
15.	Brine, preparation of brines	CO6	K1, C	Demonstrate the preparation of brine Solution	K3, S1
16.	Composition of brines used in canning, pickling and curing.	CO6	K1, C	Demonstrate the any one product Preservation by salts and acids	K3, S1

REFERENCES

TEXTBOOKS	
1	Fellows P.J., (2017), Food Processing Technology – Principles and Practices, Fourth Edition, New Woodhead Publishers, USA.
2	Susan azam ali (2008) principles of post harvest Handlig, Storage and processing of fruits and vegetables, First Edition, Food and agriculture Organization of the United nations
3	Panda H (2013), The complete book on Fruits, Vegetales and Food processing, First Edition, NIIR Project Consultancy service

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1	Raina et.al. (2003), Basic Food Preparation-A complete Manual, 3rd Ed, Orient Longman Pvt. Ltd.
2	Manay, S. & Shadaksharaswami, M. (2004), Foods: Facts and Principles, New Age Publishers.
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1	Journal of Food Processing and Preservation, Wiley- Blackwell
2	Journal of Food Process Engineering, Wiley- Blackwell
3	Trends in Food Science and Technology, Elsevier
4	Fruits and Vegetable journals- OMICS International

Course Name	Core III - Food Processing II (Technology Of Fruits And Vegetables, Sugar And Salt)	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC03	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1:	Recognize Moisture content during processing and minimally processed product
CO2:	Distinguish the types, preservation in various methods and SOP
CO3:	Differentiate the types and standard methods
CO4:	Identify the chemicals, methods and products
CO5:	Distinguish the types and preparation of sugar products
CO6:	Distinguish the types, role and preparation of salt

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3
CO5	3	3	2	3	2	3	2	3	3	3	3
CO6	3	3	2	3	2	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Fruits and Vegetables	To know about the moisture content, methods, processing of the products.	4+0+1=05
Preservation Methods	To know about the Canning and preservation techniques used by the varies Temperature	6+1+1=08
Preservation by Drying and Dehydration	To identify the types, methods and Differentiate by drying and Dehydration	7+1+1=09
Preservation by Sugars	To study about the Quality, types, methods and preparation by using the Standards	9+1+2=12
Preservation by Chemicals, Salts and Acids	To know about the permitted chemicals, types and methods of the products	8+1+2=11
Sugar	To identify the types and preparation methods of sugar and its products	4+1+0=05
Salt	To differentiate the types and composition of Brine solution	3+0+1=04
Total Hours of Instruction		54 (18x3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /	Psychomotor domain activity	Psychomotor domain level
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UNIT 1: Fruits and Vegetable Processing					
1.	Water activity and fruit spoilage	CO1	K1, F	Exemplify the water content and Water activity of foods in our routine diet	K5, S1
2.	Intermediate moisture fruits and vegetables – principle, methods and products.	CO1	K1, F	List out the Intermediate moisture fruits and vegetables	K5, S1
3.	Minimally processed fruits and vegetables-Selection criteria, Temperature, Storage Period	CO1	K2, P	Display Minimally processed fruits and vegetables and determine its Selection criteria, Temperature and Storage Period	K3, S1
UNIT 2: Preservation Methods					
4.	Preservation by use of high temperature- Pasteurization, sterilization, canning – principles, steps involved and advantages, defects in canning and spoilage of canned foods.	CO2	K2, C	Prepare a scrap book of Preservation process by using high temperature	K6, S3
5.	Preservation by use of low temperature - Refrigeration – principles, refrigerants, changes in refrigerated food, factors affecting the quality of refrigerated products, spoilage of refrigerated products and maintenance of refrigerator.	CO2	K2, C	Prepare a scrap book of Preservation process by using low temperature	K6, S3
6.	Preservation by use of very low temperature- Freezing – principle and steps in freezing, methods and types of freezing, advantages and disadvantages, frozen products.	CO2	K2, C	Prepare a scrap book of Preservation process by using very low temperature	K6, S3
UNIT 3: Preservation by Drying and Dehydration					
7.	Preservation by drying and dehydration – difference between drying and dehydration,	CO2	K2, C	Differentiate drying and dehydration of the products	K4, S2
8.	preparation of food for drying, methods of drying, types of drier, methods of dehydration,			Prepare dried or dehydrated product using fruits and vegetables	K4, S2
9.	Dried and dehydrated products.			Exemplify the dried foods in our routine diet	K5, S1
UNIT 4: Preservation by Sugars					
10.	Preservation by sugar – principle of gel formation, method of preparation, FSSAI,	CO3	K2, P	Differentiate the Preservation of sugar products by using various	K4, S2

	AGMARK, and ISO standards for Jam, Jelly, marmalade, candy, preserve,			standards	
11.	Unfermented fruit beverages – Squash, RTS beverages, cordial, syrup, fruit Juice concentrate.	CO3	K2, P	Design the pamphlet for preparation methods of Unfermented fruit beverages	K5, S4
UNIT 5: Preservation by Chemicals, Salts and Acids					
12.	Preservation by chemicals – principle, permitted chemical preservative in food processing, clarification of fruit Juices	CO4	K2, P	Systematic literature review presentation on permitted chemical preservative in food processing	K2, S2
13.	Application in value added fruits and vegetable products.	CO4	K2, P	Criticize on different value added fruits and vegetable products.	K4, S4
14.	Preservation by salts and acids – principle, pickle, sauce and ketch up.	CO4	K2, P	Sketch the types of pickle, pickle, sauce and ketch up available in the market	K3, S1
Unit-6: Sugar					
10.	Sugars- types and sources	CO5	K1, F	Tabulate the kinds of sugar as per its sources	K3, S3
11.	Methods of preparation of sugars, jaggery, khandsari, raw and refined sugar, principles of sugar cookery.	CO5	K2, P	Differentiate the methods of sugar	K4, S2
12.	Confectionery - history, types, classification, role of sugar in confectionery, role of chemical additives in confectionery.	CO5	K1, F	Differentiate the role of sugar in confectionery, role of chemical additives in confectionery	K4, S2
13.	Preparation of caramel, toffee, candy, chewing gum, bubble gum and chocolates.	CO5	K2, P	Infer about the crystalline and non-crystalline candies in the market	K4, S3
Unit-7: Salt					
14.	Types of salt, uses of salt	CO6	K1, C	Interpret on each type of salt	K5, S4
15.	Brine, preparation of brines	CO6	K1, C	Demonstrate the preparation of brine Solution	K3, S1
16.	Composition of brines used in canning, pickling and curing.	CO6	K1, C	Demonstrate the any one product Preservation by salts and acids	K3, S1

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2	Manay, S. & Shadaksharaswami, M. (2004), Foods: Facts and Principles, New Age Publishers.
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3	Trends in Food Science and Technology, Elsevier
4	Fruits and Vegetable journals- OMICS International

Course Name	Core III - Food Processing III	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC04	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1:	Define the Raw Milk handling process, types of milk and its by products
CO2:	Appraise the knowledge on preservation, cleaning and various treatment of egg processing
CO3:	Understand the concepts, preservation techniques involved in the processing of fleshy foods and its products
CO4:	Infer the handling process, chemical treatment and Value added Fish and marine products

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Milk	To familiarize with different equipments and technologies applied in a dairy plant from the point of reception of milk till it is packed, stored and its products	12+1+3=16
Egg	To learn about processing and preservation technology of egg and its products	10+2+1=13
Fleshy foods	To illustrate the concepts, preservation techniques involved in the processing of fleshy foods and its products	10+1+2=13
Fishes and Marine products	To provide learning on process, chemical treatment and Value added Fish and marine products	09+1+2=12
Total Hours of Instruction		54 (18x3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-1 Milk					
1.	Raw Milk handling – Buying and collection of milk, cooling and transportation of milk, receiving, preheating, filtration, clarification, cooling and storage of raw milk.	CO1	K2 F	Systematic literature review presentation on Raw Milk handling process	K2, S2
2.	Milk processing – standardization, pasteurization vacuum	CO1	K2 C	Visit a dairy industry and prepare a report	K3, S2

	pasteurization, homogenization, ultra filtration and reverse osmosis.				
3.	Milk products – cream, butter, butter oil	CO1	K2 P	Develop a milk based snack and Standardize the recipes	K6, S5
4.	special milks – sterilized milk, homogenized milk, soft curd milk, flavoured milk, fermented milk, yoghurt, cheese, ice cream, ghee, Khoa, Chhana, Paneer, Dahi, Shrikhand, Kheer, Rabri, Kulfi and Lassi, casein powder (edible) and milk powder.	CO1	K2 P	Schematize the production of different dairy products	K4, S2
UNIT :2 Egg					
5.	Preservation of shell eggs, egg cleaning, oil treatment, cold storage, thermo stabilisation, immersion in liquids, preservation of albumin and yolk powder production.	CO2	K2 P	Demonstrate the cleaning of egg and preparation method of egg powder	K3, S1
UNIT :3 Fleshy foods					
6.	Preslaughter care requirements, ante mortem examination of animal, slaughtering of meat – scientific methods of slaughter, ritual, religious methods of slaughter, dressing and cutting of carcass in sheep, pig, buffalo and poultry.	CO3	K2 P	Sketch out slaughtering of meat	K5, S1
7.	Post mortem examination of carcass, grading and packaging of meat, post mortem changes in meat, methods of tenderization and factors affecting tenderization.	CO3	K2 P	Demonstrate the methods of tenderization used in fleshy foods	K3, S1
8.	Meat preservation – chilling, freezing, curing, smoking, canning, dehydration, irradiation and hurdle concept.	CO3	K2 P	Prepare a scrap book of various Preservation process of meat by using different temperature	K6, S3
9.	Meat and poultry products – meat emulsion, sausage, patties, roll, loaves, luncheon meats, meat balls, nuggets, fermented sausages, ham and bacon	CO3	K2 P	Prepare and display any one meat and poultry products in your processing laboratory	K3, S2
10.	Indigenous meat products, cured meats, canned products, restricted meat	CO3	K2 P	Schematize the production of different Meat products	K4, S2

	products, sectioned and formed meat products, intermediate moisture meat product.				
UNIT 4: Fishes and Marine products					
11.	Onboard handling – Handling, washing, sorting, Evisceration, removal of gills, bleeding icing, bulking, shelving and boxing	CO4	K2 P	Demonstrate the handling process of fishes and Marine products	K3, S1
12.	Processing – post mortem changes, drying, dehydration, smoking, marination, salting, canning, fermentation, freezing,	CO4	K2 P	Demonstrate the any one processing methods of fish	K3, S1
13.	chemical treatments, low dose irradiation, high pressure treatment, MAP, vaccum packaging, gas packaging, hurdle concept	CO4	K2 P	List out examples of food packaging materials in our daily life	K5, S1
14.	Value added Fish and marine products – minced fish, fish finger, surimi, fish burger, fish protein concentrates, flakes, fish oils, chitin, chitosan, seaweeds, shark fin and fin rays.	CO4	K2 P	Criticize on different value added Fishes and Marine products	K4, S4

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2	Joseph P. Kerry, (2002), Meat Processing, first Edition, ISBN: 9781855735835, Woodhead Publishing
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JOURNALS AND DOCUMENTS	
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2	Meat science, Elsevier
3	Journal of Food Process Engineering, Wiley- Blackwell

Course Name	Food Packaging Technology	Programme Name	B.Voc Food Science and Nutrition
Course Code	15BFSNC10	Academic Year Introduced	2018 - 2019
Type of Course	Theory	Semester	V

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1	Recall the history, packaging functions and requirements										
CO2	Distinguish various types of packaging materials and other accessories in packaging										
CO3	Apply the acquired knowledge in advanced packaging systems										
CO4	Select and develop appropriate specific packaging material for specific food products										
CO5	Test the effective and worthiness of packaging materials through various standard tests										
CO6	Assess and evaluate the quality of packaged food										
CO7	Study and interpolate the packaging rules and regulations										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
C01	3	3	2	3	2	3	2	3	3	3	3
C02	3	3	2	3	2	3	2	3	3	3	3
C03	3	3	2	3	2	3	2	3	3	3	3
C04	3	3	2	3	2	3	2	3	3	3	3
C05	3	3	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Introduction and scope of food packaging	To understand the basic functions of a food package, Food package design and development	5
Packaging materials	To familiarize with different types of packaging materials and its applications	5
Packaging systems and methods for food products	To impart knowledge on recent trends in Food Packaging system	10
Food packaging design	To learn the concepts in the designing of packaging materials for various food products	8
Testing and evaluation of packaging material	To gain knowledge about the testing and standards of packaging materials	10
Testing and evaluation of packaged foods	To learn about testing and standards of packaged foods	8
Packaging laws and regulations	To familiarize with the recent packaging laws and regulations	8
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/ Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /KD	Psychomotor domain activity	Psychomotor domain level
UNIT I: Introduction and scope of food packaging					
1.	Definition, importance and role of food	CO1	K1,F	Visit a food packaging and label	K2,S2

	packaging			manufacturing industry and prepare a report	
2.	Principles in the development of safe and protective packing	C01	K1,C		
3.	Factors determining the packaging requirements of various foods	C01	K2,C		
4.	Classification of packaging	C01	K2,C		
UNIT II: Packaging materials: Properties and application of primary packaging materials					
5.	Paperboards, metals, plastics, wood, plywood, glass, flexible packaging materials	C02	K1,C	Collect different types of packages and containers(paper,plastic,metal,glass) and discuss its advantages and disadvantages in front of your classmates	K4,S3
6.	Labels, caps and closures and wads, adhesives, inks and lacquers, cushioning materials, reinforcements etc.	C02	K1,C	Collect different types of closures,wads,cushioning materials adhesives,inks and lacquers discuss its advantages and disadvantages in front of your classmates	K4,S3
UNIT III: Packaging systems and methods for food products					
7.	Vacuum packaging, gas flush packaging, CAP & MAP, aseptic and retort packaging, Bag-in-Box packaging, artificial and intelligent packaging	C03	K2,P	Write an assignment on recent packaging systems and other advanced technologies used.	K2,S2
UNIT IV: Food packaging design					
8.	Package design for fresh horticultural produce and animal foods, dry and moisture sensitive foods, frozen foods, fats and oils, thermally processed foods and beverages.	C04	K5,C	Choose a particular food materials, enlist the requirements for effective packaging and suggest all the packaging materials that can be used	K2,S3
9.	Food marketing and role of packaging	C04	K2,C	Design a suitable package with label for the given food product	
UNIT V: Testing and evaluation of packaging material					
10.	Thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, CO2 permeability, oxygen permeability, grease resistance	C05	K4,P	Bring a video related to any of the testing procedures of any packaging material and present it	K2,S2
UNIT VI: Testing and evaluation of packaged foods					
11.	Compatibility and shelf life studies, evaluation of transport worthiness of filled packages	C06	K4,P	Select a packaged food product(one brand) and identify their advanced technologies adapted to increase the shelf life of the package	K2,S3

				(compare the shelf life)	
UNIT VII: Packaging laws and regulations					
12.	FDA, PFA, Packaging Commodity Rules, Weight and Measures Act, Packaging and Labelling Rules and Regulations of FSSAI	C07	K2,F	Bring one news article regarding issues faced by the food business companies violating the packaging laws and regulations, discuss it with your classmates	K2,S3
13.	Coding and marking including barcoding	C07	K2,C	List out the different types of codings used in food packages	K2,S2
14.	Environmental & Eco issues and waste disposal	C07	K2,C	Choose one material and its implication on environment and come up with ideas for safe disposal or reuse	K3,S3

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