

PERIYAR UNIVERSITY

SALEM-636 011



DEGREE OF BACHELOR OF SCIENCE

B.Sc APPLIED GEOLOGY (CBCS)

(Semester Pattern)

REGULATIONS & SYLLABUS

(Effective from the Academic Year 2008-2009 onwards)

B.Sc., Applied Geology (CBCS)

Regulations

1. Eligibility for Admission

Candidates for admission to the first year of the Degree of Bachelor of science under Branch. VII – Applied Geology course are required to have passed the Higher Secondary Examination (Academic Stream) conducted by the Government of Tamil Nadu or an examination as equivalent to 10 +2 courses including CBSE, which have been recognized by the Periyar University.

The candidates for admission to the Branch VII Applied Geology shall have passed the qualifying Examination with the subjects under any one of the following groups.

- Group – I (Maths, Physics, Chemistry and Computer Science)
- Group – II (Maths, Physics, Chemistry and Biology)
- Group – III (Physics, Chemistry, Zoology and Botany)

For admission of students in the Government/Aided/ Unaided Colleges of Arts and Science, guidelines issued by the Director of Collegiate Education, Chennai – 6 may be followed.

2. Eligibility for the Award of Degree

A candidate shall be eligible for the award of the degree only if he/she has undergone the prescribed course of study in a college affiliated to the Periyar University for a period not less than three academic years/six semesters, passed the examination prescribed and fulfill such conditions have been prescribed therefore. The Eligibility for award of degree is based on the candidate fulfill in the part IV student component.

3. Requirement for Proceeding to II and III years

Candidates shall be eligible to proceed from first year to final year only if they earn sufficient percentage of attendance prescribed by the Syndicate of the Periyar University from time to time for the I and II year of the course. All candidates must put in 75% of attendance. The Syndicate of Periyar University has resolved that the minimum attendance requirement for condonation be fixed at 65% with condonation fee. The attendance will be calculated on the basis of 180 working days/900 instructional hours for semester courses and a uniform 75% attendance prescribed for all I, II and III year courses/ all semesters for eligibility to appear for the year end/semester end examinations.

Candidates will be permitted to appear for the practical examinations only if they have attended 75% of the practical classes prescribed for each subject, condonation of shortage of attendance for practical classes will be granted by the Principal/Heads of the Departments up to a maximum of 65% of the total number of practical classes. The condonation fee for practical is applicable for shortage of attendance.

Candidates who have put in less than 50% of attendance have to repeat the course (by rejoining) for which they lack attendance without permitting them to proceed for II or III year until they earn the required percentage of attendance for that particular year.

4. Passing Minimum

A candidate shall be declared to have passed in each paper/practical wherever prescribed if he/she secures not less than 40% of marks prescribed for the examination. He/she shall be declared to have passed the whole examinations, if he/she passed in all papers and practicals wherever prescribed as per the scheme of examinations.

5. Classification of Successful Candidates

Foundation Courses (Languages and English) and Core courses (Major and Allied Subjects):- Successful candidates passing the foundation and core courses and securing 60% and above in the aggregate shall be declared to have passed the examinations in the First class. Securing 50% and above but below 60% in the aggregate shall be declared to have passed the examinations in the Second Class. All other successful candidates shall be declared to have passed the examinations in the Third class. Candidates who obtain 75% marks and above in any subject shall be deemed to have passed that subject with Distinction provided they pass all the examinations at the first appearance.

6. Ranking

Candidates who passed all the examinations prescribed for the course in the first appearance only are eligible for ranking.

7. Age Limit for Admission

As per the guidelines issued by the Government of Tamil Nadu, the upper age limit for admission to undergraduate courses will be 21 years as on 1st July.

8. Distribution of Marks

	Internal	Exam	Total
Theory	25	75	100
Practical	40	60	100
Project	Viva voce - 20	Report -80	100

Core practical marks 40 further divided as follows:-

Field visit, Collections, Report	-	20
Practical records	-	10
Practical Quiz	-	10

40

Classification of Internal Assessment for Theory: Test 15, Assignment 5, Attendance 5 = 25

CBCS SCHEME FOR B.Sc., APPLIED GEOLOGY

Study Components	No. of Courses	Credit per Course	Total Credits
Part – I Tamil / Other Languages	2+2=4	3	12
Part – II English	2+2=4	3	12
Part – III Core Courses	12	4	48
Core Practical	4	3	12
Allied Theory	4	3	12
Allied Practical	2	4	8
Project/ Elective	1	15	15
Part – IV 1. (a) Those who have not studied Tamil upto XII Std. and taken a non-Tamil language under Part-I shall take Tamil comprising of two courses (level will be at 6 th standard)	1+1=2	2	4
(b) Those who have studied Tamil upto XII Std and taken a non-Tamil language under Part-I Shall take Advanced Tamil comprising of two courses			
(c) Other who do not come under a+b can choose non-major elective comprising of two courses			
2. Skill Based Elective Courses	3+3=6	2	12
3. Environmental Studies	1	2	2
4. Value Education	1	2	2
Part – V Extension Activities (NSS, NCC, YRC, RRC, Green Club)	1	1	1
Total			140

B.Sc., Applied Geology
Choice Based Credit System
(For the students admitted from the year 2008 onwards)

Sem	Part	Course	Paper code	Title	Hrs.		Credit	Marks		Total
					L	T / P		Int	Extn	
I	I	Language –I		Tamil –I	6	-	3	25	75	100
	II	Language -II		English - I	6	-	3	25	75	100
	III	Core Course-1	BGC01	Physical Geology & Geodynamics	4	-	4	25	75	100
		Core Practical- I		Structural Geology & Surveying		3				
		Allied Theory –I		Inorganic, Organic and Physical Chemistry-I	4	-	3	25	75	100
	IV	Allied Practical- I		Chemistry Practical		3				
		Environmental Studies		Environmental Studies	1	-				
		Value Education		Value Education	1	-				
		SBEC	BGE01-10	From List –VII for SBEC	2		2	25	75	100
II	I	Language –I		Tamil – II	6	-	3	25	75	100
	II	Language –II		English –II	6	-	3	25	75	100
	III	Core Course – II	BGC02	Geomorphology & Structural Geology	4	-	4	25	75	100
		Core Practical- I	BGCP01	Structural Geology & Survey	-	3	4	40	60	100
		Allied Theory- II		Inorganic, Organic and Physical Chemistry –II	4	-	3	25	75	100
		Allied Practical- I	BGAP01	Chemistry Practical	-	3	4	40	60	100
	IV	Environmental Studies		Environmental Studies	1	-	2	25	75	100
		Value Education		Value Education	1	-				
		SBEC	BGE01-10	From List –VII for SBEC	2	-	2	25	75	100
III	I	Language –I		Tamil –III	6	-	3	25	75	100
	II	Language – II		English –III	6	-	3	25	75	100
	III	Core Course- III	BGC03	Paleontology	4	-	4	25	75	100
		Core Practical- II	BGCP02	Paleontology & Stratigraphy	-	3				
		Allied Theory - III	06UPHA1/AM 01	Physics –I /Maths -I	4	-	3	25	75	100
		Allied Practical- II		Physics Practical	-	3				
	IV	SBEC	BGE01-10	From List –VII for SBEC	2	-	2	25	75	100
		NMEC *	BGNME01-04	From List –VIII for NMEC	2	-	2	25	75	100
IV	I	Language - I		Tamil – IV	6	-	3	25	75	100
	II	Language - II		English –IV	6	-	3	25	75	100

	III	Core Course –IV	BGC04	Principles of Stratigraphy & Indian Geology	4	-	4	25	75	100
		Core Practical - II	BGCP02	Paleontology & Stratigraphy	-	3	4	40	60	100
		Allied Theory - IV	06UPHA2/AM 02	Physics –II / Maths - II	4	-	3	25	75	100
		Allied Practical- IV	06UPHA03	Physics Practical - II	-	3	4	40	60	100
	IV	SBEC	BGE01-10	From List –VII for SBEC	2	-	2	25	75	100
		NMEC *	BGNME01-04	From List –VIII for NMEC	2	-	2	25	75	100
		Value Education		Value Education	1	-	2	25	75	100
V	III	Core Course – V	BGC05	Crystallography & Optical Mineralogy	3	2	4	25	75	100
		Core Course - VI	BGC06	Mineralogy	3	2	4	25	75	100
		Core Course - VII	BGC07	Igneous, Metamorphic & Sedimentary Petrology	3	2	4	25	75	100
		Core Course –VIII	BGC08	Hydrogeology & Environmental Geology	3	2	4	25	75	100
		Core Practical- III	BGCP03	Crystallography & Mineralogy	-	4				
		Project			-	4	-	-	-	-
	IV	SBEC	BGE01-10	From List –VII for SBEC	2	-	2	25	75	100
VI	III	Core Course – IX	BGC09	Economic Geology	3	2	4	25	75	100
		Core Course - X	BGC10	Remote Sensing & Exploration Geology	3	2	4	25	75	100
		Core Course – XI	BGC11	Mining & Engineering Geology	3	2	4	25	75	100
		Core Course –XII	BGC12	Geostatistics & Computer Applications	3	2	4	25	75	100
		Core Practical- III	BGCP03	Crystallography & Mineralogy		4	4	40	60	100
		Project	BGPR01		4	-	15	20	80	100
		SBEC	BGE01-10	From List –VII for SBEC	2	-	2	25	75	100
		Extn				-	1			100
Total							140			

SBEC- Skill Based Elective Courses

* Any other language course

*NMEC – Non Major Elective Courses – refer study components part IV

I. LIST OF LANGUAGE COURSES (TAMIL)

- இக்கால இலக்கியங்களும் உரைநடையும்
- இடைக்கால, சமய இலக்கியங்களும், சிறுகதையும்
- காப்பியங்களும், புதினமும்
- பண்டைய இலக்கியங்களும், நாடகமும்

II. LIST OF FOUNDATION COURSES (ENGLISH)

- Contemplations – I (First 5 Lesson)
- Contemplations – I (6 to 11 lesson)
- Contemplations – II (First 5 lesson)
- Contemplations – II (6 to 10 lesson)

III. LIST OF CORE COURSES

BGC01	-	Physical Geology & Geodynamics
BGC02	-	Geomorphology & Structural Geology
BGC03	-	Paleontology
BGC04	-	Principles of Stratigraphy & Indian Geology
BGC05	-	Crystallography & Optical Mineralogy
BGC06	-	Mineralogy
BGC07	-	Igneous, Metamorphic & Sedimentary Petrology
BGC08	-	Hydrogeology & Environmental Geology
BGC09	-	Economic Geology
BGC10	-	Remote Sensing & Exploration Geology
BGC11	-	Mining & Engineering Geology
BGC12	-	Geostatistics & Computer Applications

IV. LIST OF CORE PRACTICALS

BGCP01	-	Structural Geology and Surveying
BGCP02	-	Palaeontology & Stratigraphy
BGCP03	-	Crystallography & Mineralogy

V. LIST OF ALLIED THEORY SUBJECTS

- Inorganic, Organic and Physical Chemistry – I
- Inorganic, Organic and Physical Chemistry – II
- General physics Head Optics and electricity
(OR)
- Algebra, Calculus and Vector Analysis -I
- Modern Physics, Spectroscopy and Electronics
(OR)
- Integration and Differential Equations

VI. LIST OF ALLIED PRACTICALS

- Chemistry Practical
- Physics Practical

VII. LIST OF SKILL BASED ELECTIVE COURSE

- | | | |
|-------|---|---|
| BGE01 | - | Field Hydrogeology and Techniques |
| BGE02 | - | Micropaleontology Techniques |
| BGE03 | - | Gemmology and Gemstone Evolution |
| BGE04 | - | Basics of Photogrammetry |
| BGE05 | - | Granite exploration and exploitation |
| BGE06 | - | Mines and Minerals Legislation of India |
| BGE07 | - | Introduction to Geoinstrumentation |
| BGE08 | - | Water quality analysis |
| BGE09 | - | Mapping Techniques in Geology |
| BGE10 | - | Geology for competitive examination. |

VIII. LIST OF NON-MAJOR ELECTIVES COURSES

- | | | |
|---------|---|--|
| BGNME01 | - | Basic Geochemistry |
| BGNME02 | - | Basic Geophysics |
| BGNME03 | - | Geohazards |
| BGNME04 | - | Groundwater management and rain water harvesting |

IX. LIST OF COMPULSARY COURSES

- Value Education
- Environmental Studies
- Extension Activities (NSS,NCC,YRC,RRC,Green Club)

Question Paper Pattern

Time: 3 hours

Max. Marks: 75

Part A: 10 x 2 = 20

Answer all questions

Each Answer shall be in about 30 words

Part B: 5 x 5 = 25

Answer all questions with internal choice

Each answer shall be in about 300 words.

Part C: 3 x 10 = 30

Answer **any three** out of five

Each answer shall be in about 1000 words.

**முதல் வருடம் - முதல் பருவம்
தமிழ்**

தாள் 1 : இக்கால இலக்கியங்களும் உரைநடையும்

அலகு 1 : (மரபுக் கவிதைகள்)

- அ) பாரதியார்: (i) 'எங்கள் தாய்'
(ii) 'மாலை வருணனை'(பாஞ்சாலி சபதம்)
- ஆ) பாரதிதாசன்: (i) 'தமிழின் இனிமை'
(ii) 'எழுச்சியுற்ற பெண்கள்'
- இ) கவிமணி தேசிகவிநாயகம்: 'வீரபாண்டிய கட்டபொம்மன்'
- ஈ) நாமக்கல் கவிஞர்: 'உலகம் வாழ்க'
- உ) சுரதா : பாரதிதாசன் (எப்போதும் இருப்பவர்கள் - தேன்மழை)
- ஊ) கண்ணதாசன் : (i) 'ஒற்றுமை வளர்ப்போம்'(முதலிரு தொகுதிகள்)
(ii) 'ஊமைக் காயம்'(தொகுதி 4)
- எ) காரிக்கிழார் (மலேசியக்கவிஞர்): 'கடாரக் கரையிலே' (அலையோசை)
- ஏ) டி.வி.இராகவன் : 'காலத்தை வென்றவன் கவிஞன்'(மலேசியத் தமிழ் இலக்கிய வரலாற்றுக் களஞ்சியம்)

அலகு 2: (புதுக்கவிதைகள்)

- அ). ந. பிச்சமூர்த்தி : கிளிக்கூண்டு
- ஆ). சிற்பி பாலசுப்ரமணியம் : ஒரு கிராமத்து நதி (ஒ.கி.ந)
- இ). ஈரோடு தமிழன்பன் : தோணி வருகிறது (தோ.வ)
- ஈ). நா. காமராசன். : கருப்பு மலர்கள் (க.ம)
- உ). புவியரசு : புல்லாங்குழலே (ப.கு)
- ஊ). வில்வரெத்தினம் (ஈரெழுத்து கவிஞர்) : நிலவின் எதிரொலி (வேற்றாகி நின்ற வெளி)
- எ) திலகவதி : புரிதல் (பறத்தல் அதன் சுதந்திரம்)
- ஏ) லதா (சிங்கப்பூர் கவிஞர்) : குடியுரிமை (தீவெளி)
- ஐ) தமயந்தி ((ஈரெழுத்துக் கவிஞர்) : நீ, நான், நமது கனவு (அயலகத்தமிழ் இலக்கியம்)

அலகு 3: (உரைநடை)

வா.செ. குழந்தைசாமி : அறிவியல் தமிழ் - பாரதி பதிப்பகம்,
126.1008. உஸ்மான் சாலை, தி.நகர்,
சென்னை. – 600 017.

அலகு 4 : (இலக்கிய வரலாறு)

அ) புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்

ஆ) இக்கால மரபுக் கவிஞர்கள்: (பாரதி, பாரதிதாசன், கவிமணி, நாமக்கல் கவிஞர், சுரதா, கண்ணதாசன், சுத்தானந்த பாரதியார், வாணிதாசன், முடியரசன்)

இ) தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்

ஈ) தமிழில் புதினத்தின் பிறப்பும் வளர்ச்சி நிலையும்

உ) தமிழ் நாடக வரலாறு

ஊ) தமிழில் தகவல் தொடர்பு வளர்ச்சி

எ) அயல்நாடுகளில் தமிழ் வளர்ச்சி

பார்வை நூல்கள்:

1. மு.வரதராசன், தமிழ் இலக்கிய வரலாறு – சாகித்திய அகாதெமி, 304-305, அண்ணாசாலை, தேனாம்பேட்டை, சென்னை – 600 018.
2. ம.து.ச.விமலானந்தம், தமிழ் இலக்கிய வரலாறு – அபிராமி பதிப்பகம், 7B, கொடிமரத்தெரு, இராயபுரம், சென்னை – 600 013.
3. கா.கோ.வேங்கடராமன், தமிழ் இலக்கிய வரலாறு – கலையக வெளியீடு, 193 எச், கண்டர் நகர், பரமத்தி வேலூர், நாமக்கல் - 638 182.
4. க.கைலாசபதி, ஈரெழுத்து இலக்கிய முன்னோடிகள் - குமரன் பப்ளிஷர்ஸ், 12(3)மெய்கை விநாயகர் தெரு, வடபழனி, சென்னை – 600 026.
5. மா.இராமையா, மலேசியத்தமிழ் களஞ்சியம் - சோலை இருசன், இலக்கிய வரலாற்று புரட்சிப் பண்ணை, சேலம் - 636 007.

அலகு 5: (மொழித்திறன்)

அ) இலக்கணக் குறிப்பெழுதி விளக்கம் அளித்தல் - 4 மதிப்பெண்கள்

ஆ) பிறமொழிச் சொற்களைத் தமிழ்ச்சொற்களாக மாற்றுதல் - 4 மதிப்பெண்கள்

இ) கலைச்சொல்லாக்கம் - 4 மதிப்பெண்கள்

ஈ) எழுத்துப் பிழை நீக்கம் - 4 மதிப்பெண்கள்

உ) மயங்கொழிச் சொற்பொருள் வேறுபாடு அறிதல் - 4 மதிப்பெண்கள்

பார்வை நூல்கள்:

1. அ.கி.பரந்தாமனார், நல்ல தமிழ் எழுத வேண்டுமா? (பக்.40 - 199)
– பாரி நிலையம், (2005) 184, பிரகாசம் சாலை, சென்னை – 600 108.
2. பூவண்ணன், மொழித்திறன் (பகுதி.1) -வர்த்தமானன் பதிப்பகம்,(1997) 141, உஸ்மான் சாலை, தி.நகர், சென்னை – 600 017.
3. மலேசியா கனிமொழி - மயங்கொலிச் சொற்பொருள் அகராதி - திருமகள் நிலையம் (2000) 55, வெங்கட்நாராயணா சாலை, தி.நகர், சென்னை – 600 017.
4. புலவர் அ.சா.குரசாமி - தமிழில் பிழைகள் தவிர்ப்போம் (பக்.94-136) - நர்மதா பதிப்பகம், (1998) 10, நானா தெரு, தி.நகர், சென்னை - 600 017.
5. கோ.இளையபெருமாள் - தமிழில் பிழையின்றி எழுதுவது எப்படி? (பக் 14-18;77-101) - வானதி பதிப்பகம், (2003) 23, தீனதயாளு தெரு, தி.நகர், சென்னை- 600 017.
6. ஞா.தேவநேயப் பாவாணர் உரைநடை, இலக்கணமும் கட்டுரை எழுதும் முறையும் (பக் 16-30;168-176) - அலகு பதிப்பகம் (1999) 20, ஆசிரியர் சங்கக் குடியிருப்பு வில்லிவாக்கம், சென்னை - 600 049.

**Foundation Course
First Year – First Semester**

ENGLISH – PAPER - I

I. Detailed Text : Contemplations I

P. Bhaskakran Nair & Geetha Rajeevan edited Foundation books,
21/1, (New No. 49) 1st floor. Model School Road, Thousand Lights, Chennai – 600 006.

(First Five Lessons)

1. A little Bit of what you Fancy – Desmond Morris.
2. The Avenger – Anton Chekhov.
3. Leave this Chanting and Singing and Telling of Beads – Rabindaranath Tagore.
4. The Portrait- Aldous Huxley.
5. To know when to say “It’s None of Your Business”. Mark Mc Cormak.

II. Extensive Reader – (Non – Detailed Text): Nine Telling Tales - edited by Dr. Ayothi and Prof. S.A. Samkaranarayanan, NCBH, Chennai.

III. Grammar

Prescribed Text Book:

FORM AND FUNCTION:

- V.Sasikumar & V.Syamala Emerald Publishers, 15-A, First Floor, Casa Major Road,
Egmore, Chennai – 8.

1. Statements and Questions
2. Determiners, including articles.
3. Conjunctions and other devices.

IV. Composition

1. Letter Writing
2. Writing a paragraph
3. E- mail

Book Recommended:

Communication skills for Undergraduates
– Dr. T.M.Farhathullah, RBA Publications, Chennai 15

**First year - First Semester
Core Course– I**

BGC01 - Physical Geology and Geodynamics

Unit – I

Geology: Scope and importance, branches of Geology. Solar System: Planets, Satellites, Asteroids, Meteorites and Comets. Origin of Solar system: Nebular, Planetesimal, and Tidal hypotheses – Earth in the Solar system: Size, Shape, Mass, Density, Rotational and Revolution parameters. Brief description of lithosphere, Hydrosphere, Atmosphere, Biosphere and their composition.

Unit – II

Age of the Earth: Age determining Methods: Indirect method: salinity method, sedimentation method tree- ring or growth rings, Lichenometric method, Direct method: Ur-Pb method, K-Ar method Rb-Sr method, C^{14} method, Interior of the Earth: Structure and composition of Crust, Mantle and Core.

Unit –III

Earthquake: Definition, Focus, epicenter. Measurement of earthquake: seismograph, seismogram Richter's scale, Magnitude, Intensity. Earthquake belts of the world with a special reference to India. Volcanoes: Definition, Types, Causes and Effects, Volcanic Products, Volcanic landforms, Distribution of volcanoes, volcanoes in India.

Unit – IV

Dynamic Earth: Isostasy, origin and evolution of oceans, Geosynclines, Profile of continental margins, Island arcs.

Unit – V

Continental Drift, Sea floor spreading theory and evidences: Plate Tectonics.

Text Books

1. P.K. Mukerjee Text book of Geology
2. Arthur Holmes. 1965 Principles of Physical Geology, ELBS.
3. Mahabathra G.B. 1994 Text book of Physical Geology C.B.S publishers, Delhi
4. Radhakrishnan. V 1996 General Geology. V.V.P. Publishers, Tuticorin.
5. Parbin Singh 2000 A text book of Engineering and General Geology, S.K.Kataria and sons, Delhi.
6. P.C.Sanjeeva Rao and D.Bhaskara Rao. Text book of Geology 2001. Discovery Publishing House, New Delhi.

Reference books

1. Porter and Skinner 1992 Principle of Physical Geology, IV John Wiley & sons.

2. Nelson and Zumberg, 1965 Physical Geology John Wiley & Sons.

First Year – First Semester
Allied Theory – I
- Inorganic, Organic and Physical Chemistry – I

Unit – I

1.1 Chemical Bonding ,

Molecular Orbital Theory-bonding, antibonding and nonbonding orbitals.

M.O. diagrams of Hydrogen, helium, Nitrogen, Fluorine and Nitric Oxide-discussion of bond order and magnetic properties.

- 1.2 Hydrides-classification and characteristics preparation, properties and uses of Borazole, NaBH_4 and LiAlH_4 .

- 1.3 Carbonyls-mononuclear and polynuclear carbonyls-Examples.

Preparation, properties and structure of Cr(CO)_6 , Fe(CO)_5 and Ni(CO)_4 .

Unit –II Nuclear Chemistry

- 2.1 Fundamental particles of Nucleus – nuclide, isotopes, isobars and isotones

- 2.2 Natural radioactivity–radioactive series including Neptunium series-Group displacement law.

- 2.3 Nuclear Binding energy, mass defect – Calculations.

- 2.4 Nuclear Fission and Nuclear Fusion – differences – Stellar energy.

- 2.5 Artificial Radioactivity – Preparation of transuranium elements – Np, Pu, Cf, Es, and No.

- 2.6 Applications of radioisotopes – C-14 dating, rock dating, isotopes as tracers, study of Reaction mechanism (ester hydrolysis) radiodiagnosis and radiotherapy.

Unit – III

- 3.1 Covalent Bond- Orbital Overlap- Hybridisation – Geometry of Organic molecules- methane, Ethylene, Acetylene and Benzene.

- 3.2 Electron displacement Effects: Inductive, Resonance, Hyper conjugative & steric effects. Their effect on the properties of compounds..

- 3.3 Stereoisomerism: Symmetry – elements of symmetry-cause of optical activity, Tartaric acid. Racemisation. Resolution. Geometrical isomerism of Maleic and Fumaric acids-Keto-enol tautomerism of Acetoacetic ester-conformers of n-butane with brief explanation

Unit – IV

- 4.1 Aromatic compounds-Aromaticity –Huckel's rule

- 4.2 Electrophilic substitution in Benzene – Mechanism of Nitration, Halogenation –Alkylation, Acylation.

- 4.3 Isolation, preparation, properties and structure of Naphthalene Haworth's synthesis.

- 4.4 Heterocyclic compounds:- Preparation, properties and uses of Furan, Thiophene, Pyrrole and Pyridine.

- 4.5 Preparation and uses of CHCl_3 , CCl_4 , Saccharin and Freon.

Unit – V

- 5.1 Solutions: Liquid in liquid type – Raoult's law for ideal solutions. Positive and negative deviation from Raoult's law Reasons and examples, Fractional distillation and Azeotropic distillation.

- 5.2 Colligative properties: Review of colligative properties of dilute solutions-lowering of V.P, elevation of B.Pt and depression of F.Pt and osmotic pressure. Reverse osmosis. Abnormal molecular weights-van't Hoff factor –degree of dissociation and association- problems.
- 5.3 Chromatography: principle and application of column, paper and thin layer chromatography.

முதல் வருடம் - இரண்டாம் பருவம்

தாள் 2: இடைக்கால, சமய இலக்கியங்களும், சிறுகதையும்

அலகு 1: (சமய இலக்கியங்கள்)

- அ) மாணிக்கவாசகர் - திருவாசகம் - திருவமமாணை - 1,4,5,6,8
- ஆ) திருமுலர் - திருமந்திரம் - ஒன்பதாந்தந்திரம் - ஊழ் (6 பாடல்கள்)
- இ) ஆண்டாள் - நாச்சியார் திருமொழி - ஆறாம் திருமொழி - வாரணமாயிரம்...(10 பாடல்கள்)
- ஈ) பட்டினத்தார் - அன்னை இறந்தபோது - பா.எண். 1,2,3,6,7.
- உ) கண்ணதாசன் - இயேசு காவியம் - பார்ச் சிலுவை
- ஊ) மு.மேத்தா - நாயகம் காவியம் - பாம்பின் நேசமும் தோழரின் பாசமும்

அலகு : 2 (சிறுநிலக்கியங்களும் தனிப்பாடல்களும்)

- அ) முத்தொள்ளாயிரம் : அள்ளல் பழனத்து (2) காட்டுத்திரம் (97) - சேரன்
நந்தின் (7), மருப்பூசி (12) - பாண்டியன்
நாண் (70), முடித்தலை (72) - சோழன்
- ஆ) நந்திக் கலம்பகம் - (NCBG பதிப்பு; பா.எண் 23,68,6,21,12,13)
- இ) தமிழ் விடு தூது - கண்ணிகள் 100முதல் 114 வரை
- ஈ) ஒட்டக்கூத்தர், புகழேந்தி - தனிப்பாடல் திரட்டு - பாடல் எண் 5,14,15,16,17
- உ) காளமேகம் - தனிப்பாடல் திரட்டு - பாடல் எண் 4,65,67,105,108,184.
- ஊ) ஔவையார் - தனிப்பாடல் திரட்டு - பாடல் எண் 4,17,18,19,39.

அலகு 3: (சிறுகதைகள்)

இளசை எஸ். சுந்தரம் - 'சாதகப்பறவைகள்' – நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட், 41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை – 600 098.

அலகு 4: (இலக்கிய வரலாறு)

- அ) தமிழ்ச் சிறுநிலக்கிய வரலாறு
- ஆ) பன்னிரு திருமுறைகள்
- இ) நாலாயிர திவ்வியப் பிரபந்தம்

- ஈ) கிறித்தவர் தமிழ்த் தொண்டு
உ) இசுலாமியர் தமிழ் தொண்டு
ஊ) சைவ மடங்களின் தமிழ்ப்பணிகள்
எ) பதினெண் சித்தர்கள்

பார்வை நூல்கள்:

1. மது.ச.விமலானந்தம் - தமிழ் இலக்கிய வரலாறு
2. கா.கோ.வேங்கடராமன் - தமிழ் இலக்கிய வரலாறு

அலகு 5: (மொழித் திறன்)

- அ) சந்தி விதிகள்
ஆ) சொற்றொடர்ப் பிரிப்பும் சேர்ப்பும்
இ) வலி மிகுமிடங்களும் மிகாவிடங்களும்
ஈ) சொற்றொடர் மாற்றம்

- | | | |
|-----------------|-----|-------------------|
| தன்வினை | - > | பிறவினை; |
| செய்வினை | - > | செயப்பாட்டு வினை, |
| உடன்பாட்டு வினை | - > | எதிர்மறை வினை |
| நேர்க்கூற்று | - > | அயற்கூற்று |

- உ) அலுவலகக் கடிதம் எழுதுதலும் விண்ணப்பம் எழுதுதலும் - 8 மதிப்பெண்கள்

பார்வை நூல்கள்:

1. அ.கி. பரந்தமனார் - நல்ல தமிழ் எழுத வேண்டுமா? (பக்.214,280,337,348)
2. புலவர். கோ.இளையபெருமாள் - தமிழில் பிழையின்றி எழுதுவது எப்படி? (பக்.48,64,69,70,116,119)
3. டாக்டர் பொற்கோ - தமிழில் நாமும் தவறில்லாமல் எழுதலாம் (பக்.28-59) 16, ஆறாவது குறுக்கு தெரு, சாத்திர் நகர், அடையாறு, சென்னை - 600 020.
4. ஞா.தேவநேயப் பாவணர் - உரைநடை இலக்கணமும் கட்டுரை எழுதும் முறையும் (பக். 39-54,117-119,135-137,168-176)

**Foundation Course
First Year – Second Semester**

ENGLISH – PAPER – II

I. Detailed Text: Contemplation I

Ed.by. P. Bhaskakran Nair & Geetha Rajeevan

Published By: Foundation Books, Cmbridge House (Lessons from 6 to 11).

1. The Lamentation of the Old Pensioner – William Butler Yeats
2. The Second Crucifixion – Larry Collins and Sominique Lapierre
3. Next, Please – Philip Larkin.
4. I am a Cat – Natsume Soseki
5. The Boy Comes Home – A.A. Milne
6. Refund – Fritz Karinthy.

II. Extensive Reader – (Non Detailed Text):

Tales from Shakespeare (Book two)

Madhubun Educational Publishers

1. The merchant of Venice.
2. Macbeth
3. Twelfth Nighth.
4. King Lear
5. A Midsummer Night's Dream
6. Much ado About Nothing.
7. Julius Caesar

III. Grammar

Prescribed text book: FORM AND FUNCTION

By V. Sasikumar and V.Syamala

Emerald Publishers, 15A, 1st floor,

Casa Major Road, Egmore – Chennai 8.

1. The simple present and the present continuous
2. The past tenses and the present perfect etc
3. The future tenses and other verb forms

IV. Composition

1. Note making
2. Advertisement
3. Persuasive writing

Book Recommended: Communication Skills for Under graduates

- Dr. T.M. Fauhathullah, RBA Publications, Chennai – 15.

First Year – Second Semester
Core Course – II
BGCO2 – Geomorphology & Structural Geology

Unit-I

Definition and scope of geomorphology. Brief introduction to geomorphic cycles and classification of landforms.

Wind as geological agent: - definition – cause – erosional, transport, and depositional activity – landforms created by wind action: sand dunes and their types – yardangs – loess. Short account of Indian deserts.

Lakes as a geological agent: Definition – origin – classification – deposits – landforms – created by lakes – short account of Indian lakes.

Unit-II

Rivers as a geological agent: - definition – origin – types – erosional, transport, and depositional activity – fluvial landforms due to erosion and depositions – drainage patterns – stages in the rivers life cycle – stream capture and piracy – river rejuvenation – short account of Indian rivers.

Underground Water as a geological agent: erosional and depositional activity of underground water: Karst topography.

Unit-III

Glaciers as a geological agent: Definition – formation – types – movement – glacial erosion and deposition – landforms – glaciofluvial deposition – landforms – glaciofluvial deposits – causes of glaciation – short account of Indian glaciers

Sea and oceans as a geological agent: Definition, waves geological work of wave action – geological work of waves – coastal landforms created by waves – shoreline and their types. Submarine geomorphology:- feature of continental margins and deep ocean basins – submarine canyons. Types of ocean sediments and deposits. Coral reefs and atolls. Short account of Indian coasts.

Unit-IV – Structural Geology

Introduction and scope of structural geology. Introductions to topographical and geologic maps-map scale.

Outcrops: Definition – types - attitude and apparent dip – trends of outcrops - measurement of attitude, ore an outcrop using on Brunton and Clinometer compass

Outcrops configuration of rocks:-

Igneous rocks:- Concordant bodies sills, laccolith, lopolith – phacolith. Discordant bodies: dykes, stocks and batholiths. Volcanic lava flows. Metamorphic features: brief introduction of foliation and lineation and their use geological mapping.

Sedimentary rocks:- Bedding and layers – types of bedding: graded, cross, current. Surface sediment features:- mudcracks, rain imprints, and ripple marks.

Unit-V

Physical properties of rocks: - rock deformation- brittle, plastic and elastic properties of rocks.

Joints: - definition types –classification.

Folds: Definition – parts of a fold systems – criteria for recognition in field and on a map – short note on outliers, inliers, and drag folds.

Faults:- definition-Parts of faults- classification-criteria to distinguish fault from unconformities-criteria for field and map recognition of faults.

Unconformities:- definition-types –recognition in field and in geological maps-geological significance.

Reference

1. Holmes.A(1987).Principles of Physical Geology, ELBS,London.
2. Bloom,A.(1985).Geomorphology. Prentice Hall,New York
3. Radhakrishnan.V.(1996).General Geology ,V.V.P Publication Tuticorin.
4. Mahapatra,G.B.(1994).Text book of physical Geology CBS,Delhi.
5. Mathur ,S.M(2003).Physical Geology of India 2nd Ed,NBT,Delhi.
6. Billings,M.P.(1987).Structural Geology,CBS.Delhi.
7. Gokhale ,N.W.(1996).Theory of Structural Geology, CBS, Delhi.
8. Sathyanarayana Swami,B.S(1994).Structural Geology Dhanpatrai and sons, Delhi.
9. Ray,A.K(1982),Introduction to the study of geological maps,2nd Ed World phen, Calcutta
10. Davis, G.H. (1985). Structural Geology of rocks and region, Wiley, Newyork

**First Year – Second Semester
Core Practical –I**

BGAP01- Structural Geology & Surveying

Study of Topographical maps:

Identification of land forms, major structures such as Fold, Fault, Joint, Unconformities and Intrusions.

Uses of Clinometer and Brunton Compass:

Laboratory exercises in Structural Geology maps - contours – Completion of outcrops.

Three point problems

- (1) Fold maps
- (2) Fault maps
- (3) Unconformity maps

Combination of any two structures:

Such as Fold and Fault, Fault and Unconformities.

Drawing of cross – sections across the geological maps to bring out the structure of the area.

Interpretation of structures, determining the Order of Superposition of beds.

An account of geological sequences that affected the area.

Exercise on structural geology problems/Graphical determination of Dip in gradient.

Determination of True dip by simple calculation.

Determination of Apparent dip by Graphical method.

Determination of Thickness of bed by calculation, on a level ground.

Surveying:

Chain Surveying: Open traverse, closed traverse.

Prismatic compass surveying: Determination of the distance between two inaccessible stations.

Radiation method, Method of intersection

Plane table surveying: Determination of the distance between two inaccessible stations.

Radiation Method, Method of intersection

Leveling: Rise and fall method.

Reference books:

- | | | |
|----------------------------|---|--|
| Punmia | - | Surveying vol I & II |
| Gokale | - | Structural Geology practical manual |
| Compton | - | Field Geology |
| Lashee | - | Field Geology |
| Hussain S.K & M.S. Nagaraj | - | Text book of Surveying (1992) S.Chand & Company, New Delhi |

First Year –Second Semester Allied Theory – II

–Inorganic, Organic and Physical Chemistry – II

Unit – I

- 1.1 Co-ordination chemistry – definition of terms – classification of ligands – Nomenclature – Chelation – Examples. Chelate effect – explanation
- 1.2 Werner's theory – conductivity and precipitation studies. Sidgwick's theory – Effective Atomic Number concept.
- 1.3 Pauling's theory – postulates-Application to octahedral, square planar and tetrahedral complexes. Pauling's theory and magnetic properties of complexes. Merits and demerits of Pauling's theory.
- 1.4 Biological role of Haemoglobin and Chlorophyll (Elementary idea of structure and mechanism of action).
- 1.5 Application of coordination compounds in qualitative and quantitative analysis- separation of Copper and Cadmium ions, Nickel and Cobalt ions- identification of metal ions like Cu, Fe and Ni Quantitative estimation of Ni using DMG, Aluminium using Oxine.
- 1.6 EDTA and its application.
- 1.7 Environmental chemistry: Discussion of the following-Green house effect and global warming Ozonal Hole, Acid rain. BOD and COD and its importance. Sewage treatment – Rainwater harvesting its need, methods and advantages – Solid waste disposal.

Noise pollution, Radioactive pollution – health hazards.

Unit – II

Carbohydrates: Classification, preparation and properties of Glucose and Fructose-discussion of open chain and ring structure of Glucose. Mutarotation Preparation and properties of Sucrose. Structure (detailed discussion of structure not necessary) Properties of Starch, Cellulose and derivatives of Cellulose. Inter conversion of Glucose to Fructose and vice versa.

Amino Acids-Classification, preparation and properties of Glycine. And Alanine. Preparation of peptides (Bergmann method only).

Proteins: Classification according to composition, biological function and shape. Denaturation of proteins.

Unit - III

- 3.1 Chemotherapy: Preparation, uses and mode of action of sulpha drugs-prontosil, sulphadiazine and sulphafuazole. Uses of penicillin, chloramphenicol and streptomycin, Definition and one example each for – analgesics, antipyretics, tranquilizers, sedatives, hypnotics, local anaesthetics and general anaesthetics
- 3.2 Polymer chemistry: Classification of polymers – natural and synthetic – rubber, cellulose, starch, polyamides, polyesters, PVC – (starting materials and uses only). Special properties of polymers.

Unit – IV

Photochemistry: Grotthus – Draper law and Stark – Einstein's law of photochemical equivalence. Quantum yield. Example for photochemical reactions – Hydrogen- Chlorine reaction (elementary idea only) Photosynthesis. Phosphorescence, Fluorescence, Chemiluminescence and Photosensitisation – definition with example.

Phase Rule: Phase rule and the definition of terms in it. Application of phase rule to water system. Reduced phase rule and its application to a simple eutectic system (Pb-Ag) Freezing mixtures.

Unit – V

Electro chemistry: Kohlrausch law – measurement of conductance, pH determination. Conductometric titrations. Hydrolysis of salts.

Deviation of K_h . pH and buffer action in living system. Galvanic cells-EMF – Standard electrode potentials, reference electrodes, electrochemical series and its applications.

Principle of electroplating, pH determination

Corrosion: methods of prevention.

Reference books:

1. Soni.P.L, Text Book of Inorganic Chemistry, Sulthan Chand & Sons.
2. Puri and Sharma, Text Book of Inorganic Chemistry- Vishal publications
3. Jain.M.K, Principles of Organic Chemistry – Vishal publishing Co.
4. Kundu and Jain, Physical Chemistry, S.Chand.
5. Puri, Sharma and Pathania, Text book of Physical Chemistry, Vishal Publishing Co

Allied Practical – I

- Allied Chemistry

I. TITRIMETRY

- i.** Estimate of Sodium hydroxide – Standard sodium carbonate.
- ii.** Estimate of Hydrochloric acid – Standard Oxalic acid.
- iii.** Estimation of Borax – Standard Sodium carbonate.
- iv.** Estimation of Ferrous sulphate – Standard Mohr's Salt.
- v.** Estimation of Oxalic Acid – Standard Ferrous Sulphate.
- vi.** Estimation of Sodium hydroxide- Standard Potassium permanganate
- vii.** Estimation of Ferrous iron using diphenylamine as internal indicator.

II. ORGANIC ANALYSIS

- i.** Detection of elements –nitrogen, sulphur and halogens.
- ii.** Detection of aliphatic or aromatic
- iii.** Detection of whether saturated or unsaturated compounds.
- iv.** Preliminary tests and detection of functional groups: aldehydes, phenols, aromatic amines, aromatic acids, dicarboxylic acids, Urea, benzamide & carbohydrate.

இரண்டாம் வருடம் - மூன்றாம் பருவம் தமிழ்

தாள்- 3: காப்பியங்களும் புதினமும்

அலகு 1: (சமணமும் புத்தமும்)

- | | | |
|-------------------|---|---|
| அ) சிலப்பதிகாரம் | - | வரந்தரு காதை |
| ஆ) மணிமேகலை | - | வஞ்சிமாநகர் புக்க காதை |
| இ) சீவக சிந்தாமணி | - | மண்மகள் இலம்பகம் |
| ஈ) நீலகேசி | - | தருமவுரைச் சருக்கம் |
| | | நாட்டுச் சிறப்பு (பாடல் எண் 1 முதல் 26 வரை) |

அலகு 2: (சைவம், வைணவம், இசுலாம், கிறித்துவம்)

- | | | |
|------------------|---|--|
| அ) பெரிய புராணம் | - | மானக்கஞ்சாறு நாயனார் புராணம் |
| ஆ) கம்பராமாயணம் | - | சுந்தர காண்டம் |
| | | திருவடி தொழுத படலம் |
| | | (பாடல் 44முதல்93வரை 50 பாடல்) |
| இ) சீறாப்புராணம் | - | கள்வரை நதிமறித்த படலம் (விலாதத்துக் காண்டம்) |
| ஈ)தேம்பாவணி | - | பாலைபுகுபடலம் |

அலகு 3: (புதினம்)

- | | | |
|-----------------------|---|--|
| வெ. இறையன்பு ஐ.ஏ.எஸ். | - | “ஆத்தங்கரை ஓரம்” - நியூ செஞ்சரி புக் ஹவுஸ் |
| | | சென்னை – 600 098. |

அலகு 4: (இலக்கிய வரலாறு)

- (அ) தமிழ்க் காப்பிய இலக்கணம், காப்பியத் தோற்றமும் வளர்ச்சியும்.
- (ஆ) ஐம்பெருங்காப்பியங்கள்
- (இ) பெருங்காதை
- (ஈ) பெரியபுராணம்
- (உ) கம்பராமாயணம்
- (ஊ) சீறாப்புராணம்
- (எ) தேம்பாவணி
- (ஏ) தமிழ் இலக்கண வரலாறு

பார்வை நூல்கள் :

1. முனைவர் திருமதி. அ. ஜெயம், எம்.ஏ., பி.எச்.டி.,
திருமதி சந்திரலேகா வைத்தியநாதன், எம்.ஏ., எம்.பில்., ஜனகா பதிப்பகம், 15/63,
தம்பையாசாலை, மேற்கு மாம்பலம், சென்னை – 33.
2. ஜெ.ஸ்ரீசந்திரன் - 'தமிழ் இலக்கிய வரலாறு' – வர்த்தமானன் பதிப்பகம், சென்னை- 17.

அலகு 5: (மொழித்திறன்)

(அ) யாப்பிலக்கணம்

(அசை, சீர், மோனை, எதுகை, இயைபு, துறை, தாழிசை, விருத்தம்)

(ஆ) அணியிலக்கணம்

(உவமை, உருவகம், பின்வருநிலை, தற்குறிப்பேற்றம், பிறிது மொழிதல், சிலேடை,
வேற்றுமை, வேற்றுப்பொருள், வைப்பு, பாவிகம்)

(இ) ஆங்கில அலுவலகக் கடிதத்தைத் தமிழில் மொழி பெயர்த்தல்

பார்வை நூல்கள்:

1. கா.பட்டாபிராமன் - 'மொழி பெயர்ப்புக்கலை' – நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை-600 098
2. சண்முக வேலாயுதம் - 'மொழி பெயர்ப்பியல்' – உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

Foundation Course
Second Year – Third Semester
ENGLISH – PAPER – III

I. Detailed Text : Contemplations II edited by G. Radhakrishna Pillai
Published by : Foundation Books Cambridge House, Chennai.

First Five Lessons:

1. The Model Millionaire - Oscar wilde.
2. The Man who E-mailed the World - Po Bronson
3. Mirror - Sylvia Plath.
4. The Town by the Sea - Amitav Ghosh.
5. Two Gentlemen of Verona - A.J. Cronin.

II. Extensive Reader - (Non Detailed Text):
Five Modern One Act Plays - edited by A.S. Shahane
Published by Blackie Books, Chennai – 2.

III. Grammar

Prescribed text book : FORM AND FUNCTION

By V. Sasikumar and V. Syamala
Emerald Publishers, 15A, 1st floor, Casa Major Road,
Egmore – Chennai 8,

1. Greeting and Introducing
2. Inviting a person
3. Seeking Permission
4. Offering a Suggestion and Giving an Advice
5. Persuading

V. Writing Skills

1. Writing a memorandum
2. Writing minutes of the proceedings of a meeting
3. Notices

Book Recommended (for IV & V)

Communication Skills for Undergraduates
-Dr. T.M.Farhathullah, RBA Publications, Chennai – 600 003.

Second Year – Third Semester Core Course– III

BGC03 - Paleontology

Unit – I

Definition of Fossil – Nature and modes of preservation of Fossils – Uses and significance of fossils – Index fossils – zone fossils – Geological Time Scale. General morphology, Classification, Geological history and Stratigraphical importance of the following invertebrates :

Phylum Mollusca – Classes – Pelecypoda, Gastropoda and Cephalopoda.

Unit - II

General morphology, Classification, Geological history and Stratigraphical importance of the following invertebrates:

Phylum Coelenterata	-	Class Anthozoa (Corals)
Phylum Echinodermata	-	Classes – Echinoidea, Crinoidea and Blastoida.

Unit – III

General morphology, Classification, Geological history and Stratigraphical importance of the following invertebrates :

Phylum Brachiopoda		
Phylum Arthropoda	-	Class Trilobita

Unit – IV

An outline of the classification of Vertebrates – Principles of Evolution as applied to vertebrate paleontology – Sequence of Vertebrates through geologic time – Evolution of Horse, Elephant, Dinosaurs and Man.

Phylum Hemichordata – Class Graptolithina (Graptozoa)

Unit – V

An outline of classification of Plant Kingdom – A short account of the following Plant fossils – Glossopteris – Gangmopteris – Calamites – Lepidodendron – Sigillaria – Ptilophyllum.

Introduction of important micro fossils Foraminifera, Ostracods, Radiolaria Spores and pollens

Text Books

1. P.C. Jain and M.S. Anantharaman (2003) – Palaeontology – Evolution and Animal distribution – Vishal Publishing Co., Jalandhar.
2. Henry Woods (1967) – Invertebrate Palaeontology – Cambridge University Press, London.
3. Rhona M. Black (1972) – The Elements of Paleontology – Cambridge University Press.
4. Bernhard Kummel (1961) – History of the Earth – W.H. Freeman and Company, San Francisco.

Reference Books

1. Raup, D.M. and Stanley, S.N. (1971) – Principles of Paleontology – Freeman & Co.,
2. Edwin H. Colbert (1976) – Evolution of the Vertebrates – Wiley Eastern Limited, New Delhi.
3. Arnold, C.A. (1947) An Introduction to Palaeobotany – Mc Graw Hill.
4. Moore, Lalicker, and Fisher – Invertebrate Palaeontology.

Second Year – Third Semester Allied Theory– III

General physics

Unit-I

Mechanics, sound

Projectile-range up and down an inclined plane-Impulse –impact –laws of impact-coefficient of restitution –direct impact between two spheres –Compound pendulum-theory-determination of acceleration due to gravity.

Production of ultrasonic waves –Piezo electric crystal method –application –acoustics of building –reverberation –reverberation time absorption coefficient –Sabine’s formula.

Unit-II

Properties of matter

Newton’s law of gravitation –determination of gravitational constant-Boy’s method-bending of beams –expressions for bending moment –expression For the depression of the free end of the cantilever-uniform and uniform bending theory and experiment –torsion expression for couple per unit twist-torsion pendulum-theory rigidity modulus by static torsion-surface tension –excess pressure inside a curved liquid surface-surface tension and interfacial surface tension drop weight method.

Unit-III Heat

Specific heats: Determination of C_p and C_v –van –der-wal ‘s equation –critical constants and their determination-Expressions for Critical constants- Thermal conductivity of a bad conductor-Lee’s disk method

Joule –Thomson effect-porous plug experiment-theory-Inversion temperature-Boil temperature-Liquefaction of gases –Hydrogen and Helium-Adiabatic demagnetization.

Unit IV: Optics

Small angled prism – formation of two thin prisms to produce dispersion without deviation without dispersion – constant deviation spectroscope – Interference – Air wedge – Thickness of a wire – Jamin’s interferometer – Raleigh’s interferometer- Polarisation – Specific rotatory power and its determination.

Unit V: Electricity

Carey Foster’s bridge – Theory – measurement of resistance – potentiometer Low range voltmeter and ammeter calibration – Theory of moving coil Ballistic Galvanometer – Determination of current and voltage sensitivities – Comparison of capacities – B_H curve – magnetometer methods.

Books For Study And Reference

1. Mechanics and mathematical methods - R. Murugesan, S Chand & Co.
2. Properties of matter and acoustics - R. Murugesan, S Chand & Co.
3. Heat and Thermodynamics - Brijlal and Subramaniam, S Chand & Co
4. Optics and Spectroscopy - R. Murugesan, S Chand & Co.
5. Electricity and Magnetism - R. Murugesan, S Chand & Co.

**Second Year – Third Semester
Allied Theory– III**

AM 01 - Algebra, Calculas and Vector Analysis -I

Unit -I

Matrices

Characteristic Equation – Eigen values vectors – properties – problems – rank of matrix – problems – solutions of simultaneous using matrixes - consistency condition. (12 hours)

Unit- II

Theory of Equations

Polynomial equations – Relation between roots and coefficients –Imaginary roots and irrational roots – Solving equations under given conditions – Transformation of equations – Descarte s rule of signs.

Unit- III

Differential Calculas

Definition of derivative different types of differentiations –standard formula –successive differentiation –nth derivative – Leibnitz formula- problems (12 hours)

Unit - IV

Partial Differentiation – Euler’s theorem –Curvature –Radius of curvature in Cartesian and polar co-ordinates (12hours)

Unit - V

Vector Anaysis

Gradient ϕ , divergence and curl of a vector point function – solenoidal and irrotational vectors-unit normal vector-directional dervative –problems. Vector Integration-Stoke’s theorem,Gauss theorem and Green’s theorem-Statement only –application.

Text Books;

1. T.K Manickavasagam pillai-ALLIED MATHEMATICS S.Viswanathan &Co, Chennai.
2. P.R.Vittal-ALLIED MATHEMATICS Margham Publication, Chennai.
3. A.Singaravelu-ALLIED MATHEMATICS, Meenakshi Traders, Chennai.

இரண்டாம் ஆண்டு – நான்காம் பருவம் தமிழ்

தாள்4: பண்டைய இலக்கியங்களும் நாடகமும்

அலகு1: (சங்க இலக்கியம்)

அ. திருமுருகாற்றுப் படை	-	முதலிரு படைவீடுகள் (1-25)
ஆ. குறுந்தொகை	-	பா.எண். 31,68,126,200,386 (5 பாடல்கள்)
இ. புறநானூறு	-	பா.எண். 2,3,4,5,6 (5 பாடல்கள்)
ஈ. பதிற்றுப்பத்து	-	எட்டாம்பத்து (அரிசில் கிழார்) முதல் 4 பாடல்கள்

அலகு2: (அற இலக்கியம்)

அ. திருக்குறள்	-	1. பெரியாரைப் பிழையாமை 2. பொழுதுகண்டிரங்கல்
ஆ. நாலடியார்	-	1. மெய்ம்மை 2. சுற்றந்தழால்
இ. திரிகடுகம்	-	பா.எண்.6,8,27,49,96 (5 பாடல்கள்)
ஈ. நான்மணிக்கடிகை	-	பா.எண். 13,27,34,90,93, (5 பாடல்கள்)
உ. சிறுபஞ்ச மூலம்	-	பா.எண்.16,27,34,68,73, (5 பாடல்கள்)

அலகு 3,4: (நாடகம்)

முத்து வேலழகன் - “ஜன்மா” – (அம்பையின் கதை) சீதை பதிப்பகம், 6/16 தோப்பு வெங்கடாசலம் தெரு, திருவல்லிக்கேணி, சென்னை – 5.

அலகு5: (இலக்கிய வரலாறு, பொருளிலக்கணம்)

அ. இலக்கிய வரலாறு

1. முச்சங்க வரலாறு
2. சங்க காலம் பொற்காலம்
3. பத்துப்பாட்டு
4. எட்டுத்தொகை
5. பதினொன் கீழ்கணக்கு நூல்கள்

பார்வை நூல்கள்

1. முனைவர் திருமதி. அ. ஜெயம், எம்.ஏ., பி.எச்.டி.,
திருமதி சந்திரலேகா வைத்தியநாதன், எம்.ஏ., எம்.பில்., ஜனகா பதிப்பகம், 15/63,
தம்பையாசாலை, மேற்கு மாம்பலம், சென்னை – 33.
2. ஜெ.ஸ்ரீசந்திரன் - 'தமிழ் இலக்கிய வரலாறு' – வர்த்தமானன் பதிப்பகம், சென்னை- 17.

ஆ. பொருள் இலக்கணம்

1. அகத்தினை - முல்லை, குறிஞ்சி, பாலை, மருதம், நெய்தல்
(முதல்,கரு,உரிப்பொருள்கள்)
2. புறத்தினை - வெட்சி,கரந்தை,வஞ்சி,காஞ்சி,நொச்சி,உழிஞை,தும்பை,
வாகை,பாடாண்,பொதுவியல் (திணை விளக்கம்)
3. பாடப்பகுதியில் சங்கப்பாடல்களின் துறை பற்றிய விளக்கம்.

**Second Year – Forth Semester
ENGLISH – PAPER – IV**

I. Detailed Text : Contemplations II

Edited by G. Radhakrishna Pillai

Published by : Foundation Books Cambridge House.

Lessons from 6 to 10:

Siddhartha – Edwin Arnold

How to Escape from Intellectual Rubbish – Bertrand Russell

The Affliction of Margaret – William Wordsworth

The Forum – William Shakespeare

Marriage is a Private Affair – Chinua Achebe

II. Extensive Reder – (Non Detailed Text):

The Moonstone – Wilkie Collins

Publisher : Macmillan

III. Grammer

Prescribed text book: FORM AND FUNCTION

- V. Sasikumar and V. Syamala

Emeraled APublisher, 15A, 1sr Floor, Casa Major Road, Egmore- Chennai -8.

1. Phrasal verbs
2. Conditinal clauses and other devices
3. Relative clauses

IV. Communication Skills

1. Asking Questions
2. Praising and Complimenting
3. Complaining and Apologizing
4. Expressing Sympathy
5. Phoning

V. Writing Skills

1. Designing a Resume
2. Writing a report
3. Proposals

Book Recommended (For IV & V):

Communication Skills for Undergraduates

-Dr. T.M. Farhathullah, RBA Publishers, Chennai – 15.

Second Year – Fourth Semester
Core Course– IV

BGC04 - Principles of Stratigraphy and Indian Geology

Unit – I

Definition of Stratigraphy.

Principles and laws of stratigraphy - Correlations – concept of Homotaxis –Contemporaneity – Stratigraphic Nomenclature: Litho, Bio, Chrono Stratigraphic units – Geological Time Scale – Standard Geological divisions – Imperfections in geological records.

Unit – II

Physiographic divisions of India – Structure and tectonic divisions of India: Peninsular India, Extra Peninsular India and Indo-Gangetic plains – Study of the Archaean groups – Dharwar System of Karnataka –Cuddapah Supergroup, Delhi Supergroup.

Unit – III

Study of the following geological formations of India: Vindhyan Supergroup, Kurnool Supergroup – Palaeozoic Formation: Cambrian of Salt range – Haimanta system of Spiti – Ordovician, Silurian and Devonian of Spiti – Carboniferous of Spiti and Kashmir – Permian of Salt Range and Spiti.

Unit – IV

Gondwana Sequence - Classification, Lithology, Deposits, Fossils, Climate and Economic Importance – Triassic of Spiti – Jurassic of Kutch – Cretaceous of Trichinopoly and Narmada Valley.

Unit – V

Deccan Traps – Distribution, Structure – Lameta beds – Intertrappean and Infratrappean beds – Bagh beds. Tertiary Succession: Rise of Himalayas –Geological succession of Assam, Tamil Nadu and Kerala – Siwalik Group– Pliocene ice ages in India – Karewa formation – Recent formation: Alluvial deposits.

Text Books

1. M.S. Krishnan (1986) Stratigraphy of India and Burma, Higginbothams, 6th Edition.
2. D.N. Wadia (1953) Geology of India, Tata McGraw - Hill Publishing Company Ltd., New Delhi.
3. Ravindrakumar (1985) Fundamentals of Historical Geology and Stratigraphy of India, Wiley Eastern Ltd., New Delhi.

Reference Books

1. Sam Boggi Jr. (1987) – Principles of Stratigraphy and Sedimentology, Merrill Co.
2. A.J. Weller (1966) Stratigraphic Principles and Practice University Book Depot, New Delhi.
3. J.W. Gregory and B.H. Barroet – General Stratigraphy Methuen.

Second Year – Forth Semester Core Practical– II

BGCP02 - Paleontology and Stratigraphy

Paleontology:

Identification of fossils on the basis of morphological characters and fixing the biological position and range in geological time for the following classes of fossils.

Pelecypods	:	Meretrix, Arca, Cardium, Cardita, Pecten, Venus, Unio, Pinna, Modiola, Lima, Inoceramus, Lophya(Alectryonia), Gryphaea, Exogyra, Spondylus, Pectenculus, Radiolites, Trigonina and Ostrea.
Gastropods	:	Turritella, Cerithium, Turbo, Trochus, Natica, Conus, Fusus, Physa, Busycon, Voluta, Murex, Bellerophon, Helix, Cypraea, and Euomphalus.
Cephalopods	:	Orthoceras, Nautilus, Goniatites, Ceratites, Acanthoceras, Schloenbachia, Scaphites, Perisphinctes, Turritiles, Baculites, & Belemnites.
Brachiopods	:	Lingula, Lingulella, Spirifer, Productus, Terebratula, Rhynchonella, Pentamerus, Atrypa and Athyris.
Anthozoans	:	Calceola Zaphrentis, Montilivaltia, Cistiphyllum, Thecosmilia, Cyclolites, Favosites, Omphyma, Halysites and Lithostrotion.
Echinoidea	:	Echinus, Cidaris, Hemicidaris, Micraster, Holaster, Hemiaster and Stigmatophygus.
Crinoidea	:	Encrinus, Apiocrinus and Pentacrinus
Blastoidea	:	Pentremites.
Trilobites	:	Paradoxides, Calymene, Olenellus, Olenus, Asaphus, Trinucleus, Phacops.
Graptolites	:	Monograptus, Rastrites, Diplograptus, Phyllograptus, Tetragraptus.
Plant fossils	:	Glossopteris, Gangamopteris, Ptilophyllum, Lepidodendron Sigillaria, Stigmara, Calamities.
Foramanifera:		Textularia, Quinqueloculina, Globigerina, Lagena and Nummulites.
Porifera	:	Siphonia and Ventriculites.
Stratigraphy	:	Arranging the different Indian Stratigraphic horizons in accordance with age, Stratigraphic position, fossil content and order of superposition.

Second Year –Forth Semester
Allied Theory - IV

06UPHA2- Modern Physics, Sopectroscopy and Electronics

Unit – I: Atomic Physics

Vector Atom Model – Spatial Quantization – Spinning electron – Quantum numbers associated with vector atom model – Coupling schemes – LS coupling – jj coupling – Pauli's exclusion principle – Periodic classification of elements – example of electron configuration – Stern – Gerlach experiment.

Unit – II

Nuclear models – liquid drop model – semi empirical mass formula – Merits and demerits – Shell model – evidences – Collecgtive model

Nuclear radiation detectors – Ionisation chamber – Geiger Muller counter – Wilson cloud chamber – Bubble chamber

Particle accelerators – Synchrocyclotron – Betatron Solid State

Physics – Bonding in crystals – ionic bond – covalent bond – metallic bond – molecular bond – hydrogen bond

Unit – III

Molecular spectra – Theory of pure rotational spectrum – origin of vibratin – rotation spectrum – electronic spectra – Laser Raman spectroscopy – Resonance spectroscopy =- Basic theory of NMR and ESR.

Unit – IV

Semiconductor physics – construction and characteristics of FET, SCR,UJT – Phase shift oscillator working with theory – multivibrator – astable – monostable –bistable – basic circuits – Operational amplifier as differentiator and integrator.

Unit – V Digital Electronics

Binary, octal hexadecimal numbers and their inter conversion – Laws of Boolean algebra – De Morgan's theorems – NAND/ NOR as Universal building blocks – Karnaugh mapping – Pairs – quads – octets – simplification of Boolean expressions – Half and full adder – Half and full subtractor.

Books for study

Modern Physics, R.Murugesan S Chand & Co Twelfth edition
Digital Principles and applications, Malvino & Leach TMH
Principles of Electronics – VK Mehta S Chand & Co

Books for refrence

Modern Physics J.B. Rajan S Chand & Co
Hand book of Electronics Gupta & Kumar Pragathi Prakashan

Second Year –Forth Semester Allied Theory - IV

AM 02 – Integration and Differential Equations

Unit – I INTEGRATION

Integration by parts $\int_0^{\frac{\pi}{2}} -\sin x \, dx$, $\int_0^{\frac{\pi}{2}} x \cos^n x \, dx$, $\int_0^{\frac{\pi}{2}} \tan^n x \, dx$, $\int_0^{\frac{\pi}{4}} x^n e^{ax} \, dx$, $\int_0^a e^{-x} x^n \, dx$ -

Definite integrals – Properties – Reduction formulae – problems.

Unit – II ORDINARY DIFFERENTIAL EQUATIONS

Second order differential equations with constant coefficients 0- Particular integrals of the type e^{ax} V- differential equations with variable Coefficients.

Unit – III PARTIAL DIFFERENTIAL EQUATIONS

Definition – Complete, + - singular and general integrals – Solutions of standard types $f(p,q) = 0$, $f(x,p,q) = 0$, $f(y,p,q) = 0$, $f(z,p,q) = 0$, $f_1(x,p) = f_2(x,p)$ – Clairant's form – Lagrange's equations $Pp + Qq = R$ - problems.

Unit – IV LAPLACE TRANSFORM

Definition – Laplace transform of standard functions – simple theorems – problems – Inverse Laplace transform – solving second order differential equations using Laplace transforms

Unit – V FOURIER SERIES

Definition – Fourier Coefficients – Periodic functions with period 2π - Half range series – Cosine series – Sine series – problems.

Text books:

1. T.K. Manickavasagam pillai – ALLIED MATHEMATICS. S. Viswanathan & Co, Chennai.
2. P.R. Vittal – ALLIED MATHEMATICS. Margham Publications, Chennai.
3. A. Singaravelu, ALLIED MATHEMATICS. Meenakshi Traders, Chennai.

**Second Year –Forth Semester
Allied Practical– II**

Physics Practical

1. Young's modulus –non uniform bending – pin and microscope
2. Young's modulus – uniform bending – pin and microscope
3. Torsion pendulum – rigidity modulus
4. Static torsion – rigidity modulus
5. Surface tension and interfacial surface tension – drop weight method
6. Specific heat capacity of liquid – method of mixtures – half time radiation correction
7. Lee's disc – coefficient of thermal conductivity of a bad conductor
8. Sonometer – frequency of fork.
9. Air Wedge – thickness of wire
10. Newton's – radius of curvature
11. Spectrometer – I – d curve
12. Spectrometer – dispersive power of a grating
13. Potentiometer – ammeter calibration
14. Field along the axis of a coil – BH
15. Voltage regulator using Zener diode.
16. DeMorgan's theorems using ICs.

VALUE EDUCATION

மனவளக்கலையோகா

80 Hours

Unit – I Yoga and Physical Health

- 1.1 Physical Structure – Three bodies – Five Limitations
- 1.2 Simplified Physical Exercises – Hand Exercises – Leg Exercises – Breathing Exercises – Eye Exercises – Kapalapathi
- 1.3 Maharasanas 1-2 – Massages – Acu-Puncture - Relaxation
- 1.4 Yogasanas – Padmasana – Vajrasanas – Chakrasanas(Side) – Viruchasanas – Yoga Muthra – Patchimothasanas – Ustrasanas – Vakkarasanas – Salabasanas

Unit – II – Art of Nurturing the life force and Mind

- 2.1 Maintaining the Youthfulness – Postponing the ageing process
- 2.2 Sex and Spirituality – Significance of sexual vital fluid – Married life – Chastity
- 2.3 Ten stages of Mind
- 2.4 Mental frequency – Method for concentration

Unit – III – Sublimation

- 3.1 Purpose and Philosophy of life
- 3.2 Introspection – Analysis of Thought
- 3.3 Moralization of Desires
- 3.4 Neutralization of Anger

Unit – IV – Human Resources Development

- 4.1 Eradication of worries
- 4.2 Benefits of Blessings
- 4.3 Greatness of Friendship
- 4.4 Individual Peace and World Peace

VALUE EDUCATION மனவளக்கலையோகா		
80 hours		
Units	Title of the Paper	Hrs of Instruction
Unit – I Yoga and Physical Health (16 Hours)	1.1 Physical structure of human body	(4 hours)
	1.2 Simplified Physical Exercises	(4 hours)
	1.3 Maharasanas	(4 hours)
	1.4 Yogasanas	(4 hours)
Unit – II Art of Nurturing life force and Mind (16 Hours)	2.1 Maintaining youthfulness	(4 hours)
	2.2 Sex and Spirtuality	(4 hours)
	2.3 Ten stages of Mind	(4 hours)
	2.4 Mental frequency	(4 hours)
Unit – III Sublimation (16 Hours)	3.1 Purpose of life	(4 hours)
	3.2 Analysis of Thought	(4 hours)
	3.3 Moralization of Desire	(4 hours)
	3.4 Neutralization of Anger	(4 hours)
Unit – IV Human resource development (16 Hours)	4.1 Eradication of Worries	(4 hours)
	4.2 Benefits of Blessings	(4 hours)
	4.3 Greatness of Friendship	(4 hours)
	4.4 Individual Peace	(4 hours)
Unit – V Law of Nature (16 Hours)	5.1 Cause and Effect system	(4 hours)
	5.2 Purity of thought and Deed	(4 hours)
	5.3 Love and Compassion	(4 hours)
	5.4 Cultural Values	(4 hours)

Third Year – Fifth Semester Core Course– V

BGC05 - Crystallography and Optical Mineralogy

Crystallography:

Unit – I

Definition of crystals – Morphological characters: Faces – Edges – Solid angles – Interfacial angles – Contact Goniometer and its uses – Laws of crystallography – Axial ratio – Parameters – Indices and Symbols – Millerian system of notation – Symmetry Elements: Axis of symmetry, Plane of symmetry, Centre of symmetry – Classification of crystals into Systems: Forms – Holohedral, Hemihedral, Hemimorphic and Enantiomorphous forms.

Unit – II

Cubic System – Study of the Symmetry elements, Forms and representative minerals of Normal, Pyritohedral, Tetrahedral and Plagiohedral classes. Tetragonal System – Study of the Symmetry elements, Forms and representative minerals of Normal, Hemimorphic, Tripyramidal, Pyramidal – hemimorphic and Sphenoidal classes. Hexagonal Division – Study of the Symmetry elements, Forms and representative minerals of Normal, Hemimorphic, Tripyramidal and Trapezohedral classes. Rhombohedral Division – Rhombohedral, Rhombohedral – hemimorphic Trirhombohedral and Trapezohedral classes.

Unit – III

Orthorhombic System – Study of the Symmetry elements, Forms and typical minerals of Normal, Hemimorphic and Sphenoidal classes. Monoclinic system – Study of the Symmetry elements and Forms of the Normal class. Triclinic System – Study of the Symmetry elements and Forms of the Normal class. Twinning : Definition – Evidence of Twinning – Laws of Twinning – Composition plane – Twinning plane – Twin axis – Types of twinning – Simple – Repeated (Polysynthetic) – Contact – Penetration twinning.

Optical Mineralogy:

Unit –IV

Nature of light – Corpuscular theory, Electromagnetic theory & Quantum theory – Ordinary light and Plane polarized light – Reflection and Refraction – Refractive Index – Critical angle – Total internal reflection – Single refraction. Polarising / Petrological microscope and its parts - Behaviour of light in its passage through petrological microscope – Optical accessories and their uses – Gypsum plate – Mica plate – Quartz wedge.

Unit – V

Classification of minerals: Isotropic and Anisotropic – Double refraction in Calcite – Nicol prism and its construction. Properties of Uniaxial minerals under parallel and crossed Nicols – Optic axis – Optic sign – Retardation – Birefringence; - Extinction – Types of Extinction – Interference of light – Order of interference colour – Determination of order of interference colour – Dichroism : Properties of Biaxial minerals under parallel and crossed Nicols – Indicatrix – Optic axes – Optic axial angle – Extinction and Extinction angles – Trichroism / Pleochroism.

Text Books

1. E.S. Dana (1955) – A Text Book of Mineralogy – Wiley Eastern Ltd.,
2. H.H. Read (1976) – Rutley's Elements of Mineralogy – Thomas Murby & Co., London.
3. P.R.J. Naidu (1967) – Johannsen's Optical crystallography – Allied Publishers Pvt. Ltd.,
4. M.G. Chakrapani Naidu (1982) Optical Mineralogy – COSIP – ULP in Geology – Southern and Western Region, India.

Reference Books

1. Cornelius .S. et.al. – Dana's Manual of Mineralogy, John Wiley & Sons, New York.
2. Paul F. Kerr (1977) Optical Mineralogy – McGraw – Hill Book Company, New York.
3. Philips Wm. Revell (1971) – Mineral Optics – Principles and Techniques – W.H. Freeman and company, San Francisco.
4. Wahlstrom E.E. 1969, Optical crystallography John Wiley, New York.
5. Bishop, Principles of Crystallography, Oxford.

**Third Year – Fifth Semester
Core Course– VI**

BGC06 - Mineralogy

Unit – I

Mineral – Definition and Classification – General chemistry of Minerals – Bonding, Physical properties of minerals – Habit – Color – Streak – Luster – Fracture – Cleavage – Diaphaneity – Hardness – Specific gravity.

Unit – II

Characters of minerals depending upon heat – magnetism – electricity – radioactivity – Isomorphism – Polymorphism – Silicate structure.

Unit – III

Physical, chemical, optical properties and mode of occurrence of the following group of minerals – Quartz, Feldspar, Feldspathoid and Zeolite.

Unit – IV

Physical, Chemical, Optical properties and mode of occurrence of the following group of minerals – Olivine, Pyroxene and Amphibole.

Unit – V

Physical, Chemical and Optical properties of Mica and Garnet group of minerals. Descriptive study of the following minerals – Talc, Gypsum, Fluorite, Apatite, Calcite, Dolomite, Epidote, Chlorite, Tourmaline, Staurolite, Kyanite, Sillimanite, Corundum, Magnetite, and Hematite.

Text Books

1. Dana .E.S. (1955), A Text Book of Mineralogy – Wiley Eastern Ltd.
2. Brian Mason and. Berry L.G (1961) – Elements of Mineralogy W.H. Freeman & Co.,
3. Read H.H. – (1974) – Rutley's elements of Mineralogy, Thomas Murphy & Co.

Reference Books

1. Kerr P.F. (1977), Optical Mineralogy McGraw Hill Company.
2. Wahlstrom E.E. (1960), Optical, Crystallography, John Wiley New Delhi.
3. Winchell A.N., (1968), Elements of Optical Mineralogy Part, Willey Eastern.

Third Year – Fifth Semester Core Course– VII

BGC07 – Igneous, Metamorphic and Sedimentary Petrology

Unit – I

Rocks – Classification into Igneous, Sedimentary and Metamorphic groups – distribution of elements in the crust – Division of igneous rocks as plutonic, hypabyssal and volcanic – intrusive and extrusive forms – structures – Textures and microstructures.

Unit – II

Classification of igneous rocks Tyrrels – Composition and constitution of magma – study of unicomponent magma – Binary system – Diopside and Anorthite, Albite and Anorthite, Forsterite and silica systems – Ternary system represented by Albite – Anorthite – Diopside – Bowen's Reaction Principle.

Unit – III

Petrographic characteristics of Granite, Diorite, Syenite, Gabbro, Dolerite, Basalt, Pegmatite and Aplite Rocks – Anorthosites and ultramafic rocks.

Unit – IV

Principles of Sedimentation, Classification of sedimentary rocks Textures and structures of sedimentary rocks – Descriptive petrography of Residual Sediments, Clastics, Chemical and Organic deposits.

Unit-V

Definition – Agents and kinds of metamorphism – Classification of metamorphic rocks - Structures and textures of metamorphic rocks – Depth zones – a brief study of facies and grades. Cataclastic meramorphism and its products – Thermal and Dynamothermal and Plutonic metamorphisms on quartzo Felspathic, Argillaceous, Calcareous and basic ingneous rocks – Charnockites and Metasomatism – A brief account on Migmaties, Anataxis, Palingenesis and retrogressive metamorphism.

Text Books

The Principles of Petrology - G.W. Tyrrell

Reference Books

- | | | |
|-------------------------------------|---|----------------------------------|
| 1. Petrology of the igneous rocks | - | F.H. Hatch and Wells, CBS |
| 2. Petrology | - | T. Huang |
| 3. Petrography, | - | H. Williams, F.J. Gilbert, S.L.M |
| 4. Interpretation of Phase diagrams | - | W.G. Ehlers, E.G |
| 5. Metamorphism | - | A.Harkar, London, |
| 6. Metamorphism | - | B.Baskar Rao, Oxford, New Delhi. |

Core Course- VIII

BGC08 - Hydrogeology and Environmental Geology**Hydrogeology****Unit – I**

Definition of Hydrology and Hydrogeology- Groundwater in Hydrologic cycle – Origin of Groundwater: - Meteoric water, Connate water, Magmatic water, Juvenile water, Metamorphic water; water bearing formations:- Aquifers, Aquiclude, Aquifuge, Aquitard; Types of Aquifers:- Unconfined aquifer, Confined aquifers, Leaky aquifer. Vertical distribution of groundwater:- Water Table, Zone of Aeration, Zone of Saturation. Springs, Artesian well and Piezometric surface.

Unit –II

Aquifer properties and Groundwater flow:- Porosity, Soil classification based on particle size, Specific yield, Specific retention; Determination of specific yield:- Laboratory methods, Field methods: Storage coefficient of permeability, Laboratory measurement of permeability – Constant head permeameter – falling head permeameter;

Unit – III

Groundwater investigation:- Electrical resistivity method – Wenner's electrode arrangement-Schlumberger's electrode arrangement;

Groundwater Quality:- Analysis of groundwater Hydrogen ion concentration (P^H) – Total dissolved solids (TDS) - Specific conductance – Hardness – Mineral characteristics – Expression of analysis:- cations, anions:

Groundwater Recharge:- Recharge methods - Basin method, Stream channel method, Ditch or Furrow method, Flooding method, Irrigation method, Pit method, Recharge well method. Rainwater Harvesting systems.

Environmental Geology**Unit –IV**

Introduction to Environmental Sciences-A brief account of Energy system. Classification of Natural resources – Renewable and Non-renewable resources. Hazards and remedial measures relating to Earthquake, Landslides, Floods and Soil erosion.

Unit –V

Environmental degradation due to mining and mineral processing. Sources and causes of Groundwater pollution. Drinking water quality standards. Deforestation and Erosion. Environment management of radioactive waste.

Text Books

Hydrogeology

1. D.K. Todd (1980) – Groundwater Hydrology – John Wiley & Sons- New York.
2. Davis and De weist (1965) – Hydrogeology – John Wiley & Sons- New York
3. H.M. Ragunath (1987) – Ground water – Wiley Eastern Ltd – New Delhi.
4. P. Arul (2000) – Text book of Groundwater – Dhanam Agency – TamilNadu.

Environmental Geology

1. A.N. Strahler and A.H. Strahler (1973) – Environmental Geo- Science – Hamilton Pub. Co. California.
2. D.R. Coates (1981) Environmental Geology – John Wiley and Sons – New York.
3. L.Lindgren (1986) – Environmental Geology – Prentice Hall. New Jersey.

Reference Books

1. W.C. Walton (1979) – Groundwater Resource Evolution – McGraw Hill.
2. A.D. Howard and I. Ramson (1978) – Geology in Environmental Planning – Mc Graw Hill.
3. S.C. Joshi (1978) – Mining and Environment in India – Himalayan Research group – Nainital

Third Year – Sixth Semester
Core Course – IX.

BGC09 - Economic Geology

Unit -I

Definition and scope of economic geology.

Concepts of ore, gangue, tenor, grade, Host rock, and economic value of ore. Classification of mineral Deposits after Lindgren & Bateman.

Controls of ore localization.

Outline of metallogenic epoch and provinces

Unit -II

Processes of ore formation I

Magmatic concentration – sublimation – contact metasomatic – metamorphic – sedimentation

Unit- III

Processes of ore formation II

Hydrothermal cavity filling and replacement – outline of ore shoot – oxidation and supergene enrichment, Residual and mechanical concentration- evaporate deposits – Bactriogenic ore deposits

Unit-IV

Metallic mineral deposits of India

Mineralogy association genesis mode of occurrence and Indian distribution of the following ore deposits :-iron ore deposits,Gold deposits ,Aluminium ore deposits.

Unit-V

Industrial minerals

Mineralogy, association, mode of occurrence and distribution in India of the following mineral based industries. Abrasive, Refractory, Cement, Glass, Ceramic, Paint and Pigments and Fertilizers.

Fuel Geology: Brief outline of coal and petroleum

Text book and reference

1. Bateman,A.M & M.L Jensen (1981), Economic mineral deposits,3rd Wiley & Sons New York.
2. Prasad,U.(2003),Economic Mineral Deposits,CBS,Delhi.
3. Krishnaswamy,S.(1988)Indian mineral resources,Oxford & IBH,Delhi.
4. Dab, S.(1985),Industrial Mineral and Rocks of India, Oxford &IBH,Delhi.
5. Benerjee, D.K (1998), Mineral resources of India World presses Calcutta.
6. Iyyengar, N.K.N,(1964), Minerals of Madras, Dept of commerce and Industries,Guindy,Madras.
7. Gokhole, K.V.G.K and Rao, T.G (1972) Ore deposits of India,Oxford &IBH,Delhi.
8. Krishnan, M.S,(1957),Mineral resources of Madras,Memoir VSO, Geological Survey of India, Calcutta.
9. Coggin Brown J,and A.K Deb,(1995),Indian mineral wealth, Oxford press,Delhi.
10. Levorsen, A.T,(1985),Geology of Petroleum,CBS,Delhi.

Third Year – Sixth Semester

Core Course– X

BGC10 - Remote Sensing and Exploration Geology

Unit – I

Definition – Electromagnetic spectrum – Interaction of electro-magnetic spectrum with Earth and Atmosphere – Atmospheric windows. Types of Remote sensing: Passive and Active remote sensing. Photogeology: Types of Aerial photographs – scales of aerial photographs – Mosaics – Flight procedures – Stereoscope – Photo interpretation elements.

Unit – II

Satellite remote sensing - A short account of LANDSAT, SPOT – Indian Remote Sensing satellites. A brief account of multi spectral scanning – Thermal remote sensing and SLAR. A short account of the Remote sensing techniques in the study of: Drainage patterns, Major land forms, Groundwater study and Mineral Exploration.

Unit – III: Geological Exploration

Introduction: Ore genesis in relation to mineral Exploration. Guides to ore Deposits: - Physiographic, Mineralogical, Stratigraphic, Lithological and Structural guides. Geological techniques: evaluation of outcrops, Panning, Trenching, Pitting, Drilling. A short account of ore reserve estimation – Documentation of exploration data.

Unit –IV : Geochemical Exploration

Introduction – General principle : Mineral Deposits – Primary halo – Secondary halo – Background value – Interpretation – Sampling techniques – Pathfinder elements. A short account of methods of Geochemical Explorations: - Lithogeochemical – Pedogeological – Biogeochemical – Hydrogeochemical methods.

Unit V: Geophysical Exploration

Introduction – Electrical prospecting methods: Resistivity method: True and Apparent resistivity – Electrode arrangements – A short account of resistivity equipment. Magnetic method: Geomagnetic field and its variations – units of measurement – Magnetometers . Gravity method: Nature of gravity field and its variation – Practical units – Gravimeters.

Text Books

1. Arogyaswamy RNP (1980), Courses in Mining Geology, Oxford & IBH Publishers, New Delhi.
2. Panday, S.N (1996), Principles and applications of Photogeology – Wiley.
3. Prasn timer (1972) Applied Geophysics – Chaparang Hall.
4. Ramachandra Rao, Outlines of Physical prospecting – English Book depot. Dehradum.
5. Lilesand and Keifer (2008) Remote Sensing 5th edition.

Reference Books

1. Curran Paul (1975), Principles of Remote sensing – ELBS.
2. Dobrin – Introduction of Geophysical prospecting – McGraw Hill.
3. Miller (1975) – Photogeology - McGraw Hill.
4. Sabins F.F. (1970), Remote Sensing – Freeman.
5. Sharma. P.V. (1976) – Geophysical methods in Geology Elsevier Pub.

Third Year – Sixth Semester
Core Course – XI

BGC11 - Mining and Engineering Geology

Unit – I

Sampling – Principles – types – collection of sample – core samples and their preservation. Drilling – brief account of different types of drilling – Geological logging of borehole samples.

Unit – II

Methods of breaking rocks – A short note on explosives. Surface mining open cast. Alluvial mining: Panning – Slucing – Hydraulicking – Dredging - mine support and stoping – shaft sinking.

Unit – III

Subsurface mining: Criteria to choose subsurface mining, Definition of mining terms: Shaft, Level, Adit, Hanging wall, Footwall, Drive, Cross cut, Tunnel, Raise, Winze and Chute. Stopping – Open stopes – Supported stopes – pillar – Square set filled – Shrinkage stopes, Glory hole mining. Caving methods: Top slicing, Sub level caving, Block caving, Coal mining, Prospecting and Planning – Strip mining – Augering – Room and Pillar method – Long wall method.

Unit – IV

Introduction to Engineering Geology: Engineering properties of rocks, Rock discontinuities, Physical characters of building, ornamental stones and Concrete aggregates. Dams and Reservoirs – Types of dams – Dam sites. Relative suitability of different rocks – Geological investigation in dam sites.

Unit – V

Tunneling – Types, Methods of geological investigation. Road – complicated regions for Roads, Geological problems after road construction – improvement of sites – soil stabilization. Geological investigation on landslides.

Text Books

1. Mckinstry H.E. (1960) – Mining Geology – Asia Pub. Co., Delhi.
2. Arogyaswamy R.N.P. (1988) – Courses in Mining Geology – Oxford and IBH, New Delhi.
3. Parbin Singh (1991) – A text Book of Engineering and General Geology – S.K. Kataria & Sons, Ludhiana Delhi.

Reference Books

1. Thomas R.T. (1979) – An Introduction to Mining – Methun.
2. Blyth F.H. (1995) – Geology for Engineers – ELBS (UK).
3. Fox C.S. (1935) – Engineering Geology.
4. Leggat R.M. Geology and Engineering – McGraw Hill.

Third Year – Sixth Semester
Core Course– XII

BGC12 - Geostatistics and Computer Applications

Unit – I

Geoscience systems and Statistics: Numerical data in Geoscience. Frequency distribution: mean median, mode, dispersion and Measures of central tendency: Merits and Demerits: Measures of Dispersion Skewness and kurtosis, addition, multiplication and division.

Unit – II

Sampling and Sampling plan in Geoscience: Theoretical basis and sampling: Sample Random Sampling Systematic and stratified and cluster sampling: Standard errors. Null hypothesis. Correlation and Regression Analysis in Geoscience

Unit – III

Introduction to Computer – Elements of Computer: Hardware and Software.

Hardware: Input devices: Keyboard, Mouse – Output devices: Monitor, Printer – Memory – Primary: - RA, RAM and Secondary Memory: Hard Disk, Floppy & CD.

Unit – IV

A short account on: Algorithm – Flowcharts, Programming languages – Operating Systems – DOS – Windows – DBMS. Computer applications in Geology : Flowcharts for simple programmes – Geological aspects in windows.

Unit – V

Introduction to GIS softwares in GIS, Utility of computer software in geological studies – Bar diagram, pie diagram, role diagrams, scatter diagram, X-Y plots.

Text Books

1. Balagurusamy, Introduction to Computers
2. Saroj .K. Pal (1985) – Statistics for Geoscientists: Techniques and applications, concept publishing Co., New Delhi.
3. C. Davis, (1975), Statistics and data analysis in Geology, John Wiley & Sons.
4. Gupta G.V., (1995) Basic Statistics, Chand.
5. Ravichandran, D., (2001) Introduction to Computers and communication, Tata McGraw Hill Publication Ltd.,

Reference Books

1. D.F. Merriam (1989), Edited Statistical Analysis : A Computer Oriented Approach, Computer Application in the Earth Sciences, A.A. Affi. an international Symposium Pienum Press, New York.
2. Robert L. Miller (1982), Statistical analysis in the Geological Sciences, John Wiley and Sons, New York.
3. Palk S.K. (1998) Statistics for Geoscientist Techniques and Applications.
4. Gregory, S (1963) Statistical Methods and the geographer Long man & London.

**Third Year – Sixth Semester
Core Practical – III**

BGCP03 - Crystallography and Mineralogy

Crystallography:

Measurement of interfacial angles by using Contact Goniometer. Stereographic projection exhibiting symmetry elements of Normal classes of six systems. Study of crystal models: Determination of System, class on the basis of symmetry elements description of forms and determination of Miller indices of the following crystal models.

Cubic system: Galena, Garnet, Fluorite, Magnetite, Pyrite, Tetrahedrite, Boracite. Tetragonal system: Zircon, Apophyllite, Rutile, Vesuvianite, Cassiterite, Octahedrite, Scheelite, Meionite, Chalcopyrite.

Hexagonal System: Beryl Zincite, Apatite, Hematite, Calcite Corundum, Tourmaline, Phenacite, Alpha quartz. Orthorhombic system: Barite, Olivine, Sulphur, Topaz, Staurolite, Calamine and Epsomite.

Monoclinic System: Gypsum, Augite, Orthoclase, Epidote, and Hornblende. Triclinic System: Axinite, Albite, Anorthite, Kyanite, Rhodonite.

Study of Twin crystal models of the following minerals: cubic: Spinel, iron cross twin – Tetragonal: Rutile, Zircon, Cassiterite. Hexagonal: Brazil law – Calcite, Quartz – Orthorhombic: Cruciform. Aragonite – Staurolite – Monoclinic: Mica. Orthoclase: - Carlsbad, Manebach and Baveno, Gypsum – Triclinic: Albite – Simple twin

Mineralogy:

Megascopic Identification of rock-forming silicates on the basis of their physical properties; chemical composition and determination of system of crystallization of the following groups of minerals

Quartz Group: Rock crystal, Blue Quartz, Rose Quartz, Grey Quartz, Amethyst, Chalcedony, Opal, Agate, Flint, Jasper.

Feldspar Group: Orthoclase, Microcline, Perthite, Sanidine, Albite, Oligoclase, Labradorite, and Anorthite.

Feldspathoid Group: Nepheline, Sodalite, Lazurite, Lapis lazuli.

Pyroxene Group: Enstatite, Bronzite, Hypersthene, Augite, Diopside, Rhodonite, Wollastonite.

Amphibole Group: Anthophyllite, Actinolite, Tremolite, Hornblende, Glaucophane.

Mica Group: Muscovite, Biotite, Phlogopite, Lepidolite, and Vermiculite.

Other Silicates : Olivine, Chlorite, Epidote, Garnet, Apophyllite, Natrolite, Stilbite, Talc, Steatite, Beryl, Kaolin, Cordierites, Apatite, Andalusite, Sillimanite, Kyanite, Staurolite, Tourmaline, Topaz, Calcite, Dolomite, Fluorspar, Zircon.

Microscopic Identification of rock-forming silicates on the basis of their optical properties.

Quartz:

Feldspars: Orthoclase, Albite, Oligoclase, Andesine, Labradorite, and Anorthite.

Feldspathoids: Nepheline, Leucite, Sodalite, Nosean and Hauyne

Pyroxenes: Hypersthene, Augite, Aegerine, and Diopside.

Amphiboles: Tremolite, Actinolite, Hornblende, and Glaucophane.

Micas: Muscovite, Biotite, Phlogopite and Vermiculite.

Miscellaneous Minerals: Olivine, Serpentine, Chlorite, Epidote, Garnet, Apatite, Zircon, Sphene, Magnetite, Tourmaline, Calcite, Dolomite, Andalusite, Staurolite, Sillimanite and Cordierite.

FIELD TRAINING PROGRAMME

As an essential part of the course, students should be taken for a field-training programme during an academic year.

First Year

Students should be taken on local field trip to study the elementary aspects of geomorphology, structural geology, for about a week and submit a report thereon.

Second Year

Study of Palaeontological and Stratigraphically interested areas and collection of fossils. Student should submit a field report along with collections at the time of practical examinations: Duration of visit about 10 days.

Third Year

Visit to geologically interested and mineralized zones of India. Mine visit and collection of minerals and rocks. Duration of visit is 15 days.

LIST OF SKILL BASED ELECTIVE COURSES

BGE01 - Field Hydrogeology and Techniques

Unit -I

1. Importance of Hydrology
2. Calculation of Porosity
3. Measurement of Permeability

Unit - II

4. Well inventory survey: water level, water level fluctuation, subsurface layers (Soil thickness, weathered zone, Fractured zone, Bed rock)
5. Types of wells
6. Well logging
7. Sedimentary aquifers: Sandstone, limestone.

Unit - III

8. Hard rock aquifers: charnockites, Gneiss, Granite formation
9. Field observation and measurement of soil moisture zone, zone of aeration, zone of saturation.
10. Pumping Test: Yield, drawdown, recuperation, Transmissivity, Permeability.
11. Case studies: Rainfall in Salem district, Groundwater condition in Salem district.

TEXT BOOKS:

1. A Text book of Groundwater – 2000 – P.Arul, Dhanam Agency, 99D, Bazaar Street, Virudachalam – 606 001.
2. Groundwater Hydrology – 1959 – David K. Todd – John Willey & Sons, New York.
3. Ragunath. H.M. 1987, Groundwater, Wiley Eastern Ltd., New Delhi.

BGE02 - Micropaleontological Techniques

Micro paleontological techniques: Surface and Sub-surface sampling methods. Processing and separation of microfossils. Preparation of slides and thin sections of Larger benthic foraminifera. Equipments for Micropaleontological studies. Observation and identification of microfossils. Types of microfossils.

BGE03 -Gemology and Gemstone Evaluation

Unit – I

Definition and scope of gemology – minerals as gemstones – classification of gemstones – characteristic and desirable features of gemstones. Basic physical and optical properties of gemstones – optical classification of gemstones. Gem testing: Introduction to gem mineral equipment and instruments: polarizer – refractometer – pycnometer – use of heavy liquids. Non destructive methods in gem identification. Gem simulants and proxies. Artificial gemstones and substitutes.

Unit – II

Gemstone cutting: Cutting Instruments: Diamond saw – blade. Preliminary observations – rough cutting of gemstones – sizing and shaping of raw stones – styles of cutting: rounding, cabochon, flat, square, rectangle, crown, brilliant, and laser sculpting. Weight standard schemes used in gemology – 4Cs scheme for diamonds. Polishing of gemstones – polishing angles and limits. Polishing equipment and instruments.

Feasibility and economics of gem industries in India with special reference to Tamil Nadu. Grading, valuation and pricing of gems.

Unit – III

Gemstone prospecting: Host rocks – gemstone mineralization – deposits. Exploration techniques and exploitation. Gemstone provinces of India and Tamil Nadu.

Referance & Text Book

Karanh R.V.(2000),Gem and gemindustry in India,Memoir 45,Geological Society of India,Bangalore.

Anderson,B.W(1990).Gem testing (10th edition),Butterworth Scientific,London.

Babu,T.M.(1998) Diamonds in India.Geological society of India, Bangalore.

Hall,C.(1994).Gemstone,Dorling Kindersley,London.

Deer,W.A., Howie,R.A and Zussman.S.(1992).An introduction to rock forming minerals,ELBS,London.

Kerr, P.F.(1997).Optical mineralogy,4th Ed.McGraw Hill Book & Co New York.

BGE04 - BASICS OF PHOTOGRAMMETRY

Unit – I

Developments in Aerial Photography
Advantages Photogeology
Aerial Photography;
Aerial Camera and lens
Processing of film negatives

Unit – II

Photographic prints
Stereoscopy and Stereoscopic viewing
Geometric characteristics of Aerial photographs
(Terms, symbols, definitions) Scales, Relief displacement, tilt, optical distortion,
paper and film distortion, stereographic parallax
Types of films, filters,

Unit – III

Photographic instrumentation; Introduction,
Pocket stereoscope, mirror stereoscope, parallel bar, parallex ladder, sketch master,
Radial line plotter vertical Exaggeration; factors affecting vertical Exaggeration,
Determination of vertical Exaggeration.

Reference:

1. Principles and Applications of Photogeology, Shiv. N. Pandey, (1987), New age International Private Limited, Publishers – New Delhi – 110 002.
2. Lillesand and Keifer 2008 – Remote sensing & Image interpretation, John Wiley and Sons.
3. Miller 1975 Photogeology McGraw Hill
4. Pandey S.N. 1996. Principles of Applications of Photo Geology, Wiley Eastern Ltd., New Delhi.

BGE05 - Granite Exploration and Exploitation

UNIT-I

Definition of Granite and commercial terminology.
Basic properties of building and dimensional stones.
Granite rock exploration and marking methods.

UNIT-II

Mining methods of Granites
Methods of cutting and polishing of Granites
Method of explorations of massive plutons and metamorphic rocks of granite industry.
Defects of cut granite blocks

UNIT-III

Marketing and pricing.
Granites and granite industries of India and Tamilnadu.
End uses of Granite wastes.

Reference:

1. Courses in Mining geology –RPN Arogyasamy- John Wiley Eastern Pub
2. Economic minerals –U.Prasad-CBS
3. An introduction to Mineral Economics-KK Chattejee-John Wiley Eastern Pub
4. Mineral Economics-RK Sinha & NL Sharma-Oxford & IBH
5. Field Geology-Mathur

BGE06 - Mines and Minerals Legislation of India

Unit – I

Introduction to Mineral Economics; Essential critical and strategic minerals Demand and Supply National Mineral Policy – Problems and Prospects – Industrial policy Resolutions, 1956 – Schedule – A, Schedule – B, Energy policy, Forest policy. Evolution of National Mineral policy – Ideal Scope of a mineral policy – Categories of minerals for grant of concessions – Minor minerals – Major minerals.

Unit – II

Procedure for obtaining mineral concession – Termination, surrender and Determination of mining lease – The oil fields (Regulation & Development) Act, 1948 – The mines & minerals (Regulation & Development) Act, 1957 – Mineral concession Rules, 1960 – The mining leases (Modification of terms) Rules, 1956 – Minerals conservation and development Rules, 1958.

Unit – III

The Coal mines Act, 1974 – The Atomic energy Act, 1957 – The Atomic energy Act, 1962 – The mines Act, 1952 – Mines Rules, 1955 – Coal mines Regulation , 1957 – Metaliferous mines regulation, 1961 – Mineral Taxation and Incentive measures – Incidence of Taxes – Incentive measures – Depletion Allowance – Simplification of Taxation laws.

Reference Books

1. An Introduction to Mineral Economics – K.K. Chatterjee.
2. Mineral Economics - R.K. Sinha & N.L. Sharma.

BGE07 - Introduction to Geoinstrumentation

Unit – I

Basic equipments:

Description, handling and applications of the following equipments: Hammers, Chisels, Hand lenses, Clinometry, Bruton Compass, Jacob's staff, Pedometer.

Survey equipments: Chain survey, Plane table, Prismatic Compass, Theodolite, GPS.

Unit – II

Geophysical Survey Equipments:

Gravimeters, Magnetometers, Resistivity survey equipments, seismic survey equipments, scintillation counter, Well logging instruments, Pocket stereoscope, Stereometer, Pantograph, Rotometer, Plotting equipments.

Unit –III

Lab Equipments:

pH & Eh meters, Potentiometers, TDS determination, Chromatographic Techniques, AA Spectrometer, ICP – MS, XRF – XRD, Petrological microscope, Ore microscope, Photomicrograph equipment, Stereomicroscope, Field photographic Techniques, Spot analysis Kit for water and soil test.

Reference Books

- | | | |
|---------------|---|-----------------|
| Field Geology | - | S.M. Mathur, |
| Field Geology | - | GoKhale |
| Field Geology | - | F. Lahee |
| Field Geology | - | R. Compton |
| Surveying | - | Punmia |
| Geophysics | - | Telford |
| Geophysics | - | Ramachandra Rao |
| Mineralogy | - | Dennan |
-
- | | | |
|------------------------|---|------------------------------|
| Text Book of Surveying | - | S.K. Husain and M.S. Nagaraj |
|------------------------|---|------------------------------|

BGE08 - Water Quality Analysis

Unit – I

Physical properties of water: Colour, odour, taste, temperature, turbidity & viscosity. Methods of analysis of physical properties. Who and BIS Standards.

Unit – II

Chemical [properties of water: pH-alkalinity, acidity and their measurements, ionization potential, gas solubility, precipitation and dissolution of ions, equivalent weight and its measurement, colloids and coagulation, insoluble components and their measurements.

Unit – III

Laboratory methods of Analysis: Standard solutions – determination of pH – Hardness – Dissolved Oxygen – BOD – COD, TDS-TSS. Determination of F, Cl, N, P, K, Na, Ca, Mg, Fe, CaCO₃, HCO₃ & Trace metals.

References

1. Davis, N.S., DeWiest, R.J.M. (1996) Hydrogeology, John Wiley, New York.
2. Todd, D.K., (2002) Ground Water 3rd edition, John Wiley, Singapore.
3. Freeze, R.A., Cherry, J.A. (1979) Ground Water, Prentice Hall, New Jersey.
4. Sawyer, C.N., McCarty, P.L. (1978) Chemistry for Sanitary Engineers, 3rd edition, McGraw Hill, New York.
5. APHA, (1980) Standard Methods for the Examination of Water and Waste Water, 15th edition, American Water Works Association and Water Pollution Control Federation, New York.

BGE09 - Mapping Techniques in Geology

Unit – I

Definition and scope of mapping in Geology. Geologic Field Notes: Field logistics and trip planning – Field note book :- Data tabulation and remark notes – drawing to scale of stricken – standard nomenclature and structure - basic description of lithological detail and specific characterization.

Unit – II

Introduction to Topographic maps:-definition of topography- parts of topographic map – features represented, map enlargement, reduction and preparation of base map – height / elevation datum in topographic maps. –scales in maps. GPS:-Estimating location and relative height

Unit – III

Sampling of Geological material:- Types of geological samples – precaution –collection and marking of samples and their location – storage of samples – outline of methodology - followed in mineral, core, rocks and fossil sampling. Report writing: (purpose and scope) – style – clarity – drawings and diagram – section.

Referance

1. Compton, R.R (1962). Manual of Field Geology, Wiley, new York
2. Mathur, S.M (2001). Guides to Field Geology, Prentice Hall of India, Delhi.
3. Freeman, T.(1999).Procedures in Field geology, Blackwell science Oxford,U.K.
4. Dutro,T.J(1989).AGI data sheet, American Geological institute, Alexandria Virginia U.S.
5. Lahee, F.H(1961).Field Geology, CBS, Delhi.
6. Davis,G.H (1985).Structural Geology of rocks and regions, Wiley,New York.
7. McClay,(1995).Mapping of Geological Structures. Geological Soc. Publication House Barth, U.K.

BGE10 - Geology for competitive examinations

Unit – I

For Students majoring in geology/Applied Geology

1. Types of competitive examinations with Geology offered as an a paper- qualification expected – examination information.
2. Syllabi and standard expected in competitive examinations.
3. Types of question paper and their format in various competitive examinations

Unit – II

4. Preparation strategies:- General
 - Syllabi compilation and collection of previous question papers.
 - Comparison of level of difficulty and standard of various syllabi
 - Compilation of syllabi topics and preparation of not related to PG/U Geology syllabus.
 - Internet and library search for information
5. Preparation strategies for objective type examinations
 - Scope and limits of objective type examinations
 - Pattern and style of objective type questions
 - Level of difficulty and standard expected
 - Long term study and planning
6. Preparation strategies for short answer and short essay type examination
 - Scope and limit –pattern and styles- difficult and standard – language style and conciseness of answer – long term study and planning.

Unit – III

7. Study methods (Both objective type and (or) short essay type examinations)
 - Basic preparation: understanding Vs note learning
 - SQ3R Method
 - Revision techniques
 - Physical and mental health prior to examinations
 - mock exams (timed)
8. Examination techniques: -pre-exam preparation
 - Writing / choosing questions from simple to complex (or) vew known to partly known before answering/ writing answers.
 - Timing in writing answers and follow up at end of examinations
9. Examination ethics -
 - Avoid all forms of malpractice in exams
 - Legal implications and related problem due to malpractice

References

1. Maddox, H. (1985). How to study, Rupa publications, Delhi
2. Barrass, R, C 2001, Study, Routledge study guides, Chapman & Hall,
3. Srivastava, A.P. (1994), Scoring high in examinations, hearting laboratory publications, Delhi.
4. Barles , Rob, (1992). Successful study for degrees, Routledge, London.
5. Sayeed, A. (2002). Trends in objective Geology, CBS, Delhi
6. Jhulka. A. (1992) Objective Geology, CBCS, Delhi,
7. Bopche, A. (1999). Objective Geology, Dhanpat Rai, Delhi.

LIST OF NON MAJOR ELECTIVE COURSES

BGNME01 - Basic Geochemistry

Unit - I

1. Origin, abundance and distribution of elements in the universe solar system and earth – composition of crust, mantle, core, hydrosphere and atmosphere.-Geochemical classification of elements.
2. Basic crystal chemistry:-
Minerals as chemical compounds-bonding –ionization potential-electronegativity-periodic table of elements: periodic law and its utility.

Unit – II

3. Geochemical processes and their geochemical signatures - Processes controlling chemical composition of igneous, metamorphic, and sedimentary rocks.
4. Geochemistry of REE, trace elements, stable and radiogenic isotope and their applications.

Unit - III

5. Geochemistry to mineral exploration:-
Elements, dispersion and halos around an ore body- sampling methodology-analytical techniques: AAS-ICP-MS- Gravimetry –chromatography-flame photometry-DTA.

Reference:

1. Krouskoph, K.C. and D.K.Bird (1995) Introduction to Geochemistry, 3rd Ed,Wiley,New York.
2. Mason,B.and C.B Moore,(1992),Principles ofGeochemistry,4rd Ed,Wiley,New York.
3. Rollinson,h,(1993), Using Geochemical Data evaluation, presentation and interpretation, Longman,Singapore.
4. Gill,R.C(1997),Chemical fundamentals of Geology,Chapman &Hall,U.K.

BGNME02 - Basic Geophysics

Unit – I

Definition and scope of geophysics. Gross geophysical properties of Earth: Surface gravity variation, electrical properties of rock,.

Seismic properties of rocks. Distribution of density and pressure within earth.

Unit – II

Heat flow: definition – units – origin – causes. Geotherms: continental and oceanic. Heat flow measurements.

Earth's magnetism: definition – parts of earth's magnetic field – variation of earth's field – magnetic properties of rocks and minerals – basic outline of paleomagnetism.

Unit – III

Geochronology: definition – methods – limitations – radioactivity schemes – Concordia and Discordia ages.

Isostasy" definition – scope – different theories and limitations.

References

1. Lowrie, W.F., (2008) Fundamentals of Geophysics, 2nd edition, Cambridge University Press, Cambridge, U.K.
2. Anderson, D.L., (2007) Theory of Earth, 2nd edition, Cambridge University Press, Cambridge, U.K.
3. Holmes, A.L. (revised by Duff & Others), (1995) Physical Geology, 5th edition ELBS, London.

BGNME04 - Geohazards

Unit – I

Geological Hazards

Introduction to Natural Hazards

Earthquakes: Causes and Measurements – Earthquake Hazards and Risks – Earthquake Prediction and Control – Earthquake Case Histories – Tsunami.

Volcanoes, Magma, and Volcanic Eruptions- Volcanic Landforms, Volcanoes and Plate Tectonics – Volcanic Hazards, Beneficial Aspects, and Predicting Eruptions- Volcanic Case Histories.

Unit – II

Landslides – Mass Wasting and Mass – Wasting Proces – Slope Stablity, Triggering Events, Mass Wasting Hazards – Subsidence: Dissolution & Human Related Causes

The Ocean-Atmosphere System – Thunderstorms & Tonadoes – Tropical Cyclones – Hurricane – Tornados – Windstorms – Lightening – Drought – Frost and Freezes – Wild Fire

Unit – III

Coastal Zones – Costal Erosion – River Systems & Causes of Flooding – River Flooding – Flooding Hazards, Prediction and Human Intervention.

Extra-terrestrial Hazards

Meteorites & Impacting Events

Suggested Books

1. Montgomery, C.W (2008) Environmental Geology, Mc Graw Hill 8th Edition
2. Abbott, Patrick, L(2006) Natural Disasters, Mc Graw Hill, Boston, MA
3. Bryant, E (2005) Natural Hazards, Cambridge University Press, Cambridge, U.K.

BGNME05 - Groundwater Management and Rainwater Harvesing

Unit – I

Groundwater development – dynamic equilibrium in natural aquifers – groundwater budgets – management potential of aquifers – sage yield – water law – legal concepts.

Unit – II

Parameters of groundwater balance – conjunctive and consumptive use. Modeling Techniques in groundwater management. Groundwater resources evaluation in India. Estimation of recharge components.

Sampling of Geological material:- Types of geological samples – precaution –collection and marking of samples and their location – storage of samples – outline of methodology - followed in mineral, core, rocks and fossil sampling. Report writing: (purpose and scope) – style – clarity – drawings and diagram – section.

Unit- III

Groundwater mining and cyclic storage. Rainwater, surface water and groundwater interactions. Problems and remedial methods. Watershed management.

References

1. Todd, D.K., (2002) Ground Water, 3rd edition, John Wiley, Singapore.
2. Fetter, C.W., (1990) Applied Hydrogeology, 2nd edition, CBS, New Delhi.
3. Karanth, K.R. (1980) Ground Water Assessment Development and Management, Tata McGraw Hill, New Delhi.
4. Chaturvedi, M.C., (1987) Water Resources Systems Planning and Management, Tata McGraw Hill, New Delhi.
5. Davis, N.S., DeWiest, R.J.M.(1979) Hydrogeology, John Wiley, New York.
6. Freeze, R.A., Cherry, J.A. (1979) Ground Water, Prentice Hall, New Jersey.

Common Course Structure under – UG Programmes

Part	Course	Sem – I			Sem – II			Sem – III			Sem – IV			Sem – V			Sem – VI			Total Courses	Total Hours	Total Credits
		No.Of Courses	Hrs./W	Crdts	No.Of Courses	Hrs./W	Crdts	No.Of Courses	Hrs./W	Crdts	No.Of Courses	Hrs./W	Crdts	No.Of Courses	Hrs./W	Crdts	No.Of Courses	Hrs./W	Crdts			
I	Tamil Lang.	1	6	3		1	6	3		1	6	3							4	24	12	
	English Lang.	1	6	3		1	6	3		1	6	3							4	24	12	
III	Theory Core	1	4	4		1	4	4		1	4	4		4	20	16		4	12	48	48	
	Practical Elective		3			1	3	4			3	4			4			1	4	3	18	12
															Project 4			Project 1	4	15	1	15
	Theory Allied	1	4	3		1	4	3		1	4	3							4	16	12	12
	Practical		3			1	3	4			3	4							2	12	8	8
IV	En.Stud.		1			1	1	2											1	2	2	2
	Val. Edn.		1				1					2							1	2	2	2
	SBEC	1	2	2		1	2	2		1	2	2		1	2	2		1	2	6	12	12
	NMEC									1	2	2							2	4	4	4
V	Extn Act.																	1	1		1	1
Total		5	30	15		8	30	25		6	30	17		9	30	27		5	30	41	180	140

SBEC – Skill Elective Courses

NMEC – Non major Elective Courses

