

**St. PETER'S INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

(Deemed to be University U/S 3 of the UGC Act, 1956)
Avadi, Chennai – 600 054.



**B.Sc. MATHEMATICS
DEGREE PROGRAMME**

(I to VI SEMESTERS)

REGULATIONS AND SYLLABI

REGULATIONS – 2016

(Effective from the Academic Year 2016-'17)

B.Sc. MATHEMATICS DEGREE PROGRAMME

Regulations – 2016

(Effective from the Academic Year 2016-'2017)

1. Eligibility:

A Candidate who has passed Higher secondary Examination with Mathematics, Physics and Chemistry as main subjects of study or an Examinations accepted by the Institute as equivalent thereto are eligible for admission to Three Year B.Sc. Programme in Mathematics.

2. Duration:

Three years comprising 6 Semesters. Each semester has a minimum of 90 working days with a minimum of 5 hours a day.

3. Medium:

English is the medium of instruction and examinations except for the language subjects.

4. Eligibility for the Award of Degree:

A candidate shall be eligible for the award of degree only if he/she has undergone the prescribed course of study in the University for a period of not less than three academic years (6 semesters), passed the examinations of all the six semesters prescribed carrying 136 credits and also fulfilled such conditions as have been prescribed thereof.

5. Choice Based Credit System:

Choice Based Credit System is followed with one credit equivalent to one hour for theory paper and two hours for a practical work per week in a cycle of 18 weeks (that is, one credit is equal to 18 hours for each theory paper and one credit is equal to 36 hours for a practical work in a semester in the Time Table. The total credit for the B.Sc.(Mathematics) Degree Programme (6 semesters) is 136 credits.

6. Weightage for a Continuous and End Assessment:

The weightage for Continuous Assessment (CA) and End Assessment (EA) is 25:75 unless the ratio is specifically mentioned in the Scheme of Examinations. The question paper is set for a minimum of 100 marks.

7. Course of Study and Scheme of Examinations:

I Semester

Code No.	Course Title	Credit	Marks		
			CA	EA	Total
116UTMT01 / UTET01 / UHIT01 / 116UFRT01	Part I : Language -I (Tamil -I / Telugu -I / Hindi -I/ French -I)	3	25	75	100
116UEHT02	Part II : English –I	3	25	75	100
116UMMT03	Part III : Core Subject:	4	25	75	100
116UMMT04		4	25	75	100
116UMMT05 / 116UMMP01	Allied Paper –I: Physics I / Physics Practical - I	3	25	75	100
		2	40	60	100
116UMMT06	Non Major Elective I:	2	25	75	100
116UCCT01	Soft Skills (Common to all UG Branches)	2	50	50	100
Total		23	240	560	800

Non Major Elective:

1. Functional Mathematics - I
2. Functional Statistics
3. Functions and their Applications
4. Mathematical Logic

II Semester

Code No.	Course Title	Credit	Marks			
			CA	EA	Total	
216UTMT01 / UTET01 / UHIT01 / 216UFRT01	Part I : Language -II (Tamil -II / Telugu -II / Hindi -II / French -II)	3	25	75	100	
216UEHT02	Part II : English -II	3	25	75	100	
216UMMT03	Part III Core Subject:	Differential Calculus	4	25	75	100
216UMMT04		Analytical Geometry	4	25	75	100
216UMMT05 / 216UMMP01	Allied Paper -II: Physics II / Physics Practical - II	3	25	75	100	
		2	40	60	100	
216UMMT06	Non Major Elective II :	2	25	75	100	
216UCCT02	Soft Skills (Common to all UG Branches)	2	50	50	100	
Total		23	240	560	700	

Non Major Elective:

1. Functional Mathematics – II
2. Mathematical Modeling
3. Mathematics of Finance
4. Applications to Differential Equations

III Semester

Code No.	Course Title	Credit	Marks			
			CA	EA	Total	
316UTMT01 / UTET01 / UHIT01/316UFRT01	Part I : Language -III (Tamil -III / Telugu -III / Hindi -III / French - III)	3	25	75	100	
316UEHT02	Part II : English -III	3	25	75	100	
316UMMT03	Part III Core Subject:	Integral Calculus	4	25	75	100
316UMMT04		Differential Equations	4	25	75	100
316UMMT05 / 316UMMP01	Allied Paper – III: Chemistry I / Chemistry Practical - I	3	25	75	100	
		2	40	60	100	
316UCCT03	Soft Skills (Common to all UG Branches)	2	50	50	100	
Total		21	215	485	700	

IV Semester

Code No.	Course Title	Credit	Marks			
			CA	EA	Total	
416UTMT01 / UTET01 / UHIT01 / 416UFRT01	Part I : Language -IV (Tamil -IV / Telugu -IV / Hindi -IV/ French -IV)	3	25	75	100	
416UEHT02	Part II : English -IV	3	25	75	100	
416UMMT03	Part III : Core Sub:	Transform Techniques	4	25	75	100
416UMMT04		Statics	4	25	75	100
416UMMT05 / 416UMMP01	Allied Paper – IV: Chemistry II / Chemistry Practical - II	3	25	75	100	
		2	40	60	100	
416UEST01	PART IV: Environmental Studies (Common to all UG Branches)	2	25	75	100	
416UCCT04	Soft Skills (Common to all UG Branches)	2	50	50	100	
Total		23	240	560	800	

V Semester

Code No.	Course Title	Credits	Marks			
			CA	EA	Total	
516UMMT01	Core Sub:	Algebraic Structures	4	25	75	100
516UMMT02		Real Analysis-I	4	25	75	100
516UMMT03		Dynamics	4	25	75	100
516UMMT04		Discrete Mathematics	4	25	75	100
	Elective Paper - I: Choose any one from Group-A		5	25	75	100
516UVET01	Value Education (Common to all UG Branches)		2	25	75	100
Total			23	150	450	600

VI Semester

Code No.	Course Title	Credit	Marks			
			CA	EA	Total	
616UMMT01	Core Subject:	Linear Algebra	4	25	75	100
616UMMT02		Real analysis-II	4	25	75	100
616UMMT03		Complex Analysis	4	25	75	100
	Elective Paper – II: Choose any one from Group B		5	25	75	100
	Elective Paper – III: Choose any one from Group B		5	25	75	100
616UEAT01	Extension Activity (Common to all UG Branches)		1	-	-	-
Total			23	125	375	500

LIST OF ELECTIVE SUBJECTS

Course Code	COURSE TITLE
Elective – I (GROUP A)	
516UMMT05	PROGRAMMING LANGUAGE 'C' WITH PRACTICALS
516UMMT06	MATHEMATICAL MODELING
516UMMT07	NUMERICAL METHODS
Elective – II & III (GROUP B)	
616UMMT04	ELEMENTARY NUMBER THEORY
616UMMT05	GRAPH THEORY
616UMMT06	OPERATIONS RESEARCH
616UMMT07	SPECIAL FUNCTIONS

8. Passing Requirements: The minimum pass mark (raw score) be 40% in End Assessment (EA) and 40% in Continuous Assessment (CA) and End Assessment (EA) put together. No minimum mark (raw score) in Continuous Assessment (CA) is prescribed unless it is specifically mentioned in the Scheme of Examinations.

9. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

PART – I TAMIL/OTHER LANGUAGES:

TAMIL/OTHER LANGUAGES OTIIER THAN ENGLISH: Successful candidates passing the examinations for the Language and securing the marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND Class respectively. All other successful candidates shall be declared to have passed the examination in the THIRD Class.

PART – II ENGLISH:

ENGLISH: Successful candidates passing the examinations for English and securing the marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND Class respectively. All other successful candidates shall be declared to have passed the examination in the THIRD Class.

PART - III CORE SUBJECTS, ALLIED SUBJECTS, AND PROJECT/ELECTIVES :

Successful candidates passing the examinations for Part-III Courses together and securing the marks (i),60 percent and above (ii) 50 percent and above but below 60 percent in the aggregate of the marks prescribed for the Part-III Courses together shall be declared to have passed the examination in the FIRST and SECOND Class respectively. All other successful candidates shall be declared to have passed the examinations in the THIRD Class. .

PART-IV: Passing requirement as given in para 8 is applicable for Environmental Studies (EVS) and Value Education but there is no classification of successful candidates. Extension Activity is rated as satisfactory by the Head of the Department as requirement for the award of degree.

10.Grading System: Grading System on a 10 Point Scale is followed with 1 mark = 0.1 Grade point to successful candidates as given below.

CONVERSION TABLE
(1 mark = 0.1 Grade Point on a 10 Point Scale)

Range of Marks	Grade Point	Letter Grade	Classification
90 to 100	9.0 to 10.0	O	First Class
80 to 89	8.0 to 8.9	A	First Class
70 to 79	7.0 to 7.9	B	First Class
60 to 69	6.0 to 6.9	C	First Class
50 to 59	5.0 to 5.9	D	Second Class
40 to 49	4.0 to 4.9	E	Third Class
0 to 39	0 to 3.9	F	Reappearance

Procedure for Calculation

Cumulative Grade Point Average (CGPA)	=	$\frac{\text{Sum of Weighted Grade Points}}{\text{Total Credits}}$
	=	$\frac{\sum (CA+EA) C}{\sum C}$
Where Weighted Grade Points in each Course	=	Grade Points (CA+EA) multiplied by Credits
	=	(CA+EA)C
Weighted Cumulative Percentage of Marks(WCPM)	=	CGPAx10

C- Credit, CA-Continuous Assessment, EA- End Assessment

11.Effective Period of Operation for the Arrear Candidates : Two Year grace period is provided for the candidates to complete the arrear examination, if any.

12. National Academic Depository (NAD): All the academic awards (Grade Sheets, Consolidated Grade Sheet, Provisional Certificate, Degree Certificate (Diploma) and Transfer Certificate) are lodged in a digital format in National Academic Depository organized by Ministry of Human Resource Development (MHRD) and University Grants Commission (UGC). NAD is a 24x7 online mode for making available academic awards and helps in validating its authenticity, safe storage and easy retrieval.

Registrar

13. Syllabus

I Semester

116UMMT03 - ALGEBRA

Unit- 1

Polynomial equations; Imaginary and irrational roots; Relation between roots and coefficients; Symmetric functions of roots in terms of coefficients; Transformations of equations; Reciprocal equations

Chapter 6 Section 9 to 12, 15, 15.1,15.2,15.3, 16, 16.1,16.2.

Unit-2

Increase or decrease the roots of the given equation: Removal of term: Descartes' rule of signs: Approximate solutions of roots of polynomials by Horner's method; Cardan's method of solution of a cubic polynomial. Summation of Series using Binomial, Exponential and Logarithmic series: Chapter 6: Section 17, 19, 24, 30, 34, 34.1

Chapter 3: Section 10, Chapter 4: Section 3, 3.1, 7.

Unit-3

Symmetric; Skew Symmetric; Hermitian; Skew Hermitian; Orthogonal Matrices; Eigen values; Eigen Vectors; Cayley - Hamilton Theorem; Similar matrices; Diagonalization of a matrix. Chapter 2, Section 6.1 to 6.3, 9.1, 9.2 , 16 , 16.1,16.2 16.3

Unit-4

Prime number; Composite number; decomposition of a composite number as a product of primes uniquely; divisors of a positive integer n ; Euler function. Chapter 5, Section 1 to 11

Unit-5

Congruence modulo n ; highest power of a prime number p contained in $n!$; Fermat's and Wilson's theorems .Chapter 5, Section 12 to 17

Contents and treatment as in

Unit – 1 and 2

Algebra Volume I by T. K. Manicavachagam Pillay,T.Natarajan, K.S.Ganapathy, Viswanathan Publication 2007

Unit – 3, 4 and 5

Algebra Volume II by T. K. Manicavachagam Pillay ,T.Natarajan ,K.S.Ganapathy, Viswanathan Publication 2008

Reference Books:-

1. Algebra: by S. Arumugam (New Gama publishing house, Palayamkottai)

116UMMT04 - TRIGONOMETRY

Unit- 1

Expansions of powers of $\sin\theta$, $\cos\theta$ - Expansions of $\cos^n \theta$, $\sin^n \theta$, $\cos^m \theta \sin^n \theta$
Chapter 2, Section 2.1, 2.1.1, 2.1.2, 2.1.3

Unit-2

Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Expansions of $\tan(\theta_1+\theta_2 + \dots + \theta_n)$ - Expansions of $\sin x$, $\cos x$, $\tan x$ in terms of x -Sum of roots of trigonometric equations - Formation of equation with trigonometric roots.
Chapter 3, Section 3.1 to 3.6

Unit-3

Hyperbolic functions-Relation between circular and hyperbolic functions - Formulas in hyperbolic functions - Inverse hyperbolic functions
Chapter 4, Section 4.1 to 4.7

Unit 4

Inverse function of exponential functions - Values of $\text{Log}(u+iv)$ - Complex index.
Chapter 5, Section 5.1 to 5.3

Unit-5

Sums of trigonometrical series - Applications of binomial, exponential, logarithmic and Gregory's series - Difference method.
Chapter 6, Section 6.1 to 6.6.3

Content and treatment as in Trigonometry by P. Duraipandian and Kayalal Pachaiyappa, Muhil Publishers.

Reference Books:-

2. Trigonometry by T.K. Manickavachagam Pillay

ALLIED CHEMISTRY – I

Unit 1: NUCLEAR CHEMISTRY

Fundamental particles of nucleus, isobars, isotones and isomers – Differences between chemical reactions; fusion and fission – Radio active series, group displacement law – Mass defect, derivation of $1\text{amu} = 931\text{ MeV}$ – nuclear binding energy and calculation – Applications of radio isotopes – carbon dating, and medicinal applications.

Unit 2: INDUSTRIAL CHEMISTRY

Fuels- Classification-gaseous fuels like water gas, producer gas, liquefied petroleum gas, gobar gas, Compressed natural gas - Fertilizers- Classification – urea ,Ammonium sulphate, superphosphate, Triple super phosphate, potassium nitrate- manufacture and uses - Silicones - Preparation, properties and applications.

Hardness of water: temporary and permanent hardness, disadvantages of hard water - Softening of hard water - Zeolite process, demineralization process and reverse osmosis - Purification of water for domestic use: use of chlorine, Ozone and UV light - Definition and determinations of BOD and COD.

Unit 3: FUNDAMENTALS OF ORGANIC CHEMISTRY

Classification of organic compounds -.Hybridization in methane, ethane, acetylene, benzene - classification of reagents - electrophiles, nucleophiles and free radicals - Classification of reactions addition, substitution, elimination, condensation and polymerisation - Polar Effects - Inductive effect, resonance, hyper-conjugation, steric effect - Keto-enol tautomerism - electrophilic substitution mechanism in benzene (Nitration and Sulphonation) – Heterocyclic compounds - Preparation, properties and uses of furan, Thiophene, pyrrole and pyridine

Unit 4: THERMODYNAMICS

Definition of Certain terms - system, surrounding, reversible and irreversible proces - Limitations of I Law Need for II Law - Different Statements of II. Law - Carnot cycle - Efficiency - Carnot Theorem - Thermodynamic Scale Of Temperature - Entropy- Definition Unit and change of entropy for phase transformation 'Free energy nature of Process in terms of Free energy and entropy-Statement of Third Law.

Unit 5: CHEMICAL KINETICS

Rate of chemical reaction- Differential rate expression - order and molecularity - Integrated rate expression for first, second, and zero order reactions - Half-life period— Effect of temperature on rate - Activation energy . Arrhenius equation - Arrhenius reation rate theory - Homogeneous and heterogeneous catalysis. Photochemistry • Statement of Grothus - Draper Law, Stark-Einstein's Law, Quantum Yield. Hydrogen chlorine reaction (elementary idea only) Photosynthesis, Photosensitisation, Phosphorescence Fluorescence, Chemiluminiscence - Definition with examples.

BOOK FOR REFERENCE

- 1 Dr. Veeraiyan V., Text book of Ancillary Chemistry, Highmount Publishing house, Chenna-14. Edition - 2008. (Both In Tamil and English)
- 2 Vaithyanathan S. and Others, Text book of Ancillary Chemistry, Priya Publications, Karur-2. Edition-2006.
- 3 Soni P.. and Others, Text book of Organic chemistry, Sultan Chand and Company, New Delhi, Edition - 2006.
- 4 Soni P. and Others, Text book of Inorganic Chemistry, Sultan Chand* and Company, New Delhi, Edition - 2006.
- 5 Puri B.R., Sharma and Pathania, Text book of Physical Chemistry, Vishal Publishing Co., New Delhi. Edition-2006.
- 6 Dara S.S., Text book of Environmental chemistry and Pollution Control.- S.Chand and Co., NewDelhl, Edition 2006.

116UMMT06 - Non Major Elective

1. Functional Mathematics - I

Unit -1

Ratio and proportions

Unit -2

Percentages

Unit – 3

Profit and Loss , Discounts

Unit – 4

Simple Interest and Compound Interest

Unit – 5

Solutions of simultaneous equations problems on ages and two digit number

Book for Reference :

Quantitative Aptitude-R.S. Agarwal

2. Functional Statistics

Unit -1

Set theory- union and intersection of two and three sets – subsets- complements of a set- power set – problems

Unit -2

Permutation and combination

Properties of nPr and nCr (no derivation),cyclic permutation –problems based on these

Unit -3

Probability theory : Definition, mutually exclusive events; independent events – Addition theorem – multiplication theorem on probability, conditional probability(no derivation) – problems

Unit – 4

Measures of averages – Arithmetic mean – Geometric Mean , Harmonic Mean, weighted Arithmetic Mean – Median – Mode – problems

Unit – 5

Measures of Dispersion :- Range ,Quartile Deviation ,Variance ,Standard Deviation – problems.

Books for Reference :

1. Business Statistics by P.R.Vittal
2. Business Statistics by S.P.Gupta

3. Functions and their applications

Unit -1

Functions – definition – types of functions, Domain, Range, Increasing and Decreasing Function, Even and Odd functions

Unit -2

Graphs of linear functions – Exponential function- Logarithmic function, Power function- quadratic function

Application to linear functions in Business and Economics

Unit -3

Linear cost models – simple problems

Unit -4

Break – Even Analysis – simple problems

Unit -5

Linear supply and Demand curves – Market Equilibrium – simple problem

Reference Book:

CA – Foundation Course – Mathematics by P.N.Arora and S.Arora(chapter-5)

4. Mathematical Logic

Unit -1

Connectives – Negation ,Conjunction ,Disjunction using Truth table ; other connectives – Symmetric ,Associative , Distributive.

Unit -2

Conditional and Biconditional statements – Tautologies using Truth table-simple problems

Unit -3

Equivalence formula – Duality law – simple problems

Unit -4

Normal forms – Disjunctive Normal form – Conjunctive Normal form(using only equivalence formula)

Unit -5

Principal disjunctive normal form (PDNF)-Principal Conjunctive Normal Form(PCNF)- using only truth table.

Book for Reference :

1. Discrete Mathematical structures with applications to computer Science J.P.Tremblay ,R.Manokar
2. Discrete Mathematics – Dr.M.K.Venkataraman,Dr.N.Sridhararn , N.ChandraSekaran

116UCCT01 - SOFT SKILLS (COMMON TO ALL UG BRANCHES)

Semester-I-. Essentials of Language and Communication – Level I

Unit I

Recap of Language Skills – Speech, Grammar, Vocabulary, Phrase, clause, sentence, Punctuation.

Unit II

Fluency building

What is fluency – Why is fluency important – Types of fluency – Oral fluency – Reading fluency – Writing fluency – Barriers of fluency – How to develop fluency.

Unit III

Principles of communication: LSRW in communication.

What is meant by LSRW Skills – Why it is important – How it is useful – How to develop the skills?

Oral – Speaking words, articulation, speaking clearly.

Written communication – Generating ideas/ gathering data organizing ideas, Setting goals, Note taking, Outlining, Drafting, Revising, Editing and Proof reading.

Non verbal communication – Body language, Signs and symbols, Territory/Zone, Object language.

Recommended Texts:

- 1.** Hewing, Martin. 1999. Advanced English Grammar: A Self-study Reference and practice Book for South Asian Students. Reprint 2003. Cambridge University Press. New Delhi.
- 2.** Lewis, Norman. 1991. Word Power Made Easy. Pocket Books.
- 3.** Hall and Shepherd. The Anti-Grammar Book: Discovery Activities for Grammar Teaching Longman.
- 4.** Powell. In Company. MacMillan.
- 5.** Cotton, et al. Market Lader. Longman.

II Semester

216UMMT03 - DIFFERENTIAL CALCULUS

Unit- 1

Successive differentiation - n^{th} derivative- standard results - trigonometrical - transformation - formation of equations using derivatives - Leibnitz's theorem and its applications Chapter 3 section 1.1 to 1.6, 2.1 and 2.2

Unit- 2

Total differential of a function - special cases - implicit functions - partial derivatives of a function of two functions - Maxima and Minima of functions of 2 variables- Lagrange's method of undetermined multipliers. Chapter 8 section 1.3 to 1.5 and 1.7, Section 4, 4.1 and 5 .

Unit- 3

Envelopes - method of finding envelopes - Curvature- circle, radius and centre of curvature- Cartesian formula for radius of curvature - coordinates of the centre of curvature - evolute-and involute - radius of curvature and centre of curvature in polar coordinates - p-r equation Chapter 10 Section 1.1 to 1.4 and Section 2.1 to 2.7

Unit- 4

P-r equations- angle between the radius vector and the tangent - slope of the tangent in the polar coordinates - the angle of intersection of two curves in polar coordinates- polar sub tangent and polar sub normal - the length of arc in polar coordinates. Chapter 9 Section 4.1 to 4.6

Unit- 5

Asymptotes parallel to the axes - special cases - another method for finding asymptotes - asymptotes by inspection - intersection of a curve with an asymptote. Chapter 11 - Section 1 to 4, Section 5.1 , 5.2,6 and 7 Content and treatment as in Calculus Vol- 1 by S. Narayanan and T.K. Manicavachagom pillay - S. Viswanathan publishers - 2006

Reference Books:-

1. Calculus by Thomas and Fenny ,Pearson Publication
2. Calculus by Stewart

216UMMT04 - ANALYTICAL GEOMETRY

Unit-1

Chord of contact – polar and pole,- conjugate points and conjugate lines – chord with (x_1, y_1) as its midpoint – diameters – conjugate diameters of an ellipse.- semi diameters- conjugate diameters of hyperbola Chapter – 7 Sections 7.1 to 7.3 , Chapter – 8 Section 8.1 to 8.5

Unit- 2

Co-normal points, co-normal points as the intersection of the conic and a certain R.H. concyclic points – Polar coordinates, general polar equation of straight line – polar equation of a circle on A_1A_2 as diameter, equation of a straight line, circle, conic – equation of chord , tangent, normal. Equations of the asymptotes of a hyperbola. Chapter – 9 Sec 9.1 to 9.3 , Chapter – 10 Sec 10.1 to 10.8

Unit- 3

Introduction – System of Planes - Length of the perpendicular – orthogonal projection. Chapter 2 Sec 2.1 to 2.10

Unit- 4

Representation of line – angle between a line and a plane- co-planar lines- shortest distance 2 skew lines- Length of the perpendicular- intersection of three planes Chapter 3 Sec 3.1 to 3.8

Unit- 5

Equation of a sphere ; general equation ; section of a sphere by a plane - equation of the circle ; tangent plane ; radical plane ; coaxial system of spheres; orthogonal spheres. Chapter 6 Sec 6.1 to 6.9

Contents and treatment as in

1. Analytical Geometry of 2D by P.Durai Pandian- Muhil publishers for Unit – 1 and 2
2. Analytical Solid Geometry of 3D by Shanthi Narayan and Dr.P.K. Mittal for Unit – 3 to 5

Reference Books:-

1. Analytical Geometry of Two Dimension by T. K. Manikavachakam Pillai and S. Narayanan.
2. Analytical Geometry of Three Dimension by T. K. Manikavachakam Pillai and S. Narayanan

CHEMISTRY - II

Unit1: CO-ORDINATION CHEMISTRY

Definition of terms - Classification of Ligands - Nomenclature - Chelation - EDTA and the application - Werner's Theory - Effective Atomic Number - Pauling's theory- Postulates - Applications to $\text{Ni}(\text{CO})_4, \text{Ni}(\text{CN})_4, (\text{CO}(\text{CN})_6)^{4-}$ • Merits and Demerits of. Werners and Pauling's theory - Biological Role of haemoglobin and Chlorophyll (elementary idea only) - Applications of co-ordination compounds in qualitative analysis and Quantitative analysis like Separation of. copper and cadmium ions; Nickel and cobalt ion; Identification of metal ions like Cu, Fe and Ni. Estimation of Ni using DMG and Al using Oxine.

Unit 2:BIOMOLECULES

Classifications, preparation and reactions of glucose and fructose. Discussion of open and ring structure of glucose. Mutarotation. Interconversion of glucose to fructose and vice versa - Preparation and properties of sucrose. Properties of starch, cellulose and derivatives of cellulose - Diabetes - causes and control :measures RNA and DNA (elementary idea only) - Amino acids: Classification, preparation and properties of alanine -preparation of dipeptide using Bergman method.

Unit 3: PHASE DIAGRAM

Phase rule: Definition of terms, application of phase rule to water system - reduced phase rule and its application to Pb-Ag system. Freezing mixture - Completely miscible and partially miscible liquid systems - upper and lower critical solution temperatures

Unit 4: ELECTROCHEMISTRY

Galvanic cells - emf - standard electrode potential - reference electrodes -electrochemical series and its applications - Determination of pH using electrochemical method - Electroplating process -Nickel and Chrome plating - Different type of cells - primary cell, Secondary cell and fuel cells -Corrosion and methods of prevention, .Conductometric titrations - hydrolysis of salts. Derivation of K_h - Definition of pH and its determination by colorimetric method. Buffer solution -; Henderson's equation. Applications of pH and buffer in biological processors and industries - Corrosion and its prevention.

Unit 5: ANALYTICAL CHEMISTRY

Introduction to Qualitative and Quantitative Analysis - Principle of volumetric analysis - Separation techniques - extraction - distillation - crystallization— Chromatographic separations - Principles and applications of column , paper, thin layer, gas-liquid and ion-exchange.

BOOKS FOR REFERENCE

1. Dr. Veeraiyan V., Text book of Ancillary Chemistry, Highmount Publishing house, Chennai-14. Edition -2006. (Both in Tamil and English)
2. Vaithianathan S. and Others, Text book of Ancillary Chemistry, Priya Publications, Karur-2. Edition -2006.
3. Soni P.L and Others, Text book of Organic chem/sfry, Sultan Chand and Company, New Delhi, Edition-2006.
4. Soni P.L. and Others, Textbook of Inorganic Chemistry, Sultan Chand and Company, New Delhi, Edition -2006.
5. Puri B.R., Sharma and Pathania, text book of Physical Chemistry, Vishal Publishing Co., New Delhi. Edition-2006.
6. Dara S.S., Text book of Environmental chemistry and Pollution Control.- S.Chand and Co., NewDelhi, Edition 2006.

216UMMT06

Non Major Elective

1. Functional Mathematics - II

Unit :1

Time and work – pipes and cisterns – Problem

Unit -2

Time and Distance, Relative Speeds- Problems on Races, Boats and Streams and Trains

Unit – 3

Mensuration – Problems

Unit -4

Polygons-Interior angles – Numbers of diagonals – Regular polygons – Problem

Unit -5

Stocks and Shares – Problems

Reference book:

Quantitative Aptitude - R.S. Agarwal

2. Mathematical Modeling

Unit -1

Steps in Building a Mathematical Model-need for Mathematical Modeling – Model for surveying the earth and Heaven

Unit -2

Height of a Tower- width of a River – Digging a tunnel through a mountain

Unit -3

Radius of earth – radius of Moon-Radii of Sun and Planets

Unit -4

Distance of earth – Distance of a star – shortest distance between two points on the surface of the earth.

Unit – 5

Models in terms of difference equations – growth of population – influence on pollution – on population growth – influence of age structure on population growth

Treatments as in

J.N.Kapur , Insight into Mathematical Modeling Mathematical Science Trust Society
N.D.1992

3. Mathematics of Finance

Unit -1

Rates of interest – simple and compound interest rates – Effective rate of interest – Nominal rate of interest constant force of interest- relationship between these rates of interest

Unit-2

Accumulation and present value of single payment using these rates of interest – Accumulation and present value of a single payment using symbols – when the force of interest is a function of t , $\phi(t)$.

Unit -3

Definition of $A(t_1, t_2)$, $A(t)$, $v(t_1, t_2)$ and $v(t)$ – expressing accumulation and present value of a single payment using these symbols - when the force of interest is a function of t , $\phi(t)$

Unit – 4

Series of payments (even and uneven), definition of annuity (examples in real life situation) – accumulations and present values of annuities with level payment and where the payments and interest rates have same frequencies.

Unit -5

Definition of perpetuity and examples – Accumulation and present values of annuities where payments and interest rates have different frequencies

Books for Reference :

An introduction to Mathematical of finance by J.J. Scott, William F

4. Applications of Differential Equations

Unit -1

Applications of first order differential equations – Growth, Decay and chemical reactions

Unit – 2

Flow of water from an orifice

Unit – 3

Falling bodies and other rate problems

Unit -4

The Brachistochrone, Fermat, Bernoulli – problems

Unit -5

Simple Electric Circuits

Content and Treatment as in :-

1. Differential equations and its Applications, Chapter III upto section 6. S.Narayanan and T.K.ManickavachagamPillay

216UCCT02 - SOFT SKILLS (COMMON TO ALL UG BRANCHES)

Semester-II- Essentials of Language and Communication – Level – II

Unit-I

Speaking Skills

Formal and Informal Conversation – Conversation in the work place – Interviews – Public Speech – Lectures.

Unit – II

Listening Skill

Comprehending – Retaining – Responding – Tactics – Barriers to Listening – Overcoming listening barriers – Misconception about listening.

Unit – III

Reading Skill

Acquiring reading – Reading Development – methods teaching – Reading difficulties.

Unit – IV

Writing skill

Note-making – CV's – Report writing, copy writing, Agenda – Minutes – Circular – Essay writing on any current issues – paragraph – Essay writing, Writing Research papers – Dissertation.

Unit- V

Business Correspondence

Meaning of Business correspondence – Importance of Business Correspondence essential qualities of a business letters. Different types of business letters – cover letter, thank you letters, message through email and Fax, Acceptance letters, rejection letters, and withdrawal letters.

Recommended Texts:

1. Minippally, Methukutty. M. 2001. Business Communication Strategies. 11th Reprint. Tata McGraw – Hill. New Delhi.
2. SasiKumar. V and P.V. Dharmija. 1993. Spoken English: A Self-Learning Guide Conversation Practice. 34th reprint. Tata McGraw – Hill. New Delhi.
3. Swets, Paul. W. 1983. The Art of Talking So That People Will Listen: Getting
4. Through to Family, Friends and Business Associates. Prentice Hall Press. New York.
5. John, Seely The Oxford guide to writing and speaking. Oxford U P, 1998, Delhi.
6. The Process of Writing: Planning and Research, Writing, Drafting and Revising.

III Semester

316UMMT03 - INTEGRAL CALCULUS

Unit- 1

Reduction formulae –Types $\int x^n e^{ax} dx$, $\int x^n \cos ax dx$, $\int x^n \sin ax dx$
 $\int \cos^n x dx$, $\int \sin^n x dx$, $\int \sin^m x \cos^n x dx$, $\int \tan^n x dx$, $\int \cot^n x dx$, $\int \sec^n x dx$, $\int \operatorname{cosec}^n x dx$
 $\int x^n (\log x)^m dx$. Bernoulli's formula. Chapter 1 Section 13, 13.1 to 13.10, 14, 15.1

Unit- 2

Multiple Integrals- definition of the double integrals- evaluation of the double integrals- double integrals in polar coordinates – triple integrals – applications of multiple integrals – volumes of solids of revolution – areas of curved surfaces – change of variables – Jacobians Chapter 5 Section 1, 2.1, 2.2, 3.1, 4, 6.1, 6.2, 6.3, 7 Chapter 6 Section 1.1, 1.2, 2.1 to 2.4

Unit- 3

Beta and Gamma functions- indefinite integral – definitions – convergence of $\Gamma(n)$ – recurrence formula of Γ functions – properties of β -function- relation between β and Γ functions Chapter 7 Sections 1.1 to 1.4 , 2.1 to 2.3, 3, 4, 5.

Unit-4

Introduction, Gradient, divergence, curl, directional derivative, unit normal to a surface. Solenoidal and irrotational. Laplacian Differential Operator. Chapter 2 Sections 2.3 - 2.8

Unit-5

Line, surface and volume integrals; Theorems of Gauss, Stokes and Green. (Without proof) – Problems. Chapter 3 Sections 3.1-3.8 and Chapter 4 Sections 4.1- 4.8

Content and treatment as in

1. Calculus Vol- II by S. Narayanan and T.K. Manicavachagam pillay - S. Viswanathan publishers – 2007 for Unit 1 , Unit 2 , Unit 3
2. Content and treatment as in Vector Analysis by P.Duraipandian and Laxmi Duraipandian. Emerald Publishers. For Unit 4 , Unit 5

Reference Books:-

1. Integral Calculus and differential equations : Dipak Chatterjee (TATA McGraw Hill Publishing company Ltd.)
2. Vector Algebra and Analysis by Narayanan and T.K.Manickvachagam Pillay S Viswanathan Publishers.
3. Vector Analysis: Murray Spiegel (Schaum Publishing Company, New York)

316UMMT04 - DIFFERENTIAL EQUATIONS

Unit- 1

Homogenous equations. Exact equations. Integratic factor. Linear equations, Reduction of order. Chapter 2 Sections 7-11

Unit- 2

Second order linear differential equations introduction .General solution of homogenous equations. The use of known solution to find another. Homogeneous equation with constant coefficients- Method of undetermined coefficients; Method of variation of parameters; Chapter 3 Sections 14-19

Unit -3

System of first order equations-Linear systems. Homogeneous linear systems with constant coefficients.(Omit non-homogeneous system of equations)
Chapter 10 Sections 55 and 56

Unit-4

Formation of P.D.E by eliminating arbitrary constants and arbitrary functions; complete integral; Singular integral; general integral: Lagrange's equations $Pp + Qq=R$.

Chapter 0 Sections 0.4 and 0.5

Unit-5

Charpit's method and Special types of first order equations.
Chapter 0 Sections 0.11, 0.11.1

Contents and treatment as in

1. Differential equations with Applications and Historical Notes by George F. Simmons Second Edition, Tata Mcgraw Hill Publications. Unit 1, 2 and 3
2. Introduction to Partial Differential Equations Second Edition(2009) by K.Sankara Rao, PHI Learning Private Limited. Unit 4 and 5

Reference Books:-

1. Differential equations by Simmons.
2. Partial Differential Equations by Sneddon.
3. Ordinary and partial differential equations by Dr.M.D.Raisinghanian S.Chand

PHYSICS - I

Unit 1 : Waves and Oscillations

Simple harmonic motion – composition of two simple harmonic motion at right angles (periods in the ratio 1:1) – Lissajou’s figures – uses – laws of transverse vibrations of strings – Melde’s string – transverse and longitudinal modes – determination of a.c frequency using sonometer (steel and brass wires) – ultrasonics – production – application and uses – reverberation – factors for good acoustics of hall and auditorium.

Unit 2 : Properties of matter

Elasticity : Elastic constants – bending of beam – Young’s modulus by non- uniform bending – energy stored in a stretched wire – torsion in a wire – determination of rigidity modulus by torsional pendulum – static torsion.

Viscosity : Coefficient of viscosity – Poissuelle’s formula – comparison of viscosities - burette method – Stoke’s law – terminal velocity – viscosity of highly viscous liquid – lubrication.

Surface tension : Molecular theory of surface tension – excess of pressure inside a drop and bubble – variation of surface tension with temperature – Jaeger’s method.

Unit 3 : Thermal Physics

Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory and application – liquefaction of gasses – Linde’s process – Helium I and II – adiabatic demagnetization. Thermodynamic equilibrium – laws of thermodynamics – entropy change of entropy in reversible and irreversible processes.

Unit 4 : Electricity and Magnetism

Capacitor – energy of a charged capacitor - loss of energy due to sharing of charges – magnetic field due to a current carrying conductor – Biot Savart’s Law – Field along the axis of the coil carrying current – peak, average and RMS values of ac current and voltage – power factor and current values in an ac circuit – circuit control and protective devices – switch and its types – fuses circuit breaker and relays.

Unit 5 : Geometrical optics

Refraction – Refractive index by microscopy – air cell – refraction at grazing incidence and grazing emergence in prisms – combination of two small angled prisms to produce dispersion without deviation and deviation without dispersion – direct vision prism – constant deviation prism – defects of images – coma – distortion – spherical and chromatic aberration in lenses.

Books for study

1. Allied Physics by R. Murugesan, S.Chand & Co, New Delhi (2005).
2. Waves and Oscillations by Brijlal and N. Subramanyam, Vikas Publishing house, New Delhi (2001).
3. Properties of Matter by Brij Lal and N.Subramaniam, S. Chand & Co., New Delhi (1994).
4. Heat and Thermodynamics by J.B.Rajam and C.L.Arora, 8th edition, S.Chand & Co., New Delhi (1976).
5. Optics and Spectroscopy by R. Murugesan, S.Chand & Co, New Delhi (2005).

Books for Reference

1. Fundamentals of Physics by Resnick Halliday and Walker, 6th edition, , John Willey and Sons, Asia Pvt.Ltd., Singapore.
2. Text book of Sound by V.R.Khanna and R.S.Bedi, 1st edition, Kedharnaath Publish & Co, Meerut (1998).
3. Electricity and Magnetism by N.S. Khare and S.S. Srivastava, 10th Edition, Atma Ram & Sons, New Delhi (1983).
4. Optics by D.R. Khanna and H.R. Gulati, S. Chand & Co. Ltd., New Delhi (1979).

316UCCT03 - SOFT SKILLS (COMMON TO ALL UG BRANCHES)

Semester- III- COMPUTING SKILLS – LEVEL - I

Objective:

The major objective in introducing the course is to impart hands on training to students in Microsoft Office essentials like MS Word, MS Excel and MS Access. The course is basic course offered at two levels exclusively meant for students who have no computer knowledge. Course is designed as a practical oriented course and not for chalk and board teaching.

Pre- requisite : NIL

Unit 1 : Introduction to computers – classification of computers; Computers inside – Hardware (processing, memory i/o, storage etc), Software (Systems, application); Operating Systems – DOS, LINUX, UNIX, Windows ; Programming – Overview, need and skills; Networking Basics; Virus; Hacking

Unit 2 : Word processing - Operating of word documents like open, close, save, print ; Editing Text – tools, formatting , bullets, layout ; Navigating word – Keyword, mouse, document formatting ; paragraph alignment - indentation, headers, footers, numbering; printing – preview, options

Unit 3 : File Management – Importance of file management, backing of files, files and folders- editing, deleting, retrieving, renaming, subfolders; Manipulating windows – minimize, maximize; power point basics- terminology- templates, viewing

Unit 4 : Spreadsheets – MS Excel – opening, entering text and data, formatting, navigating; Formulas- entering, handling and copying; charts- creating, formatting and printing, header and footer, centering of data; printing

Unit 5 : Networking - Internet explorer; www – working, browsing, searching, saving; bookmark – features, favorite, create, delete ; printing webpage; email – creating, receiving, reading and sending messages

Note – Unit 2 -5 are to be taught as practical with hands on experience

References :

1. Introduction to Computers – Peter Norton, Tata McGraw-Hill, India
2. Microsoft 2003 – Jennifer Ackerman Kettel et al., Tata Mc-Graw Hill, India
3. Working In Microsoft office 2006– Ron Mansfield , Tata Mc-Graw Hill, India

Examinations :

1. Sessional tests could be based on Theory and practical
2. End semester is based on practical examination only
- 3.

IV Semester

416UMMT03 - TRANSFORM TECHNIQUES

Unit- 1

Introduction – Properties of Laplace transform- Laplace transform of elementary functions- Problems using properties-Laplace transform of special function, unit step function and Dirac delta function - Laplace transform of derivatives and Integrals – Evaluation of integral using Laplace Transform - Initial Value Theorem – Final Value Theorem and problems –Laplace Transform of periodic function

Chapter 2 : Section 2.1 to 2.20

Unit-2

Introduction, Properties of inverse Laplace transform, Problems (usual types); Convolution Theorem - Inverse Laplace Transform using Convolution theorem

Chapter 3, Section 3.1 to 3.11

Unit-3

Introduction, Expansions of periodic function of period 2π ; expansion of even and odd functions; half range cosine and sine series – Fourier series of change of interval.

Chapter 1, Section 1.1 to 1.11

Unit- 4

Introduction of Fourier transform - Properties of Fourier Transforms - Inverse Fourier transform – Problems, Fourier sine and cosine transforms and their inverse Fourier transform – Problems, Convolution theorem, Parseval's identity and problems using Parseval's identity. Chapter 4, Section 4.1 to 4.12

Unit- 5

Applications of Laplace transform to solution of first and second order linear differential equations (constant coefficients) and simultaneous linear ordinary differential equations – Application of Laplace transform to partial differential equations. Application of Laplace Transform and Fourier transform to Initial and Boundary Value Problems.

Chapter 5, Section 5.1, 5.3, 5.7 to 5.11

Contents and treatment as in "Fourier Series and Integral Transforms" – Dr. S. Sreenath, S.Ranganatham, Dr. M.V.S.S.N.Prasad and Dr. V. Ramesh Babu. S.Chand and Company Ltd

Reference Books:-

1. Engineering Mathematics volume 3 : M.K. Venkataraman(National Publishing Co.)
2. Engineering Mathematics volume 3 : P.Kandasamy and others(S.Chand and Co.)
3. Advanced Engineering Mathematics : Stanley Grossman and William R.Devit (Harper and Row publishers)

416UMMT04 - STATICS

Unit-1

Newton's laws of motion - resultant of two forces on a particle- Equilibrium of a particle- Limiting Equilibrium of a particle on an inclined plane
Chapter 2 - Section 2.1, 2.2, Chapter 3 - Section 3.1 and 3.2

Unit-2

Forces on a rigid body - moment of a force - general motion of a rigid body- equivalent systems of forces - parallel forces - forces along the sides of a triangle - couples
Chapter 4 - Section 4.1 to 4.6

Unit-3

Resultant of several coplanar forces- equation of the line of action of the resultant- Equilibrium of a rigid body under three coplanar forces - Reduction of coplanar forces into a force and a couple.- problems involving frictional forces
Chapter 4 - Section 4.7 to 4.9, Chapter 5 - Section 5.1, 5.2

Unit-4

Centre of mass - finding mass centre - a hanging body in equilibrium - stability of equilibrium - stability using differentiation
Chapter 6 - Section 6.1 to 6.3, Chapter 7 - Section 7.1, 7.2

Unit-5

Virtual work - hanging strings- equilibrium of a uniform homogeneous string - suspension bridge
Chapter 8 - Section 8.1, Chapter 9 - Section 9.1, 9.2

Contents and treatment as in "Mechanics - P. Duraipandian, Laxmi Duraipandian, Muthamizh Jayapragasham, S. Chand and Co limited 2008 .

Reference Books:

1. Dynamics - K. Viswanatha Naik and M. S. Kasi, Emerald Publishers.
2. Dynamics - A. V. Dharmapadam, S. Viswanathan Publishers.
3. Mechanics - Walter Grenier

416UMMT05 - ALLIED PAPER - IV

Unit 1 : Physical Optics

Velocity of light – Michelson’s method. Interference : Colours of thin films –air wedge – determination of diameter of a thin wire by air wedge – test for optical flatness – Diffraction – Fresnel’s explanation of rectilinear propagation of light – theory of transmission grating – Normal incidence – polarization – double refraction - optical activity – polarimeter.

Unit 2 : Atomic Physics

Atom model – vector atom model – electron, spin, quantum numbers – Pauli’s exclusion principle – electronic configuration of elements and periodic classification of elements – various quantum numbers – magnetic dipole moment of electron due to orbital and spin motion – Bohr magneton – spatial quantisation – Stern and Gerlach experiment.

Unit 3 : Nuclear Physics

Nuclear model – liquid drop model – magic numbers - shell model – nuclear energy – mass defect – binding energy. Radiation detectors – ionization chambers – GM Counter – Fission Controlled and Uncontrolled chain reaction – nuclear reactor – thermonuclear reactions – stellar energy.

Unit 4 : Elements of relativity and quantum mechanics

Postulates of theory of relativity – Lorentz transformation equations – derivation – length contraction – time dilation – mass energy equivalence – uncertainty principle – postulates of wave mechanics – Schrodinger’s equation – application to a particle in a box.

Unit 5 : Electronics

Basic Electronics: Zener diode – voltage regulator – LED – Transistor RC coupled amplifier – feedback principle – condition for oscillation – phase shift oscillator – Wein’s bridge oscillator.

Digital Electronics : NAND and NOR gates – Universal building blocks – Boolean algebra – Demorgan’s theorem – verification – elementary ideas of ICs – SSI , MSI, LSI and VLSI – Half adder, Full adder, Half Subtractor and Full subtractor.

Books for study

1. Allied Physics by R. Murugesan, S.Chand & Co, New Delhi (2005).
2. Allied Physics by K. Thangaraj and D. Jayaraman, Popular Book Depot, Chennai (2004).
3. Text book of Optics by Brijlal and N. Subramanyam, S.Chand & Co, New Delhi (2002).
4. Modern Physics by R. Murugesan, S.Chand & Co, New Delhi (2005).
5. Applied Electronics by A. Subramaniam, 2nd Edition, National Publishing Co., Chennai (2001).

Books for Reference

1. Fundamentals of Physics by Resnick Halliday and Walker, 6th edition, , John Willey and Sons, Asia Pvt.Ltd., Singapore.
2. Optics by D.R. Khanna and H.R. Gulati, S. Chand & Co. Ltd., New Delhi (1979).
3. Concepts of Modern Physics by A.Beiser, Tata McGraw Hill Publication, New Delhi (1997).
4. Digital Fundamentals by Thomas L.Floyd, Universal Book Stall – New Delhi (1998).

416UEST01 - ENVIRONMENTAL STUDIES (COMMON TO ALL UG BRANCHES)

CORE MODULE SYLLABUS FOR ENVIRONMENTAL STUDIES FOR UNDER GRADUATE COURSES OF ALL BRANCHES OF HIGHER EDUCATION

Vision

The importance of environmental science and environmental studies cannot be disputed. The need for sustainable development is a key to the future of mankind. Continuing problems of pollution, loss of forest, solid waste disposal, degradation of environment, issues like economic productivity and national security, Global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues. The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 and world Summit on Sustainable Development at Johannesburg in 2002 have drawn the attention of people around the globe to the deteriorating condition of our environment. It is clear that no citizen of the earth can afford to be ignorant of environment issues. Environmental management has captured the attention of health care managers. Managing environmental hazards has become very important.

Human beings have been interested in ecology since the beginning of civilization. Even our ancient scriptures have emphasized about practices and values of environmental conservation. It is now even more critical than ever before for mankind as a whole to have a clear understanding of environmental concerns and to follow sustainable development practices. India is rich in biodiversity, which provides various resources for people. It is also basis for biotechnology. Only about 1.7 million living organisms have been described and named globally. Still many more remain to be identified and described. Attempts are made to conserve them in ex-situ and in-situ situations. Intellectual property rights (IPRs) have become important in a biodiversity-rich country like India to protect microbes, plants and animals that have useful genetic properties. Destruction of habitats, over-use of energy resource and environmental pollution have been found to be responsible for the loss of a large number of life-forms. It is feared that a large proportion of life on earth may get wiped out in the near future.

In spite of the deteriorating status of the environment, study of environment has so far not received adequate attention in our academic programmes. Recognizing this, the Hon'ble Supreme Court directed the UGC to introduce a basic course on environment at every level in college education. Accordingly, the matter was considered by UGC and it was decided that a six months compulsory core module course in environmental studies may be prepared and compulsorily implemented in all the University/Colleges of India. The experts committee appointed by the UGC has looked into all the pertinent questions, issues and other relevant matters. This was followed by framing of the core module syllabus for environmental studies for undergraduate courses of all branches of Higher Education. We are deeply conscious that there are bound to be gaps between the ideal and real. Genuine endeavour is required to minimize the gaps by intellectual and material inputs. The success of this course will depend on the initiative and drive of the teachers and the receptive students.

SYLLABUS

Unit 1 : Multidisciplinary nature of environmental studies

Definition, scope and importance, need for public awareness. (2 lectures)

Unit 2 : Natural Resources :

Renewable and non-renewable resources :

Natural resources and associated problems.

- a. Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b. Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c. Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

- d. Food resources : World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e. Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
- f. Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles. (8 lectures)

Unit 3 : Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystems :-
 - (a) Forest ecosystem
 - (b) Grassland ecosystem
 - (c) Desert ecosystem
 - (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) (6 lectures)

Unit 4 : Biodiversity and its conservation (8 lectures)

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 5 : Environmental Pollution (8 lectures)

Definition

- Cause, effects and control measures of :-
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 6 : Social Issues and the Environment (7 lectures)

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

Unit 7 : Human Population and the Environment (6 lectures)

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- VII
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Unit 8 : Field Work

- Visit to a local area to document environmental assets rivers/forest/grassland/hill/mountain.
- Visit to a local polluted site – urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond,river,hill slopes,ect. (Field work Equal to 5 lecture hours)

416UCCT04 - SOFT SKILLS (COMMON TO ALL UG BRANCHES)

Semester- IV- COMPUTING SKILLS – LEVEL II

Objective:

The major objective in introducing the course is to impart hands on training to students in Microsoft Office essentials like MS Word, MS Excel and MS Access. The course is basic course offered at two levels exclusively meant for students with no computer knowledge. Course is designed as a practical oriented course and not for chalk and board teaching.

Pre- requisite : Essentials of Microsoft office as given in Level I

Unit 1 : Word processing - Auto formatting; Paragraph and character styles – creating , modifying and using styles; Templates – modifying, attaching and controlling; Tables and columns - creating, manipulating and formulating; mail merge; labels- creating

Unit 2 : Data Management – MS Access - Introduction, concepts and terms; database and tables- creating, data types, editing fields, renaming, resizing of fields, finding, sorting and displaying of data –printing

Unit 3 : Spreadsheets – MS Excel – Worksheets – moving, copying, sorting, inserting of cells, rows, columns; Charts – creating, editing, adding, rotating, printing, deleting and controlling; graphics- creating and placing, drawing lines and shapes; using multiple worksheets ; printing

Unit 4 : Presentations – Power point- starting, browsing and saving, creating, editing, formatting of text and paragraphs, inserting tables and charts; Presentation through slides, handouts and printing.

Unit 5 : Graphics and Multimedia - Clip art – create and insert; shapes- draw, insert and copy; create a flow

Note – Unit 1 -5 are to be taught as practical with hands on experience

References :

1. Introduction to Computers – Peter Norton, Tata McGraw-Hill, India
2. Microsoft 2003 – Jennifer Ackerman Kettel et al., Tata Mc-Graw Hill, India
3. Working In Microsoft office 2006– Ron Mansfield , Tata Mc-Graw Hill, India

Examinations :

1. Sessional tests could be based on Theory and practical
2. End semester is based on practical examination only

V Semester

516UMMT01 - ALGEBRAIC STRUCTURES

Unit -1

Introduction to groups. Subgroups, cyclic groups and properties of cyclic groups; Lagrange's Theorem; A counting principle Chapter 2 Section 2.4 and 2.5

Unit -2

Normal subgroups and Quotient group; Homomorphism; Automorphism.
Chapter 2 Section 2.6 to 2.8

Unit - 3

Cayley's Theorem; Permutation groups.
Chapter 2 Section 2.9 and 2.10

Unit -4

Definition and examples of ring- Some special classes of rings; homomorphism of rings; Ideals and quotient rings; More ideals and quotient rings.
Chapter 3 Section 3.1 to 3.5

Unit - 5

The field of quotients of an integral domain; Euclidean Rings; The particular Euclidean ring.
Section 3.6 to 3.8

Contents and treatment as in "Topics in Algebra" – I. N. Herstein, Wiley Eastern Ltd.

Reference Book :-

1. Modern Algebra by M.L.Santiago
2. Modern Algebra by S. Arumugam and others, New Gamma publishing House, Palayamkottai.
3. Modern Algebra by Visvanathan Nayak

516UMMT02 - REAL ANALYSIS -I

Unit – 1

Sets and elements; Operations on sets; functions; real valued functions; equivalence; countability ; real numbers; least upper bounds.

Chapter 1 Section 1. 1 to 1.7

Unit – 2

Definition of a sequence and subsequence; limit of a sequence; convergent sequences; divergent sequences; bounded sequences; monotone sequences;

Chapter 2 Section 2.1 to 2.6

Unit – 3

Operations on convergent sequences; operations on divergent sequences; limit superior and limit inferior; Cauchy sequences.

Chapter 2 Section 2.7 to 2.10

Unit- 4

Convergence and divergence; series with non-negative numbers; alternating series; conditional convergence and absolute convergence; tests for absolute convergence; series whose terms form a non-increasing sequence; the class l^2

Chapter 3 Section 3.1 to 3.4, 3.6, 3.7 and 3.10

Unit – 5

Limit of a function on a real line;. Metric spaces; Limits in metric spaces.Function continuous at a point on the real line, reformulation, Function continuous on a metric space.

Chapter 4 Section 4.1 to 4.3 Chapter 5 Section 5.1-5.3

Contents and Treatment as in "Methods of Real Analysis" : Richard R. Goldberg (Oxford and IBH Publishing Co.)

Reference Books :-

1. Principles of Mathematical Analysis by Walter Rudin
2. Mathematical Analysis Tom M Apostol

516UMMT03 - DYNAMICS

Unit -1

Basic units – velocity – acceleration- coplanar motion – rectilinear motion under constant forces – acceleration and retardation – thrust on a plane – motion along a vertical line under gravity – line of quickest descent - motion along an inclined plane – motion of connected particles.

Chapter 1 - Section 1.1 to 1.4, Chapter 10 - Section 10.1 to 10.6

Unit – 2

Work, Energy and power – work – conservative field of force – power – Rectilinear motion under varying Force simple harmonic motion (S.H.M.) – S.H.M. along a horizontal line- S.H.M. along a vertical line – motion under gravity in a resisting medium.

Chapter 11 - Section 11.1to 11.3 , Chapter 12 - Section 12.1 to 12.4

Unit – 3

Forces on a projectile- projectile projected on an inclined plane- Enveloping parabola or bounding parabola – impact – impulse force - impact of sphere - impact of two smooth spheres – impact of a smooth sphere on a plane – oblique impact of two smooth spheres

Chapter 13 - Section 13.1 to 13.3, Chapter 14 - Section 14.1, 14.5

Unit – 4

Circular motion – Conical pendulum – motion of a cyclist on a circular path – circular motion on a vertical plane – relative rest in a revolving cone – simple pendulum – central orbits - general orbits - central orbits- conic as centered orbit.

Chapter 15 - Section 15.1 to 15.6, Chapter 16 - Section 16.1 to 16.3

Unit – 5

Moment of inertia. Two dimensional motion of a rigid body –equations of motion for two dimensional motion – theory of dimensions- definition of dimensions.

Chapter 17 -Section 17.1, Chapter 18 - Section 18.1, 18.2, Chapter 19 - Section 19.1

Contents and treatment as in “Mechanics” – P. Duraipandian , Laxmi Duraipandian , Muthamizh Jayapragasham, S. Chand and Co limited 2008 .

Reference Books:

1. Dynamics – K. Viswanatha Naik and M. S. Kasi, Emerald Publishers.
2. Dynamics – A. V. Dharmapadam, S. Viswanathan Publishers.
3. Mechanics – Walter Grenier

516UMMT04 - DISCRETE MATHEMATICS

Unit- 1

Set, some basic properties of integers, Mathematical induction, divisibility of integers, representation of positive integers

Chapter 1 - Sections 1.1 to 1.5

Unit – 2

Boolean algebra, two element Boolean algebra, Disjunctive normal form, Conjunctive normal form

Chapter 5 - Sections 5.1 to 5.4

Unit – 3

Application, Simplification of circuits, Designing of switching circuits, Logical Gates and Combinatorial circuits.

Chapter 5 - Section 5.5, 5.6

Unit – 4

Sequence and recurrence relation, Solving recurrence relations by iteration method, Modeling of counting problems by recurrence relations, Linear (difference equations) recurrence relations with constant coefficients, Generating functions, Sum and product of two generating functions, Useful generating functions, Combinatorial problems.

Chapter 6 - Section 6.1 to 6.6

Unit – 5

Introduction, Walk, Path and cycles, Euler circuit

Chapter 7 - Sections 7.1 to 7.3

Contents and treatment as in introduction to Discrete Mathematics, 2nd edition, 2002 by M. K. Sen and B. C. Chakraborty, Books and Allied Private Ltd., Kolkata.

Reference Books:

1. Discrete mathematics for computer scientists and mathematicians by J. L. Mertz, Abraham Kendel and T. P. Baker prentice-hall, India.
2. Discrete mathematics for computer scientists by John Truss-Addison Wesley.
3. Elements of Discrete Mathematics, C. L. Liu, New York Mcgraw-Hill, 1977.

516UVET01 - VALUE EDUCATION (COMMON TO ALL UG BRANCHES)

PART- IV VALUE EDUCATION - III YEAR – FIFTH SEMESTER CREDITS : 2

Objective : Values are socially accepted norms to evaluate objects, persons, and situations that form part and parcel of sociality. A value system is a set of consistent values and measures. Knowledge of the values are inculcated through education. It contributes in forming true human being, who are able to face life and make it meaningful. There are different kinds of values like, ethical or moral values, doctrinal or ideological values, social values and aesthetic values. Values can be defined as broad preferences concerning appropriate courses of action or outcomes. As such, values reflect a person's sense of right and wrong or what "ought" to be. There are representative values like, "Equal rights for all", "Excellence deserves admiration". "People should be treated with respect and dignity". Values tend to influence attitudes and behavior and help to solve common human problems. Values are related to the norms of a culture.

Unit I: Value education-its purpose and significance in the present world – Value system – The role of culture and civilization-Holistic living – Balancing the outer and inner – Body, Mind and Intellectual level- Duties and responsibilities.

Unit II : Salient values for life- Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity , and inclusiveness, Self esteem and self confidence, punctuality – Time, task and resource management – Problem solving and decision making skills- Interpersonal and Intra personal relationship – Team work – Positive and creative thinking.

Unit III : Human Rights – Universal Declaration of Human Rights – Human Rights violations – National Integration – Peace and non-violence – Dr. A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.

Unit IV: Environment and Ecological balance – interdependence of all beings – living and non-living. The binding of man and nature – Environment conservation and enrichment.

Unit V : Social Evils – Corruption, Cyber crime, Terrorism – Alcoholism, Drug addiction – Dowry – Domestic violence – untouchability – female infanticide – atrocities against women- How to tackle them.

Books for Reference:

1. M.G.Chitakra: Education and Human Values, A.P.H.Publishing Corporation, New Delhi, 2003

VI Semester

616UMMT01 - LINEAR ALGEBRA

Unit – 1

Vector spaces. Elementary basic concepts; linear independence and bases
Chapter 4 Section 4.1 and 4.2

Unit – 2

Dual spaces
Chapter 4 Section 4.3

Unit – 3

Inner product spaces.
Chapter 4 Section 4.4

Unit – 4

Algebra of linear transformations; characteristic roots.
Chapter 6 Section 6.1 and 6.2

Unit – 5

Matrices; canonical forms; triangular forms.
Chapter 6 Section 6.3 and 6.4

Treatment and content as in "Topics in Algebra" – I. N. Herstein-Wiley Eastern Ltd.

Reference Books:

1. University Algebra – N. S. Gopalakrishnan – New Age International Publications, Wiley Eastern Ltd.
2. First course in Algebra – John B. Fraleigh, Addison Wesley.
3. Text Book of Algebra – R. Balakrishna and N. Ramabadran, Vikas publishing Co.
4. Algebra – S. Arumugam, New Gamma publishing house, Palayamkottai.

616UMMT02 - REAL ANALYSIS -II

Unit – 1

Open sets; closed sets; Discontinuous function on \mathbb{R}^1 . More about open sets; Connected sets
:
Chapter 5 Section 5.4 to 5.6
Chapter 6 Section 6.1 and 6.2

Unit – 2

Bounded sets and totally bounded sets: Complete metric spaces; compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity.
Chapter 6 Section 6.3 to 6.8

Unit – 3

Sets of measure zero, definition of the Riemann integral, existence of the Riemann integral; properties of Riemann integral.
Chapter 7 Section 7.1 to 7.4

Unit – 4

Derivatives; Rolle's theorem, Law of mean, Fundamental theorems of calculus.
Chapter 7 Section 7.5 to 7.8

Unit – 5

Taylor's theorem; Pointwise convergence of sequences of functions, uniform convergence of sequences of functions.
Chapter 8 Section 8.5 Chapter 9 Section 9.1 and 9.2

Content and Treatment as in "Methods of Real Analysis"- Richard R. Goldberg (Oxford and IBH Publishing Co)

Reference Books:

1. Principles of Mathematical Analysis by Walter Rudin
2. Mathematical Analysis Tom M Apostol

616UMMT03 - COMPLEX ANALYSIS

Unit – 1

Functions of a complex variable - mappings, limits - theorems on limits, continuity, derivatives, differentiation formulae - Cauchy-Riemann equations - sufficient conditions for differentiability- Cauchy-Riemann equations in polar form - Analytic functions - Harmonic functions.

Chapter 2 Section 2.9 to 2.12, 2.14 to 2.20 and 2.22

Unit – 2

Linear functions - The transformation $w = 1/z$ - linear fractional transformations - an implicit form - exponential and logarithmic transformations - transformation $w = \sin z$ - Preservation of angles.

Chapter 8 Section 8.68 to 8.71 and 8.73, 8.74 Chapter 9 : 9.79

Unit – 3

Complex Valued functions- contours - contour integrals - Anti derivatives - Cauchy-Goursat theorem. Cauchy integral formula - derivatives of analytic function - Liouville's theorem and fundamental theorem of algebra -maximum moduli of functions.

Chapter 4 Section 4.30 to 4.42

Unit – 4

Convergence of sequences and series - Taylor's series -Laurent's series - zeros of analytic functions.

Chapter 5 Section 5.43 to 5.47

Unit – 5

Residues - Residue theorems- Three types of isolated singular points- Residues at poles- Zeros and poles of order 'm' - Evaluation of improper integrals - Improper integrals involving sines and cosines - Definite integrals involving sines and cosines - Argument principle and Rouché's theorem.

Chapter 6 Section 6.53 to 6.57 and Chapter 7 Section 7.60 to 7.65.

Content and treatment as in

Complex variables and Applications (Sixth Edition) by James Ward Brown and Ruel V.Churchill, Mc.Grawhill 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

Electives

Group - A

516UMMT05 - PROGRAMMING LANGUAGE 'C' WITH PRACTICALS

Unit - 1

Introduction. Constants-Variables-Data-types (Fundamental and user defined) Operators-Precedence of operators – Library functions –Input ,Output statements-Escape sequences-Formatted outputs – Storage classes -Compiler directives.

Chapter 2 Sections 2.1 - 2.8 , Chapter 3 Sections 3.1 – 3.7, 3.12 ,Chapter 4 Sections 4.2 – 4.5

Unit – 2

Decision making and branching: Simple if, if e

lse, nested if, else if ladder and switch statement –conditional operator – go to statement.

Decision making and looping : while, do while and for statement – nested for loops – continue and break statements.

Chapter 5 Sections 5.1 – 5.9 ,Chapter 6 Sections 6.1 – 6.5

Unit - 3

Arrays : One dimensional and 2 dimensional arrays – declarations – initialization of arrays– Operation on strings-String handling functions.

Chapter 7 Sections 7.1 – 7.4 ,Chapter 8 Sections 8.1 – 8.8

Unit – 4

Functions : Function definition and declaration – Categories of functions – recursion – Concept of pointers. Function call by reference - call by value.

Chapter 9 Sections 9.1 – 9.13

Chapter 11 Sections 11.1-11.5

Unit – 5

Files : Definition, operations on files- file operation functions.

Chapter 12, Sections 12.1 – 12.

Content and Treatment as in

Programming in ANSI C 2nd edition by E.Balagurusamy, Tata-Mcgraw Hill Publishing Company.

Reference Books:

1. Venugopal, programming in C
2. Gottfried, B.S : programming with C , Schaum's outline series, TMH 2001
3. Yashvant Kanitkar, Let us 'C' BPB Publications

516UMMT06 - MATHEMATICAL MODELING

Unit-1

Mathematical Modeling : Simple situations requiring mathematical modeling, characteristics of mathematical model.

Chapter 1 Sections 1.1-1.5

Unit - 2

Mathematical Modeling through differential equations: Linear Growth and Decay Models. Non-Linear growth and decay models, Compartment models.

Chapter 2 Sections 2.1- 2.4

Unit - 3

Mathematical Modeling, through system of Ordinary differential equations of first order: Prey-predator models, Competition models, Model with removal and model with immigrations.

Epidemics: simple epidemic model, Susceptible-infected-susceptible(SIS) model, SIS model with constant number of carriers.

Medicine : Model for Diabetes Mellitus.

Chapter 3 Sections 3.11,3.12,3.2.and 3.51

Unit - 4

Introduction to difference equations.

Chapter 5 Sections 5.1 and 5.2

Unit - 5

Mathematical Modeling, through difference equations:Harrod Model, cobweb model application to Actuarial Science

Sections 5.3 (5.3.3 not included)

Content and treatment as in

J N Kapur, Mathematical Modeling, New Age International publishers.(2009)

Reference Books :-

1. Mathematical Modeling by Bimal k . Mishra and Dipak K.Satpathi

516UMMT07 - NUMERICAL METHODS

Unit 1

Interpolation and Approximation: First difference- Introduction; forward and backward difference; Newton's forward and backward difference formulas for equal intervals; Divided differences; Newton's divided difference formula; Lagrangian Polynomials for unequal intervals

Chapter 5, Section 5.1, Chapter 6, Section 6.1 to 6.3 and Chapter 8, Section 8.1 to 8.5 and 8.7

Unit 2

Numerical Differentiation and Integration :Differentiation using Newton's forward and backward interpolation formulae; Numerical integration by trapezoidal, Romberg's method; Simpson's 1/3 and 3/8 rules.

Chapter 9, Section 9.1 to 9.4, 9.6, 9.7 to 9.14

Unit 3

Taylor series method; Picard's method ; Euler method for first order equation; Modified Euler method; Fourth order Runge – Kutta method for solving first order equations;.

Chapter 11, Section 11.1, 11.5 to 11.9, 11.11 to 11.13.

Unit 4

Numerical solution of ordinary differential equation by finite difference method; Numerical solution of partial differential equations - Elliptic equation, Poisson equation.

Appendix E, Chapter 12, Section , 12.1, 12.4 and 12.5 to 12.7

Unit 5

Numerical solution of partial differential equations - Parabolic equations, Hyperbolic equations

Chapter 12, Section 12.8 to 12.10

Content and treatment as in Numerical Methods by Dr P.Kandasamy, Dr. K. Thilagavathy and Dr. K. Gunavathi. S.Chand and Company Ltd

Reference Books

1. Numerical Methods With Programming in C by T. Veerarajan and T. Ramachandran.
2. Introductory Methods of Numerical Analysis by S.S.Sastry.

GROUP B

616UMMT04 - ELEMENTARY NUMBER THEORY

Unit 1

Introduction – divisibility- primes- The Binomial theorem
Chapter 1 Sections - 1.1 to 1.4

Unit 2

Congruences, Solution of Congruences, Chinese Remainder Theorem- primitive roots and power Residues- Number Theory from an Algebraic view point - Groups, rings and fields.
Chapter – 2 Sections 2.1 to 2.3, 2.8 (cor 2.42, Th 2.43 and cor 2.44 are omitted) - 2.10.- 2.11

Unit 3

Quadratic Residues , Quadratic reciprocity , The Jacobi Symbol
Chapter – 3 Sections 3.1 to 3.3

Unit 4

Greatest Integer Function, Arithmetic function, The Mobius Inversion formula
Combinational Number Theory
Chapter – 4 Sections 4.1 to 4.3 and 4.5

Unit 5

The equation $ax+by=c$, Simultaneous Linear Equations, Pythagorean Triangle, Assorted examples.
Chapter – 5 Sections 5.1 to 5.4

Content and treatment as in - An introduction to the Theory of Numbers (Vth edition) by Ivan Niven, Herbert S. Zuckerman and Hugh L. Montgomery John Wiley & Sons, Inc.2001.

Reference Books:

1. Elementary theory of numbers, cy. Hsiung, Allied publishers, 1995.
2. Elementary Number Theory, Allyn and Bacon Inc., Boston, 1980.
3. Introduction to Analytic Number Theory, Tom. M. Apostol, Narosa Publishing House, New Delhi, 1989.

616UMMT05 - GRAPH THEORY

Unit – 1

Graphs, sub graphs, degree of a vertex, isomorphism of graphs, independent sets and coverings, intersection graphs and line graphs, adjacency and incidence matrices, operations on graphs,
Chapter 2 Sections 2.0 – 2.9

Unit – 2

Degree sequences and graphic sequences – simple problems. Connectedness, walks, trails, paths, components, bridge, block, connectivity – simple problems.
Chapter 3 Sections 3.0 – 3.2 , Chapter 4 Sections 4.0 – 4.4

Unit – 3

Eulerian and Hamiltonian graphs
Chapter 5 Sections 5.0 – 5.2

Unit – 4

Trees – simple problems.
Planarity : Definition and properties, characterization of planar graphs.
Chapter 6 Sections 6.0 – 6.2 ,Chapter 8 Sections 8.0 – 8.2

Unit - 5

Digraphs and matrices, tournaments, some application connector problem
Chapter 10 Sections 10.0 – 10.4 ,Chapter 11 Sections 11.0 – 11.1

Content and treatment as in
Invitation to Graph Theory by S.Arumugam and S.Ramachandran, New Gamma Publishing House, Palayamkottai

Reference Books

1. A first book at graph theory by John Clark and Derek Allan Holton, Allied publishers
2. Graph Theory by S.Kumaravelu and Susheela Kumaravelu, Publishers authors C/o 182 Chidambara Nagar, Nagarkoil

616UMMT06 - OPERATIONS RESEARCH

Unit-1

Linear programming: Formulation – graphical solution. Simplex method. Big-M method. Duality- primal-dual relation.

Chapter 6 Sections 6.1 – 6.13, 6.20 – 6.31

Unit – 2

Transportation problem: Mathematical Formulation. Basic Feasible solution. North West Corner rule, Least Cost Method, Vogel's approximation. Optimal Solution. Unbalanced Transportation Problems. Degeneracy in Transportation problems.

Assignment problem: Mathematical Formulation. Comparison with Transportation Model. Hungarian Method. Unbalanced Assignment problems

Chapter 9 Sections 9.1 – 9.12 ,Chapter 8 Sections 8.1 – 8.5

Unit – 3

Sequencing problem: n jobs on 2 machines – n jobs on 3 machines – two jobs on m machines – n jobs on m machines.

Game theory : Two-person Zero-sum game with saddle point – without saddle point – dominance – solving $2 \times n$ or $m \times 2$ game by graphical method.

Chapter 10 Sections 10.1 – 10.6 ,Chapter 12 Sections 12.1 – 12.15

Unit – 4

Queuing theory: Basic concepts. Steady state analysis of M / M / 1 and M / M / S models with finite and infinite capacities.

Chapter 5 Sections 5.1 – 5.18

Unit – 5

Network: : Project Network diagram – CPM and PERT computations. (Crashing excluded)

Chapter 13 Sections 13.1 – 13.10

Content and treatment as in

Operations Research, by R.K.Gupta , Krishna Prakashan India (p),Meerut Publications

Reference Books :

1. Gauss S.I. Linear programming , McGraw-Hill Book Company.
2. Gupta P.K. and Hira D.S., Problems in Operations Research , S.Chand & Co.
3. Kanti Swaroop, Gupta P.K and Manmohan , Problems in Operations Research,Sultan Chand & Sons
4. Ravindran A., Phillips D.T. and Solberg J.J., Operations Research, John wiley & Sons.
5. Taha H.A. Operation Research, Macmillan pub. Company, New York.
6. Linear Programming, Transporation, Assignment Game by Dr.Paria, Books and Allied(p) Ltd.,1999.
7. V.Sundaresan,K.S. Ganapathy Subramaian and K.Ganesan,Resource Management Techniques..A.R Publications.

616UMMT07 - SPECIAL FUNCTIONS

Unit – 1

Introduction and Review of power series – Series solution of first order differential equations
Chapter 5 Sections 26 and 27

Unit-2

Second order linear differential equations-Regular, singular points.
Chapter 5 Sections 28 and 29

Unit – 3

Regular singular points continued: Gauss's hyper geometric equations.
Chapter 5 Sections 30 and 31

Unit – 4

Legendre polynomials-Properties of Legendre polynomials
Chapter 8 Sections.44 and 45

Unit – 5

Bessel functions and Gamma functions-Properties of Bessel Functions.
Chapter 8 Sections 46 and 47

Contents and treatment as in Differential equations with Applications and Historical Notes by
George F. Simmons Second Edition ,Tata Mcgraw Hill Publications.

Reference Books

- 1.** Differential Equations by D. Raisinghania.
- 2.** Differential Equations by Ganesh C.Gorian

616UEAT01 - EXTENSION ACTIVITY (COMMON TO ALL UG BRANCHES)

A candidate shall be awarded a maximum of 1 Credits for Complusory Extension Service.

All the Students shall have to enrol for NSS /NCC/ NSO (Sports & Games) Rotract/ Youth Red cross or any other service organizations in the college and shall have to put in Complusory minimum attendance of 40 hours which shall be duly certified by the Principal of the college before 31st March in a year. If a student LACKS 40 HOURS ATTENDANCE in the First year, he/she shall have to compensate the same during the subsequent years.

Students those who complete minimum attendance of 40 hours in One year will get HALF A CREDIT and those who complete the attendance of 80 or more hours in Two Years will ONE CREDIT.

Literacy and population Education Field Work shall be compulsory components in the above extension service activities.

Registrar