PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM – 636011

DEGREE OF BACHELOR OF SCIENCE

CHOICE BASED CREDIT SYSTEM

Syllabus for

B.SC. MATHEMATICS (COMPUTER APPLICATIONS)

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to Periyar University from 2017-2018 onwards)

REGULATIONS

OBJECTIVES OF THE COURSE

Mathematics is a key to success in the field of science and engineering. Mathematics plays an important role in the context of globalization of Indian economy, modern technology, and computer science and information technology. Today, students need a thorough knowledge of basic principles, methods, results and a clear perception of the power of mathematical ideas and tools to use them effectively in modeling, interpreting and solving the real world problems. The syllabus of this program is aimed at preparing the students with the latest developments and put them on the right track to fulfill the present requirements.

COMMENCEMENT OF THIS REGULATION

This regulation shall take effect from the academic year 2017 – 2018, i.e, for the students who are admitted to the first year of the course during the academic year 2017 – 2018 and thereafter.

ELIGIBILITY FOR ADMISSION

A Pass in the Higher Secondary Examination of Tamil Nadu Higher Secondary Board or some other Board accepted by the Syndicate as equivalent thereto with Mathematics (other than Business mathematics) as one of the subjects.

DEFINITIONS

Programme : Program means a course of study leading to the award of the degree in a discipline.

Course : Course refers to the subject offered under the degree programme.

SYLLABUS

The syllabus of the UG degree has been divided into the following five categories:

Part I	:	Tamil / Other Languages.
Part II	:	English Language.
Part III	:	Core Courses, Elective Courses and Allied Courses.
Part IV	:	Skill Based Elective Courses, Non-Major Course, Environmental Studies and Value Education.
Part V	:	Extension Activity.

- **Elective Course:** There are 3 Elective Courses offered for B.Sc. Mathematics (CA) students. One course from each set should be selected for each elective course.

- **Skill Based Elective Course:** This course aims to impart advanced and recent developments in the concerned discipline.
- **Non-Major Course:** Irrespective of the discipline the student can select papers that are offered by other disciplines as non-major course.
- **Extension Activity:** Participation in NSS / NCC / YRC / RRC / Sports or other co-circular activities are considered for Extension activity.

CREDITS

Weightage given to each course of study is termed as credit.

CREDIT SYSTEM

The weightage of credits are spread over to different semester during the period of study and the cumulative credit point average shall be awarded based on the credits earned by the students.A total of 140 credits are prescribed for the under graduate programme.

DURATION OF THE COURSE

The candidates shall complete all the courses of the programme within 5 years from the date of admission. The programme of study shall consist of six semesters and a total period of three years with 140 credits. The programme of study will comprise the course according to the syllabus.

EXAMINATIONS

The course of study shall be based on semester pattern with Internal Assessment under Choice Based Credit System.

The examinations for all the papers consist of both Internal (Continuous Internal Assessment-CIA) and External (end semester) theory examination. The theory examination shall be conducted for three hours duration at the end of each semester. The candidates failing in any subjects(s) will be permitted to appear for the same in the subsequent semester examinations.

COURSE OF STUDY AND SCHEME OF EXAMINATION

Part	Paper Code	Subject Title	Hours			Credits	Exam Hrs.	Marks		
			Lect.	Prac.	Total			CIA	EA	Total
SEMESTER I										
I	Language	Tamil – I	6	-	6	3	3	25	75	100
II	Language	English – I	6	-	6	3	3	25	75	100
III	Core I	Classical Algebra	5	-	5	4	3	25	75	100
III	Core II	Differential Calculus	4	-	4	4	3	25	75	100
	Allied I	Paper -I (Theory)	5	-	5	4	3	25	75	100
	Allied Practical I	Paper -I (Practical)	-	2	2	-	*	-	-	-
IV	Value Education	Yoga	2	-	2	2	3	25	75	100
SEMESTER II										
I	Language	Tamil – II	6	-	6	3	3	25	75	100
II	Language	English – II	6	-	6	3	3	25	75	100
III	Core III	Integral Calculus	5	-	5	4	3	25	75	100
III	Core IV	Vector Analysis	4	-	4	4	3	25	75	100
	Allied I	Paper- II (Theory)	5	-	5	3	3	25	75	100
	Allied Practical I	Paper - I (Practical)	-	2	2	3	3	40	60	-
IV	EVS		2	-	2	2	3	25	75	100

Part	Paper Code	Subject Title	Hours			Credits	Exam Hrs.	Marks		
			Lect.	Prac.	Total			CIA	EA	Total
SEMESTER III										
I	Language	Tamil – III	6	-	6	3	3	25	75	100
II	Language	English – III	6	-	6	3	3	25	75	100
III	Core V	Visual Basic- Theory	4	-	4	3	3	25	75	100
	Core VI	Differential Equations and Laplace Transforms	3	-	3	3	3	25	75	100
	Allied II	Paper- II (Theory)	5	-	5	4	3	25	75	100
	Allied Practical II	Paper-II (Practical)	-	2	2	-	**	-	-	-
	SBEC-I	Visual Basic Practical	-	2	2	2	3	40	60	100
IV	NMEC-I		2	-	2	2	3	25	75	100
SEMESTER IV										
I	Language	Language/ Tamil – IV	6	-	6	3	3	25	75	100
II	Language	English – IV	6	-	6	3	3	25	75	100
III	Core VII	Programming in C Theory	4	-	4	3	3	25	75	100
III	Core VIII	Office Automation Practicals	3	-	3	3	3	25	75	100
	Allied II	Paper-II (Theory)	5	-	5	3	3	25	75	100
	Allied I Practical II	Paper-II (Practical)	-	2	2	3	3	40	60	100
IV	NMEC-II		2	-	2	2	3	25	75	100
	SBEC II	C Programming Practical	2	-	2	2	3	40	60	100

Part	Paper Code	Subject Title	Hours			Credits	Exam Hrs.	Marks		
			Lect.	Prac.	Total			CIA	EA	Total
		SEMESTER V								
III	Core IX	Modern Algebra-I	5	-	5	5	3	25	75	100
	Core X	Real Analysis-I	6	-	6	4	3	25	75	100
	Core XI	Complex Analysis-I	5	-	5	4	3	25	75	100
	Elective I	Operations Research	5	-	5	5	3	25	75	100
	Elective II	Discrete Mathematics	5	-	5	5	3	25	75	100
IV	SBEC- III	Quantitative Aptitude	2	-	2	2	3	25	75	100
	SBEC- IV	MAT Lab	-	2	2	2	3	40	60	100
		SEMESTER VI								
III	Core XII	Modern Algebra- II	5	-	5	5	3	25	75	100
	Core XIII	Real Analysis -II	6	-	6	5	3	25	75	100
	Core XIV	Complex Analysis -II	5	-	5	4	3	25	75	100
	Core XV	Graph Theory	5	-	5	5	3	25	75	100
	Elective III	C Programming	5	-	5	5	3	25	75	100
IV	SBEC V	Latex Theory	2	-	2	2	3	25	75	100
	SBEC III	Latex Practicals	-	2	2	2	3	40	60	100
		Extension Activity	-	-	-	1	***	-	-	***
		Total				**140**				**4200**

\# - Syllabus and Question paper are same for Bsc., Maths & Bsc., Maths (CA). The exam to be conducted on the same day

* - Examination at the end of Second Semester.

** - Examination at the end of Fourth Semester.

*** - No Examination – Participation in NCC / NSS / RRC / YRC / Others if any.

ALLIED SUBJECTS FOR B.Sc. MATHEMATICS:

Any two of the following subjects (Physics / Chemistry / Statistics / Electronics / Accountancy) can be chosen as Allied Subjects.

NAME OF THE COURSE	PAPER CODE
Allied Physics – I	
Allied Physics – II	
Allied Physics – Practical	
Allied Chemistry – I	
Allied Chemistry – II	
Allied Chemistry – Practical	
Allied Statistics – I	
Allied Statistics – II	
Allied Statistics – Practical	
Allied Electronics – I	
Allied Electronics – II	
Allied Electronics – Practical	
Allied Accountancy – I	
Allied Accountancy – II	
Allied Accountancy – Practical	

SKILL BASED ELECTIVE COURSE:

NAME OF THE COURSE	PAPER CODE
Office Automation Practical	
C Programming (Practical)	
Quantitative Aptitude	
MAT LAB	
Latex Theory	
Latex Practical	

UNIFORMITY IN THE NUMBER OF UNITS IN EACH PAPER:

Each theory paper shall consist of five units. The Question paper shall consist of questions uniformly distributed among all the units.

1. QUESTION PAPER PATTERN FOR THE THEORY PAPERS

Duration: **Three Hours** Maximum Marks: **75**

Part A: (10 X 2 = 20 marks)

Answer ALL Questions

(Two Questions from Each Unit)

Part B: (5 X 5 = 25 marks)

Answer ALL Questions

(One Question from Each Unit with internal choice)

Part C: (3 X 10 = 30 marks)

Answer Any THREE Questions out of Five Questions

(One Question from Each Unit)

2. MARKS AND QUESTION PAPER PATTERN FOR PRACTICALS

MAXIMUM:**100 Marks** INTERNAL MARK: **40 marks**

EXTERNAL MARK: **60 marks**

(Practical Exam -45 marks + Record - 15 marks)

QUESTION PATTERN FOR THE PRACTICAL EXAM PAPERS

Answer any THREE questions out of 5 questions (3 x 15 = 45 marks)

PASSING MINIMUM

i) The Candidates shall be **declared to have passed the examination if he/she secures not less than 40 marks in total (CIA mark + Theory Exam mark) with minimum of 30 marks in the Theory Exam conducted by the University.**

ii) The Candidates shall be **declared to have passed the examination if he/she secures not less than 40 marks in total (CIA mark + Practical Exam mark) with minimum of 18 marks out of 45 marks in the Practical Exam conducted by the University.**

CONVERSION OF MARKS TO GRADE POINTS AND LETTER GRADE (Performance in a Course/Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.	O	Outstanding
80-89	8.0-8.	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
40-49	4.0-4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

Ci = Credits earned for course i in any semester

Gi = Grade Point obtained for course i in any semester

n = refers to the semester in which such course were credited

Grade point average (for a Semester):

Calculation of grade point average semester-wise and part-wise is as follows:

GRADE POINT AVERAGE [GPA] = $\Sigma i\ Ci\ Gi / \Sigma i\ Ci$

$$GPA = \frac{\text{Sum of the multiplication of grade points by the credits of the courses offered under each part}}{\text{Sum of the credits of the courses under each part in a semester}}$$

Calculation of Grade Point Average (CGPA) (for the entire programme):

A candidate who has passed all the examinations under different parts (Part-I to V) is eligible for the following part wise computed final grades based on the range of CGPA.

CUMULATIVE GRADE POINT AVERAGE [CGPA] = $\Sigma n \Sigma i\ Cni\ Gni / \Sigma n\ \Sigma i\ Cni$

$$CGPA = \frac{\text{Sum of the multiplication of grade points by the credits of the entire programme under each part}}{\text{Sum of the credits of the courses of the entire programme under each part}}$$

CGPA	GRADE
9.5 – 10.0	**O+**
9.0 and above but below 9.5	**O**
8.5 and above but below 9.0	**D++**
8.0 and above but below 8.5	**D+**
7.5 and above but below 8.0	**D**
7.0 and above but below 7.5	**A++**
6.5 and above but below 7.0	**A+**
6.0 and above but below 6.5	**A**
5.5 and above but below 6.0	**B+**
5.0 and above but below 5.5	**B**
4.5 and above but below 5.0	**C+**
4.0 and above but below 4.	5**C**
0.0 and above but below 4.0	**U**

Classification of Successful candidates

A candidate who passes all the examinations in Part I to Part V securing following CGPA and Grades shall be declared as follows **for Part I or Part II or Part III**:

CGPA	GRADE	
9.5 – 10.0	**O+**	First Class – Exemplary *
9.0 and above but below 9.5	**O**	First Class with Distinction*
8.5 and above but below 9.0	**D++**	First Class
8.0 and above but below 8.5	**D+**	
7.5 and above but below 8.0	**D**	
7.0 and above but below 7.5	**A++**	
6.5 and above but below 7.0	**A+**	
6.0 and above but below 6.5	**A**	
5.5 and above but below 6.0	**B+**	Second Class
5.0 and above but below 5.5	**B**	
4.5 and above but below 5.0	**C+**	Third Class
4.0 and above but below 4.5	**C**	

Conferment of the Degree

No candidate shall be eligible for conferment of the Degree unless he / she

i. has undergone the prescribed course of study for a period of not less than six semesters in an institution approved by/affiliated to the University or has been exempted from in the manner prescribed and has passed the examinations as have been prescribed therefor.

ii. Has completed all the components prescribed under Parts I to Part V in the CBCS pattern to earn 140 credits.

iii. Has successfully completed the prescribed Field Work/ Institutional Training as evidenced by certificate issued by the Principal of the College.

Ranking

A candidate who qualifies for the UG degree course passing all the examinations in the first attempt, within the minimum period prescribed for the course of study from the date of admission to the course and secures I or II class shall be eligible for ranking and such ranking shall be confined to 10 % of the total number of candidates qualified in that particular branch of study, subject to a maximum of 10 ranks. The improved marks shall not be taken into consideration for ranking.

NOTE:

- All the Papers (including computer papers) specified in this syllabus should be handled and valued by faculty of Mathematics Department only.
- Both Internal and External Examiners for University Practical Examination should be appointed (including computer papers) from faculty of Mathematics only.

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – I

CORE I - CLASSICAL ALGEBRA

UNIT – I

Binomial Series: Binomial theorem for a positive integral index – Binomial theorem for a rational index – Summation of Binomial series. Exponential series – Exponential series for all real Values of x – Standard results for the Exponential series – Logarithmic series – Problems. (Chapter -2, Chapter-3 and Chapter-4)

UNIT – II

Matrices: Test for consistency of linear equations – Characteristic equation – Characteristic roots and characteristic vectors of a matrix – Cayley–Hamilton theorem - Similarity of matrices - Diagonalizable matrix – Problems.

(Chapter -6 (Page 6.38 to Page 6.82))

UNIT – III

Theory of equations: Fundamental theorem in the theory of equations – Relation between the roots and coefficients of an equation – Imaginary and irrational roots – Symmetric functions of the roots of an equation interms of its coefficients – Problems.

(Chapter -7 (Page 7.1 to Page 7.30))

UNIT – IV

Reciprocal equations – Transformation of equations – Multiplication of roots by m – Diminishing the roots of an equation – Removal of a term of an equation – Problems.

(Chapter 7 (page 7.30 to page 7.56)).

UNIT – V

Descarte's rule of signs – Descarte's rule of signs for negative roots of an equation – Horner's method for approximation of roots of a polynomial equation – Newton's Method of evaluating a real root correct to given decimal places – Problems.

(Chapter – 7 (Page 7.57 to Page 7.67))

TEXT BOOK:

1. Algebra, Analytical Geometry and Trigonometry" by Dr.P.R.Vittal and V.Malini, Margham Publications, Chennai – 17.Third Edition 2000. Reprint 2014

REFERENCE BOOKS:

1. Algebra Volume I - T.K.Manicavachagam Pillai & others S.Viswanathan Printers and publishers Pvt. Ltd – 2003 Edition.

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – I

CORE II - DIFFERENTIAL CALCULUS

UNIT – I

Partial derivatives, Higher derivatives, Homogeneous function, Total differential co efficient, Implicit function – Problems Chapter – 3 (Page 3.1 to Page 3.45).

UNIT – II

Jacobians , Maxima and Minima of functions of two variables, Necessary and sufficient conditions (without proof), Method of Lagrange's multipliers (no derivation) – Simple problems Chapter – 3 (Page 3.46 to Page 3.77).

UNIT – III

Polar coordinates – Angle between Radius vector and the tangent, Angle of intersection of two curves, Length of perpendicular from the pole to the tangent, Pedal Equation, Asymptotes: Definition - Methods of finding asymptotes to plane algebraic curves – Problems (Chapter 5 and Chapter 7)

UNIT – IV

Curvature and radius of curvature - Definitions, Cartesian formula for radius curvature, Parametric formula for radius of curvature - Radius of curvature in polar co- ordinates, Radius of curvature for pedal curves, Radius of Curvature for polar tangential curves – problems. (Chapter 6.)

UNIT – V

Envelope of the one parameter family of curves. Definition, necessary and sufficient condition (without proof) Envelope for two parameter family co-ordinates of the center of curvature, Chord of curvature – Evolutes: Definition, Properties for evolute (without proof) – Problems. (Chapter 8 and Chapter 9.)

TEXT BOOK:

1. Calculus – By P.R. Vittal and Malini, Margham Publications, Chennai – 17. Third edition- 2000, Reprint 2010.

REFERENCE BOOKS:

1. Calculus: S. Narayanan and others ,S. Viswanathan Publications
2. Calculus: Dr. S. Sudha ,Emerald Publishers.

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – II

CORE III - INTEGRAL CALCULUS

UNIT – I

Bernoulli's formula for integration by parts, Reduction formulae – Problems. (Chapter 2)

UNIT – II

Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluations of definite integrals using Beta and Gamma functions – Problems. (Chapter 13)

UNIT – III

Double Integrals, Double integrals in polar co ordinates, Triple Integrals – Problems (Chapter 17 (page 17.1 to page 17.22)).

UNIT – IV

Change of order of Integration, Application of Double and Triple Integrals to Area, Volume and Centroid. (Chapter 17 (Page 17.22 to Page 17.43))

UNIT – V

Fourier Series: Fourier expansions of periodic functions with period 2π, Fourier Series for odd and even functions. Half range Fourier series. (Chapter 21.)

TEXT BOOK:

1. Calculus – By P.R. Vittal and Malini, Margham Publications, Chennai – 17. (Units I, II, III and IV) Third edition- 2000, Reprint 2010.
2. Allied Mathematics- By P.R.Vittal Margham Publications, Chennai- 17. (Unit-V)

REFERENCE BOOKS:

1. P. Kandasamy and K. Thilagavathy, Allied Mathematics
2. Integral Calculus: Shanti Narayanan (S. Chand and Co.)

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – II

CORE IV - VECTOR ANALYSIS

UNIT – I

Vector differentiation – Limit of a Vector function – Continuity and derivative of Vector function – Geometrical and Physical significance of Vector differentiation – Gradient – Directional derivative of Scalar point functions – Equations of Tangent plane and normal line to a level surface.

UNIT – II

Vector point function: Divergence and curl of a vector point function – Solenoidal and irrotational functions – Physical interpretation of divergence and curl of a Vector point function.

UNIT – III

Vector identities – Laplacian operator.

UNIT – IV

Integration of Vector functions – Line, Surfaces and volume integrals

UNIT – V

Gauss–Divergence Theorem – Green's Theorem – Stoke's theorem (Statements only) – Verification of theorems- simple problems.

TEXT BOOK:

1. Vector Analysis, Dr.P.R. Vittal, Margham Publication, Chennai – 17.

REFERENCE BOOKS:

1. T.K. Manickavasagam and others, Vector Analysis, Vijay Nicole Imprints Pvt. Ltd., Chennai – 29, 2004.
2. P. Duraipandian and others, Vector Analysis, S. Viswanathan and Co.,Chennai– 31

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – III

CORE V - VISUAL BASIC – THEORY

UNIT – I

Introduction – Data Access – Developing for the interest, new control, VB's Control set building controls in VB, IDE and VB – Development environment, Event – Driven programming working with objects and controls – Tool Box, VB Modules, Event Driven code, Designing a form.

UNIT – II

Designing user interface – Visual elements of VB – Menus toolbars an tab strips actives an other controls – Status bars on Animation and timer events, Aligning controls, Setting focus and tab order : Right mouse button support working with printer, common dialog, Drivers, folders and files. Adding graphic and multimedia.

UNIT – III

Connecting a database – Building a database project – ODBC – DAO – RDO – ADO – OLEDB – DB – Controls building reports - Data Environment.

UNIT – IV

Building Internet Application: Internet Basics with VB, HTML Basics, IIS and Active Server Pages, WEB Class Designer.

UNIT – V

IIS Object model – Building DHTML Applications – DHTML Page designer Building the interface.

TEXT BOOK:

1. Visual Basic 6.0. The Complete Reference, Noel Jorke, Tata McGraw Hill Publication Co., New Delhi, 2002.

REFERENCE BOOKS:

1. Visual Basic 6.0., Corel, Tata McGraw Hill Publication Co., New Delhi, 2002.

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – III

CORE VI - DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

UNIT – I

Ordinary Differential Equations – Second order Differential Equations with constant co–efficients – Particular Integrals of the form $e^{x}V$, where V is of the form x, x^2, sinax, cosax, xsinax and xcosax.

UNIT – II

Second order differential Equations with variable co – efficients – both homogeneous linear equations and homogeneous non - linear equations.

UNIT – III

Partial Differential Equations –Definition – Complete solution, Singular solution and general solution – Solution of equations of standard types f(p,q)=0, f(x,p,q)=0, f(y,p,q)=0, f(z,p,q)=0 and $f_1(x,p)= f_2(y,q)$ – Clairaut's form – Lagrange's equation Pp+Qq=R.

UNIT – IV

Laplace Transforms – Definition – Laplace transforms of Standard functions – Elementary theorems – Problems.

UNIT – V

Inverse Laplace transforms – Standard formulae – Elementary Theorems – Applications to Second order linear differential equation (Problems with only one differential equation).

TEXT BOOK:

1. T.K. Manickavasagam Pillai and S. Narayanan, Calculus, Vijay Nicole Imprints Pvt. Ltd., C – 7, Nelson Chambers, 115 Nelson Manickam Road, Chennai – 600 029, 2004.
2. Dr.P.R. Vittal, Differential Equations, Fourier Series and Analytical Solid Geometry, Margham Publications, 24, Rameswaram Road, T. Nagar, Chennai – 600 017, 2000.

REFERENCE BOOKS:

1. Differential equations and its applications by S.Narayanan & T.K. Manichavasagam Pillay S.Viswanathan PVT. LTD –2001 Edition
2. Engineering Mathematics by M.K. Venkatraman,National Publishing company, Chennai.

B.SC. MATHEMATICS (COMPUTER APPLIATION)

SEMESTER – III

SKILL BASED ELECTIVE COURSE – I

VISUAL BASIC PRACTICAL

1. In VB, Create a project that display the current data and time. Use VB Variable now and the format Library functions.

2. Write a program for the following List of Practicals.

   i) To enter and display text, using text box and command button.

   ii) To Convert temperature in Fahrenheit to Centigrade or Vice – Versa.

   iii) To Select any one from a list, U combo box to display choices.

   iv) To Calculate factorial of a given number.

   v) To Illustrate the use of Timer control

   vi) To Illustrate the Usage of Scroll bars.

   vii) To Illustrate the Usage of Dropdown menus

   viii) To Illustrate the Usage of Menu enhancement

   ix) To Illustrate the Usage of Pop – Up menu

   x) To Illustrate the Usage of Input boxes

   xi) To find smallest of n numbers

   xii) To find the sine of angle

   xiii) To Sort list of numbers in ascending/descending order.

   xiv) To Determine sum and average of given number

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – IV

CORE VII - PROGRAMMING IN C

UNIT – I

Introduction – Basic structure of C – Programs – Character Set – Keywords and Identifiers – Constants – Variables – Data types – declaration of variables – Assigning value to variables – defining symbolic constants, operators and expressions.

UNIT – II

Reading and writing a character – formatted input and output – IF – IF ELSE – ELSE IF laddar – Switch statement – operator – GO TO Statement – WHILE – DO – FOR Statement.

UNIT – III

Array – Introducing one dimensional and two dimensional arrays – initializing two dimensional arrays. Handling of character string.

UNIT – IV

User defined functions – form of C functions – return values and their types – calling a function – three categories of functions – structures and unions – Introduction - Structure definition – giving values to members – Structure initialization – Unions.

UNIT – V

Pointers – Introduction – Understanding pointers accessing the address of a variable – Declaring and initializing pointers. File management – Introduction defining, Opening and closing a file – I/O Operation on files.

Text Book:

1 E. Balagurusamy, 1998, Programming in ANSI C, Tata McGraw Hill Publications Co., Ltd., ED. 2.1.

Reference Books:

1. Mullish Copper, 1998, The Spirit of C, Jaico Publication.

2. YashwantKanikar, 2002, Let Us C, BPB Publications.i.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – IV

CORE VIII - OFFICE AUTOMATION – PRACTICALS

LIST OF PRACTICALS

MS Word

- Preparation of word document (Typing, aligning, Font Style, Font Size, Text editing, colouring, Spacing, Margins)
- Creating and Editing a table (Select no of rows, Select no of columns, row heading, column heading, column width, row width, row height, spacing text editing)
- Formatting a table (insert rows/columns, delete rows/columns, cell merging/ splitting, Cell alignment)
- Preparation of letters using mail merge.
- Demonstration of Find, Replace, Cut, Copy and paste texts in a word document.

MS Excel

- Preparation of a Table using Excel.
- Creation of Charts, Graphs and Diagrams

MS Power Point

- Preparation of slides in power point.
- Creation of Animation Pictures.

MS Access

- Creation of simple reports using MS Access.

General

- Export a given graph from Excel to word.
- Sending an Email.
- Download a document from internet.
- Import a picture from internet to word document.
- Create a Power point presentation when a word document is given.

Text Book

1. Andy Channelle, "Beginning Open Office 3: From Novice to Professional" A Press series, Springer-Verlog, 2009

Reference Books

1. Perry M. Greg, "Sams Teach Yourself Open Office.org All In One", Sams Publications, 2007.

Note:

- This paper should be handled and valued by the faculty of Mathematics only.
- Both Internal and External Examiners for University Practical Examination should be appointed from faculty of Mathematics Department only.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – IV

SKILL BASED ELECTIVE COURSE – II

C PROGRAMMING PRACTICAL

Write C programming for the following:

1. To Find the sum of N numbers
2. To Find the Largest of given 3 numbers
3. To solve a quadratic equations
4. To find the simple and compound interest
5. That reads an integer N and determine whether N is prime or not.
6. To arrange the number in ascending and descending order
7. To generate the Fibonacci sequence
8. To Find mean and standard deviation
9. Find addition and subtraction of two matrices.
10. Find the multiplication of two matrices.

TEXT BOOK:

1. E. Balagurusamy, Reprint 2006, Programming in ANSI C, Tata McGraw Hill Publishing Company Ltd., New Delhi, 3rd Edition.

REFERENCE BOOKS

1. Peter Aitken and Bradley L Jones, Teach Yourself C in 21 Days, Tech Media, New Delhi, 4th Edition.
2. Tony Zhang, Teach Yourself C in 24 Hours, Sams Publications, 1st Edition, 1997.
3. Ram Kumar and RakashAgrawal, Programming in ANSI C, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1993

Note: For University Practical Examination both Internal and External Examiners should be appointed from Mathematics Department only.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V

CORE IX - MODERN ALGEBRA – I

UNIT - I

Group Theory: Definition of Group, Examples of Groups, Some preliminary Lemmas and Subgroups – Definition – Lemmas – Theorems (Lagrange's, Euler and Fermat) – Examples. (Sections 2.1 to 2.4)

UNIT - II

Group Theory (Continuation): A Counting Principle – Normal Sub Groups and Quotient groups and Homomorphism – Definitions – Lemmas – Theorems – Examples.(Sections 2.5 to 2.7).

UNIT - III

Group Theory (Continuation): Automorphism, Cayley's Theorem and permutation groups – definition – Lemmas – Theorems – Examples. (Sections 2.8 to 2.10.)

UNIT - IV

Ring Theory: Definition and Examples of Rings, some special classes of Rings, Homomorphisms, Ideals and Quotient Rings and more ideals and Quotient Rings – Definition – Lemmas – theorems – Examples. (Sections 3.1 to 3.5).

UNIT - V

Ring theory (Continuation): The field of quotient of an integral Domain, Euclidean Rings, A particular Euclidean ring and polynomial rings – Definition – Lemmas – theorems – Examples.- Polynomials over the rational field- polynomial rings over the commutative rings .(Sections 3.6 to 3.11)

TEXT BOOKS

1 I.N. Herstein, Topics in Algebra, John Wiley, New York, 1975.

REFERENCE BOOKS

1. Mathematics for Degree Students (B.Sc. 3rd Years), Dr.U.S. Rana, S. Chand, 2012.
2. A first course in Modern Algebra, A.R. Vasistha, Krishna Prekasan Mandhir, 9, Shivaji Road, Meerut (UP), 1983.
3. Modern Algebra, M.L. Santiago, Tata McGraw Hill, New Delhi, 1994.
4. Modern Algebra, K. Viswanatha Naik, Emerald Publishers, 135, Anna Salai, Chennai, 1988.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V

CORE X - REAL ANALYSIS – I

UNIT - I

Functions – Real Valued functions – Equivalence countability – Real numbers – Least upper bound (Sections 1.3 to 1.7) Sequence of real numbers – definition of sequence and subsequence – Limit of a sequence - Convergent sequences – divergent sequences. (Sections2.1 to 2.4)

UNIT - II

Bounded sequences – Monotone sequences – operations on convergent sequences – operations on divergent sequences – Limit superior and limit inferior – Cauchy sequences (Sections 2.5 to 2.10).

UNIT - III

Convergent and divergent series of real numbers – series with non–negative terms – Alternating series – conditional convergence and absolute convergence – Rearrangements of series – Test for absolute convergence – series whose terms form a non increasing sequence (Sections 3.1 to 3.7)

UNIT - IV

The Class l^2 – Limit of a function on the real line – metric spaces – Limit in metric spaces. (Sections 3.10, 4.1 to 4.3).

UNIT - V

Functions continuous at a point on the real line – Reformulation – Functions continuous on a metric space – open sets – closed sets – Discontinuous functions on R^1. (Sections 5.1 to 5.6)

TEXT BOOK

1 Richard R. Goldberg, Methods of Real Analysis – Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

REFERENCE BOOKS

1. D. Somasundaram and B.Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, Third Reprint, 2007.

2. Tom. M. Apostel, Mathematical Analysis, Narosa Publications, New Delhi, 2002.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V

CORE XI - COMPLEX ANALYSIS – I

UNIT - I

Regions in the Complex Plane – Functions of a complex variable – Limits – Theorems on Limits – Limits Involving the Point at Infinity – Continuity – Derivative – Differentiation Formulas – Cauchy – Riemann Equations – Sufficient Conditions for differentiability – polar coordinates – Analytic Functions – Examples – Harmonic Functions. Chapter I (Section 11 Only). (Chapter II (Sections 12, 15, 16 to 26)).

UNIT - II

Derivative of Functions W(t) – Definite integrals of Functions W(t) – Contours – Contour Integrals – Some Examples – Examples with Branch cuts – Upper bounds for Moduli of contour Integrals – Anti-derivatives – Proof of the theorem – Cauchy–Goursat Theorem – Proof of the theorem - Simply connected Domains – Multiply connected Domains. (Chapter 4 (Sections 37 to 49)).

UNIT - III

Cauchy Integral Formula – An Extension of the Cauchy integral formula – Some consequences of the extension – Liouville's Theorem and the Fundamental Theorem of Algebra – Maximum modules Principle..(Chapter 4 (Section 50 to 54)).

UNIT - IV

Mappings – Mappings by the Exponential Function – Linear Transformations – the transformation w = 1/Z - Linear Fractional Transformations – An Implicit form. (Chapter 2 (Sections 13, 14) & Chapter 8 (Sections 90 to 94))

UNIT - V

The Transformation w = sinz, w = cosz, w = sinhz, w=coshz – Mappings by z^2 and branches of $Z^{1/2}$ - Conformal mappings – preservation of Angles – Scale factors – Local Inverses. (Chapter 8 (Section 96, 97) and Chapter 9 (Sections 101 to 103)).

<u>TEXT BOOK</u>

1. James Ward Brown and Ruel V. Churchil,l Complex Variables and Applications, McGraw Hill, Inc, Eighth Edition.

<u>Reference Books</u>

1. P Gupta – Kedarnath & Ramnath, Complex Variables, Meerut -Delhi
2. J.N. Sharma, Functions of a Complex variable, Krishna Prakasan Media(P) Ltd, 13th Edition, 1996-97.
3. T.K.Manickavachaagam Pillai, Complex Analysis, S.Viswanathan Publishers Pvt Ltd.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V

ELECTIVE I

OPERATIONS RESEARCH

UNIT - I

Introduction - Definition of O.R. - Scope, phases and Limitations of O.R. - Linear Programming Problem - Graphical Method - Definitions of bounded, unbounded and optimal solutions - procedure of solving LPP by graphical method - problems - Simplex technique - Definitions of Basic, non-basic variables - basic solutions - slack variables, surplus variables and optimal solution, simplex procedure of solving LPP - Problems.

UNIT - II

Introduction- Balanced and unbalanced T.P, Feasible solution- Basic feasible solution - Optimum solution - degeneracy in a T.P. - Mathematical formulation - North West Corner rule - Vogell's approximation method (unit penalty method) Method of Matrix minima (Least cost Method) - problems- algorithm of Optimality test (Modi Method) -Problems. Introduction - Definition of Assignment problem, balanced and unbalanced assignment problem -restrictions on assignment problem - Mathematical formulation -formulation and solution of an assignment problem (Hungarian method) - degeneracy in an assignment problem – Problems.

UNIT - III

Introduction - Definition - Basic assumptions - n jobs to be operated on two machines - problems - n-jobs to be operated on three machines - problems - n-jobs to be operated on m machines - problems . Definition of Inventory models-Type of inventory models: (i) Uniform rate of demand, infinite rate of production with no shortage (ii) Uniform rate of demand, finite rate of replacement with no shortage - Book Works - Problems.

UNIT - IV

Definitions -Newspaper boy problem - Inventory model with one and more price break problems. Introduction- definition of steady state, transient state and queue discipline, characteristics of a queuing model - Applications of queuing model - Little's formula - Classification of queues - Poisson process - properties of Poisson process. Models(i) (M/M/1): (∞/FCFS),(ii) (M/M/1) : (N/FCFS),(iii) (M/M/S) : (∞/FCFS) - formulae and problems only.

UNIT - V

Introduction - definition of network, event, activity, three time estimates (optimistic, pessimistic & most likely), critical path, total float and free float - difference between CPM and PERT – Problems.

TEXT BOOK

1. P.K. Gupta, Manmohan and Kanti Swarup, Operations Research, 9th edition, 2001, Sultan Chand &Sons, Chennai.

REFERENCE BOOKS

1. CK Mustafi, Operations Research, Fourth Edition, New Age International Publishers
2. P.K.Gupta and D.S. Hira, Operations Research, 2th edition, 1986, S Chand & Co, New Delhi.
3. S. Kalavathy, Operations Research, 2nd edition -2002, Publishing House Pvt. Limited,New Delhi.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V

ELECTIVE II

DISCRETE MATHEMATICS

UNIT - I

Mathematical logic – Statements and Notations – Connectives – Negation – Conjunction – Disjunction – Statement formulas and Truth table – Conditional and Bi- conditional – well formed formulas. Tautologies. (Sections 1.1, 1.2.1 to 1.2.4, 1.2.6 to 1.2.8)

UNIT - II

Normal forms – Disjunctive Normal forms – Conjunctive Normal forms – Principal Disjunctive Normal forms – Principal conjunctive normal forms – ordering and uniqueness of normal forms – the theory of inference for the statement calculus – validity using truth tables – Rules of inference. (Sections 1.3.1 to 1.3.5., 1.4.1 to 1.4.2)

UNIT - III

The predicate calculus – Predicates – The Statements function, Variables and quantifiers – Predicate formulas – Free and bound variables – The universe of discourse – inference theory of the predicate calculus – Valid formulas and Equivalence – some valid formulas over finite Universes – Special valid formulas involving quantifiers – Theory of inference for the predicate calculus. (Sections 1.6.1 to 1.6.4).

UNIT - IV

Relations and ordering – Relations – Properties of binary relation in a set – Partial ordering – Partially ordered set: Representation and Associated terminology – Functions – Definition and introduction – Composition of functions – inverse functions – Natural numbers – Peano axioms – Mathematical Induction. (Sections 2.3.1, 2.3.2, 2.3.8, 2.3.9, 2.4.1., 2.4.3., 2.5.1)

UNIT - V

Lattices a partially ordered sets : Definition and Examples – Some properties of Lattices. Boolean Algebra: Definition and example – Sub algebra, Direct Product and homomorphism – Boolean Functions – Boolean forms and free Boolean algebra – values of Boolean expression and Boolean functions. (Sections 4.1.1., 4.1.2., 4.2.1, 4.2.2, 4.3.1., 4.3.2.,)

TEXT BOOK

1. J.P. Trembly, R. Manohar, Discrete Mathematical Structure with Applications to Computer Science, Tata McGraw Hill, 2001.

REFERENCE BOOK

1. Dr. M.K.Sen and Dr. B.C.Charraborthy, Introduction to Discrete Mathematics, Arunabha Sen Books & Allied Pvt. Ltd., 8/1 Chintamoni Das Lane, Kolkata – 700009, Reprinted in 2016.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V

SKILL BASED ELECTIVE COURSE – III

QUANTITATIVE APTITUDE

UNIT - I

Chain rule – Time and work.

UNIT - II

Time and Distance.

UNIT - III

Problems on Trains.

UNIT - IV

Boats and Streams.

UNIT - V

Calendar and Clocks.

TEXT BOOK

1. R.S. Aggarwal, Quantitative Aptitude for Competitative Examinations, S. Chand co. Ltd., 152, Anna Salai, Chennai, 2001.

REFERENCE BOOKS:

1. Quantitative Aptitude "by Abhijit Guha, Tata McGraw Hill Publishing Company Limited, New Delhi (2005).

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER –V

SKILL BASED ELECTIVE COURSE – IV

MAT LAB

UNIT – I

A simple Mathematical Model - Conservation laws in Engineering and Science -Numerical Methods Covered in this Book (Chapter I -Full).

UNIT – II

The MATLAB Environment - Assignment - Mathematical operations - Use of Built - in Functions - Graphics - Other Resources - Case study - Exploratory Data Analysis. (Chapter II –Full)

UNIT – III

M - Files - Input - Output - Structured Programming - Nesting and Indentation (Chapter III -section 3.1 - 3.4).

UNIT – IV

Passing Functions To M - Files - Case Study :Bungee Jumper Velocity (Chapter 3 -Section 3. 5 -3.6

UNIT – V

Errors 80 - Round Off Errors - Truncation Errors - Total Numerical Error -Blunders - Model Errors — Data Uncertainty (Chapter IV - Full).

TEXT BOOK

1. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineers AndScientists, TATA McGraw -Hill Publishing company Ltd., 2007

REFERENCE BOOK

1. Stanley, Technical Analysis and applications with Matlab, Printed and bounded in IndiabyBarkha Nathprinters, Delhi, I Indian Reprint 2007

2. Brian -R.Hunt, Ronald l.LipsmanJonathan.m. Rosenberg,Aguide to MatlabForBeginnners and Experienced users, Printed in India at Raplika press PvtLtd, Kundly, CambridgeUniversity press, Reprint 2005.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – VI

CORE XII

MODERN ALGEBRA – II

UNIT I: Vector Spaces and Modules

Elementary Basic concepts and Linear Independence & Bases - definition - lemmas -theorems - examples.- Dual spaces- Inner Product Spaces - definition - lemmas -theorems - examples.- Modules (Sections 4.1 to 4.5)

UNIT II : Fields

Extension fields – The Trancedence of e – roots of polynomials – constructions with straightedge and compass – more about roots – the elements of Galois theory. (Sections 5.1 to 5.6)

UNIT III : Linear Transformations.

The Algebra of linear transformations, Characteristic roots and Matrices - definition - lemmas-theorems - examples. (Sections 6.1 to 6.3)

UNIT IV : Linear Transformations

Canonical forms: Triangular form and Nilpotent Transformations - definition - lemmas –theorems examples. (Sections 6.4 & 6.5)

UNIT V : Linear Transformations(continuation)

Trace and Transpose and Determinants - Definitions - Properties - Theorems - Cramer's Rule -Problems. (Sections 6.8 & 6.9)

TEXT BOOK

1. I.N. Herstein, Topics in Algebra-2nd Edition, John Wiely, New York, 1975.

REFERENCE BOOKS

1. Dr. U S Rana, Mathematics for Degree Students (B.Sc 3rd Years), S.Chand, 2012.
2. A.R.Vasistha, A first course in modern algebra, Krishna Prekasan Mandhir, 9, Shivaji Road, Meerut (UP), 1983.
3. K.Viswanatha Naik, Modern Algebra, Emerald Publishers, 135, Anna Salai, Chennai -2, 2001.
4. K.Viswanatha Naik, Modern Algebra, Emerald Publishers, 135, Anna Salai, Chennai -2, 1988.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – VI

CORE – XIII

REAL ANALYSIS – II

UNIT - I

More about open sets – connected sets – bounded sets and totally bounded sets – complete metric spaces. (Sections 6.1 to 6.4)

UNIT – II

Compact metric spaces – continuous functions on compact metric spaces – continuity of the inverse function – uniform continuity. (Sections 6.5 to 6.8)

UNIT - III

Sets of measure zero – definition of the Riemann integral – Existence of the Riemann integral – Properties of the Riemann integral (Sections 7.1 to 7.4)

UNIT- IV

Derivatives – Rolle's theorem – The law of the mean – Fundamental theorem of calculus. (Sections :7.5 to 7.8)

UNIT - V

Pointwise convergence of sequences of functions – uniforms convergence of sequences of functions – consequences of uniform convergence – convergence and uniform convergence of series of functions (Sections :9.1 to 9.4)

Text Book

1. Richard R. Goldberg, Methods of Real Analysis – Oxford and IBH Publishing co, Pvt. Ltd., New Delhi.

Reference Books

1. D. Somasundaram and B.Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, Third Reprint, 2007.
2. Tom. M. Apostel, Mathematical Analysis, Narosa Publications, New Delhi, 2002.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – VI

CORE XIV - COMPLEX ANALYSIS – II

UNIT - I

Convergences of Sequences - Convergences of Series – Taylor series – Proof of Taylor's Theorem – Examples – Laurent series – Proof of Laurent's theorem – Examples. (Chapter 5 :Section 55 to 62).

UNIT - II

Absolute and Uniform convergence of power series – continuity of sums of power series – Integration and differentiation of power series – Uniqueness of series representations – Multiplication and Division of power series. (Chapter 5 Sections 63 to 67).

UNIT - III

Isolated Singular points – Residues – Cauchy's Residue Theorem – Residue at Infinity – the Three Types of Isolated Singular points – Residues at poles – Examples – Zeros of Analytic Functions – Zeros and Poles – Behaviour of Functions Near Isolated Singular Points. (Chapter 6 : Section 68 to 77)

UNIT - IV

Evaluation of Improper Integrals – Examples – Improper Integrals from Fourier Analysis – Jordan's Lemma. (Chapter 7 :Sections 78 to 81).

UNIT - V

Indented Paths – An Indentation, around a branch point – Integration Along a Branch cut – Definite Integrals Involving sines and cosines – Argument Principle – Rouche's Theorem. (Chapter 7 :Section 82 to 87).

TEXT BOOK

1. James Ward Brown and Ruel V. Churchill ,Complex Variables and Applications, Eighth Edition by McGraw Hill, Inc.

REFERENCE BOOKS

1. Theory and Problems of Complex Variables-Murray.R.Spiegel,Schaum outline series.

2. Complex Analysis-P. Duraipandian.

3. Introduction To Complex Analysis.S. Ponnuswamy, Narosa publishers 1993.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – VI

CORE XV - GRAPH THEORY

UNIT - I

Introduction – Definition – Examples – Degrees – Definition – Theorem 1, 2 – Problems – Subgraphs – Definition – Theorems – Operations on graphs – Definition theorem–1 – Problems.

UNIT - II

Introduction – Walks, Trails and Paths – Definitions Theorem–1,2,3 – Connectedness and Components – Definitions – Theorems – Definition – Distance – Theorems – Cut point – Bridge – Blocks – Connectivity.

UNIT - III

Introduction – Eulerian Graphs – Definition – Lemmas – Theorem – Konigsberg Bridge problem – Fleury's Algorithms – Hamiltonian graphs – Definitions - Theorems – Lemma – Closure – Theorems.

UNIT - IV

Introduction – Characterization of Trees – Theorems – Centre of a tree – Definition – Theorem.

UNIT - V

Introduction – Definition – Basic properties definitions – Theorems – Paths and connections – Theorems – Definition – Diagraphs and matrices – Definitions – Theorems.

TEXT BOOK

1. S.Arumugam, S.Ramachandran, Invitation to Graph theory, Scitech Publications, Chennai, 2001.

REFERENCE BOOKS

1. John clark and Derek Allan Holton ,A first book at graph theory,Allied publishes.
2. S.Kumaravelu and Susheela Kumaravelu ,Graph theory,Publishers Authors C/o.182, Chidambara Nagar, Nagarkoil - 629 002.
3. Introduction To Complex Analysis.S. Ponnuswamy, Narosa publishers 1993.

B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – V I

ELECTIVE – III

JAVA PROGRAMMING

UNIT - I

Basic concepts of object – oriented programming – objects and classes – Data Abstraction and Encapsulation – Inheritance – polymorphism – Dynamic Binding – Message communication – Java features – Java Environment – Java Program structure – Java Virtual Machine.

UNIT - II

Introduction – Constants – Variables – Data types – Declaration of variables – scope of variables – type casting – operators and expressions – Decision making and branching – Decision making and looping.

UNIT - III

Classes – objects and methods – Arrays – Strings – Interfaces – Multiple inheritance.

UNIT - IV

Packages – Multithreaded programming – Managing Errors and Exceptions.

UNIT - V

Applet Programming – Introduction – Building Applet code – applet life cycle – Creating an executable applet – Designing a web page – Applet tag – adding applet to HTML file – Running the Applet – Managing I/O files in Java.

TEXT BOOK

1. E. Balagurusamy, Programming with Java a Printer, Tata McGraw Hill Publications Co., Ltd., New Delhi, 1998.

REFERENCE BOOKS

1. Pootrick Naughton and Hebert Schedelt, The Complete Reference Java – 2, Tata McGraw Hill Publications Co., Ltd., New Delhi, 3rd Edition, 2006.
2. Hebert Schedelt, Java – 4th Edition.

NOTE:

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B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – VI

SKILL BASED ELECTIVE COURSE – V

LATEX THEORY

UNIT - I

Basic LaTex – Sample document and Key Concepts – type style – environments – Lists – Contering – tables – verbatim – vertical and horizontal spacing.(Chapter 2 Sections 2.1. to 2.4.)

UNIT - II

Typesetting Mathematics – Examples – Equation environments – Fonts, hats and underlining – braces – arrays and matrices – Customized commands – theorems like environments. (Chapter 3 Sections3.1. to 3.7.)

UNIT - III

Math miscellaxy – Math Styles – Bold Math – Symbols for number sets – binomial coefficient. (Chapter 3 Sections 3.8. to 2.4.)

UNIT - IV

Further essential LaTex – Document classes and the overall structure – titles for documents – Sectioning commands. (Chapter 4 Sections 4.1. to 4.3.)

UNIT - V

Miscellaneous extras – Spacing – Accented characters – Dashes and hyphens – quotation marks – trouble shooting – Pinpointing the error – common errors – warning messages. (Chapter 4 Sections42.4. to 4.5.)

TEXT BOOKS

1.David F Griffiths and Desmond J. Higham, Learning LaTex, SIAM (Society for Industrial and Applied Mathematics) Publishers, Phidel Phia, 1996.

REFERENCE BOOKS

1. Martin J. Erickson and Donald Bindner, A Student's Guide to the Study, Practice, and Tools of Modern Mathematics, CRC Press, Boca Raton, FL, 2011.
2. L. Lamport. LATEX: A Document Preparation System, User's Guide and ReferenceManual. Addison-Wesley, New York, second edition, 1994

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B.SC. MATHEMATICS (COMPUTER APPLICATION)

SEMESTER – VI

SKILL BASED ELECTIVE COURSE – VI:

LATEX PRACTICALS

LIST OF PRACTICALS

Write Latex program for the following

1. Type a Document in different alignments (Left, Right, Center, Justify).
2. Type a Letter for applying a job.
3. Type your own Bio – Data.
4. Draw a Table structure.
5. Type a given Mathematical expression using Differentiation, Integration and Trigonometry.
6. Type a given Mathematical expression using all expression.
7. Type a given expression using all inequalities.
8. Type of given Article.
9. Draw any picture and insert in LateX file.
10. Type a given Question paper
11. Convert one LateX file into power point presentation.

TEXT BOOKS

1. David F Griffiths and Desmond J. Higham, Learning LaTex, SIAM (Society for Industrial and Applied Mathematics) Publishers, Phidel Phia, 1996.

REFERENCE BOOKS

1. Martin J. Erickson and Donald Bindner, A Student's Guide to the Study, Practice, and Tools of Modern Mathematics, CRC Press, Boca Raton, FL, 2011.
2. L. Lamport. LATEX: A Document Preparation System, User's Guide and ReferenceManual. Addison-Wesley, New York, second edition, 1994

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Model question paper

MODERN ALGEBRA – I

Paper code:

Time: 3 hrs Maximum Marks: 75

SECTION-A

(10 X 2 = 20 marks)

Answer all the questions

1. Define Abelian group?
2. Define Sub group.
3. Define Question group
4. Define Normal sub group
5. What is commutative ring?
6. Define Isomorphism?
7. Define Kernal of ø
8. Define Integral domain.
9. Define Euclidean Ring.
10. Define gcd (a,b).

Section – B

(5 X 5 = 25marks)

Answer all the question

11. a) State and prove Fermat theorem.
    b) If G is a finite group and a ϵ G prove that $a^{0(G)} = e$
12. a) Prove that the sub group N of G is a normal sub group of G every left to set of N in G is a right coset of N in G.
    b) If G is a finite group and N is a normal subgroup of G, Prove that O(G/N)=O(G)/O(N).
13. a) Let ø be a homomorphism of G onto G with kernel R, prove that G / R G.
    b) If G is a group prove that (the set of automorphisms of G), A(G) is also a group.
14 a) Show that a finite integral domain is a field.
    b) Let R be a Commutative Ring with unit element whose only ideals are (0) and R itself.prove that R is a field.
15. a) Let R be a Euclidean Ring, for a,b,c € R, and a/bc but (a,b)=1,prove that a/c.
    b) Prove that every integral domain can be imbedded in a field.

Section – C (5X5=25 marks)

Answer any three questions

16. State and prove Lagrange's theorem
17. Prove that HR is a sub group of G --> HR = RH.
18. State and prove Cayley theorem.
19. If is a prime number prove that J_p, the ring of integers mod p, is a field.
20. Let R be a Euclidean ring and a,b,€ R , if b ≠0 is not a unit in R prove that d(a) <d(ab).

Model Question Paper

Allied Paper-I : Allied Mathematics- I

Paper Code: 17UMAA01

Time: 3 Hours Maximum: 75 Marks

SECTION-A (10×2=20Marks)

Answer **ALL** Questions

1. Solve the equation $2x^3 - x^2 + 4x + 3 = 0$ given that $1+\sqrt{2}$ is root
2. Diminish by 2 the roots of the equation $x^4 + x^3 - 3x^2 + 2x - 4 = 0$
3. Find the characteristic roots of a matrix A= $\begin{pmatrix} 3 & 2 \\ 2 & 3 \end{pmatrix}$
4. Find sum and product of the eigen values of the matrix A= $\begin{pmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{pmatrix}$
5. Write the formula for radius of curvature in cartesian coordinates.
6. Find the radius of curvature at (1,1) of the curve $x^4 + y^4 = 2$
7. Form the partial differential equation by eliminating the arbitrary contant from $z = ax + by + ab$
8. Form the partial differential equation by eliminating the arbitrary function from $z = f(\frac{y}{x})$
9. Find the value of $\int_0^{\frac{\pi}{2}} \sin^8\theta \, d\theta$
10. Evaluate : $\int x\, e^{-x} dx$.

SECTION-B (5×5=25Marks)

Answer **ALL** Questions

11. (a) Show that the equation $3x^5 - 2x^3 - 4x + 2 = 0$ has at least two imaginary roots

(OR)

(b) Solve the equation $x^4 + 2x^3 - 5x^2 + 6x + 2 = 0$ given that $1+i$ is a root

12. (a) Find the characteristic roots of the matrix A = $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$

(OR)

(b) Find the eigen values and eigen vectors for the matrix A= $\begin{pmatrix} 4 & 1 \\ 3 & 2 \end{pmatrix}$

13.(a)Find the radius of curvature at any point θ on the curve $x = a(\theta + \sin\theta)$ and $y = a(1 - \cos\theta)$

(OR)

(b) Find ρ for the curve $r = a(1 + \cos\theta)$

14. (a) Form the partial differential equation by eliminating the arbitrary constant from z $= (x-a)^2 + (y-b)^2 + z^2 = 1$

(OR)

(b) Form the partial differential equation by eliminating the arbitrary function from f(x+y+z , xyz) =0

15. (a) Evaluate $\int_0^{\frac{\pi}{2}} \log tanx$ dx.

(OR)

(b) If $I_n = \int_0^{\frac{\pi}{2}} cos^n$ x dx then prove that $I_n = \frac{n-1}{n} I_{n-2}$

SECTION-C (3×10=30Marks)

Answer any **THREE** Questions

16. Remove the second term of the equation x^4 - 12 x^3 + 48x^2-72x + 35 = 0 and Hence solve it.

17. Verify Cayley Hamilton Theorem for the matrix A= $\begin{pmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{pmatrix}$

18. Find the radius of curvature at the point ($\frac{a}{4}, \frac{a}{4}$) of the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$

19. Prove that $\int_0^{\frac{\pi}{2}} \log sin\theta \, d\theta = -\frac{\pi}{2} \log 2$.

20. Solve (mz – ny)p – (nx – lz)q = ly – mx

Model Question Paper
Allied Paper -II: Allied Mathematics-II

Paper Code: 17UMAA 02 Time: 3hrs

Max.: 75 Marks

SECTION A (10×2=20 Marks)

Answer **ALL** Questions

1) If $u = x^2$, $v = y^2$ then find $\frac{\partial(u,v)}{\partial(x,y)}$

2) Write the condition for a function to a ttain maximum

3) Write the Newton's Forward difference formula

4) Prove that $\Delta^2 y_1 = y_3 - 2y_2 + y_1$

5) Solve $(D^2 - 4D + 4)y = 0$

6) Find the Particular Integral o f $(D^2 + 4)y = \sin 2x$

7) Find $L[t e^{-2t}]$

8) Find $L[t^n]$

9) Find $L^{-1}\left[\frac{1}{s^2-a^2}\right]$

10) Find $L^{-1}\left[\frac{10}{(s+2)^6}\right]$

SECTION-B (5×5=25)

Answer ALL Questions

11(a) If $x + y = u$, $y = uv$ then find $J(x,y)$

(OR)

(b) Find the maximum value of $f(x,y) = x^2 + 5y^2 - 6x + 10y + 12$

12 (a) Estimate f(5) from the following data:

X:	3	4	5	6
f(x):	4	13	-	43

(OR)

(b) Use Newton's Forward difference formula find y when x=4 ,Given

X:	3	5	7	9
Y:	180	150	120	90

13 (a) Solve: $(D^2 8D + 9)y = 8\sin 5x$

(OR)

(b) Solve: $(D^2 - 3D + 2)y = e^{5x} + 2$

14 (a) Find $L[\sin^3 2t]$

(OR)

(b) Find L $[\, e^{3t}cos6t - t^3 + e^t \,]$

15 (a) Find $L^{-l}\left[\frac{S-3}{S^2+4S+13}\right]$

(OR)

(b) Find the Inverse Laplace Transform of $\left[\frac{7s-1}{(s+1)(S+2)(s+3)}\right]$

SECTION-C (3 ×10=30 Marks)

Answer any **THREE** Questions

16) Find the maximum and minimum values of
$f(x,y) = 2(x^2 - y^2) - x^4 + y^4$

17) By using Lagrage' formula find y when x=2 from the following:

X:	6	3	5	6	8
Y:	276	460	414	343	110

18) Solve : $(D^2 - 5D + 6)\, y = e^x \cos 2x$

19) Find L $\left[\frac{cos3t - cos2t}{t}\right]$

20) **Solve:** $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = 0$ **given y(0)=-2 ,**
$y^{l}(0)=5$ by using Laplace Transform

Model Question Paper

Allied Paper-III: Allied Mathematics Practical -III

Paper Code: 17UMAAP01

Time : 3 hrs

Maximum : **60** Marks
Prac. = 45 Marks[
Rec. = 15 Marks

Answer ANY THREE **Questions (3×15=45 Marks)**

1) Find the characteristic equation and Verify Cayley Hamilton Theorem for the matrix A = $\begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$.

2) (a) If y = a cos(log x) +bsin(log x) then Prove th at $x^2y_2 + xy_1 + y = 0$

(b) If Y= $e^{a\sin^{-1}x}$, prove that

$(1-x^2)y_{n+2} - (2n+1)\,xy_{n+1} - (n^2+a^2)y_n = 0$

3) (a) Verify Euler's theorem for $u = x^3 + y^3 + z^3 - 3\,xyz$

(b) If u = $\tan^{-1}\dfrac{x^2+y^2}{x+y}$ then

Show that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = \dfrac{1}{2}\sin 2u$

4) (a) If $\vec{r} = \vec{x} + \vec{y} + \vec{z}$ then Prove that $\nabla r = \dfrac{1}{r}\vec{r}$

(b) Find the directional derivative of $\phi = x^2 + y^2 + z^2$ at the point (1 , 1 , 1) in the direction $\vec{i} + \vec{j} + \vec{k}$

5) (a) If $\vec{F} = x^2z\,\vec{i} - 2y^3z^2\vec{j} + xy^2z\,\vec{k}$ then find div $\vec{F}$ and Curl $\vec{F}$ at the point (1, - 1 , 1) .

(b)Prove that the vector $\vec{F} = 3x^2y\,\vec{i} - 4xy^2\,\vec{j} + 2xyz\,\vec{k}$

MODEL QUESTION PAPER

OPERATIONS RESEARCH

Time: 3 hrs
Maximum Marks : 75

SECTION-A (10X2=20 MARKS)

Answer all the question

1. What are the limitation of operations research?
2. What is the difference between slack and surplus variable?
3. Define: degeneracy in a transportation problem?
4. Define: an assignment problem?
5. Define: Elapsed time?
6. Write the formula for the minimum total annual inventory cost TC^{o} in the EOQ problem with no shortages?
7. Write the optimum order quantity Q^{o} for the EOQ problems with shortages?
8. How do you calculate E(n) in (M/M/1;∞/FIFO) model?
9. Define total float of an activity in a critical path?
10. What is the value of expected time in PERT?

SECTION-B (5X5=25)

Answer all the question

11. (a) Use Graphical method, solve:

Minimum: z = 2x – y

Subject to: x + y d 5

x + 2x d 8

x , y e 0

(or)

(b) Use Simplex method, solve:

Maximation : $z= 5x_1 + 7x_2$

Subject to: $x_1 + x_2$ d 4

3x+8x d 24

$10x_1+7x_2$ d 35

x_1 , x_2 e 0

12. (a) Use North West Corner Rule, find Initial Basic Feasible Solution (IBFS) to the following transportation problem.

Destionations					Supply
Origin	8	9	6	3	18
	6	11	5	10	20
	3	8	7	9	18
Demand	15	16	12	13	

(or)

(b) Solve the following Assingme nt problem.

	Job I	II	III	IV	V	
A	6	5	8	11	16	
B	1	13	16	1	10	
C	16	11	8	8	8	
D	9	14	12	10	10	Worker
E	10	13	11	8	16	

13. (a) there are Nine jobs each of which has to go through the machines M_1 and M_2 in the order M $_{1,}$ M_2. The processing time (in time) are given as follows:

Jobs:	A	B	C	D	E	F	G	H	I
Machine M_1:	2	5	4	9	6	8	7	5	4
Machine M_2:	6	8	7	4	3	9	3	8	11

(or)

Determine the sequence of these jobs that will minimize the total elapsed time T.

(b) Derive the fundamental EOQ problem?

14.(a) Find the optimum order quantity for a product for which the price breaks are as follows:

Quantity	Unit cast
0 d $Q_1 < 800$	Re.1.00
800 d Q_2	Re.0.98

(b) Find the average queue length and the average waiting time of an arrival in (M/M/1;N/FIFO) system.

15.(a) Write down the difference between CPM and PERT?

(b) Draw the network for the activites A, B, ….< K such that A<C;B<D;C<E,F;C,D<G;F,G<H;E<I;I<J;H<K. The notation X < Y means that the activity X must be finished before Y can begin.

SECTION -B (5X5=25)

16.Use Simplex method, solve:

Maximize: $z = 500x_1 + 20x_2 + 30x_3$

Subject to: $5x_1 + x_2 + 7x_2$ d 5

$5x_1 + x_2 + 6x_3$ d 6

$3x_1 - x_2 - 9x_3$ d 3

` x_1, x_2, x_3 e 0

17. Solve the following Assignment problem.

Job

	H_1	H_2	H_3	H_4	H_5
A	6	5	8	11	16
B	1	13	16	1	10
C	16	11	8	8	8
D	9	14	12	10	10
E	10	13	11	8	16

Worker

18. a) Use graphical method to determine the minimum time needed to process two jobs on five machines A , B , C , D, and E. the technological order for the these jobs on machines is as follows:

Processing time (in hours) are given as follows:

Job 1:	3	4	2	6	2
Job 2:	5	4	3	2	6

Processing time (in hours) are given as follows:

Job 1:	3	4	2	6	2
Job 2:	5	4	3	2	6

b) Find the optimal order quality for a product for which the price breaks are as follows:

Quantity	Unit cast(Rs)
0 d $Q_1 < 500$	Rs.1000
500 d Q_2 d 4000	Rs. 925
4000 d Q_3	Rs. 875

19. At a railway station only one train is handled at a time. The yard can accommodate only two trains to wait. Arrival rate is 6 per hour and the service r ate is 12/hr. find the steady state probabilities for the various number of trains in the system. Also find the average waiting time of the train coming into the yard.

20. Find the critical path for the network given below, and find the probability of completing the project 14 days?