FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A++" Grade by NAAC (4th Cycle)
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT: MATHEMATICS

NAME OF THE PROGRAMME : B. Sc

PROGRAMME CODE : UAMA

ACADEMIC YEAR : 2023 – 2024

VISION OF THE DEPARTMENT

To empower students both as individuals and as citizens in the society through Mathematics with sound knowledge and investigate new methodologies for future applications.

MISSION OF THE DEPARTMENT

- To achieve high standards of excellence in generating and propagating knowledge in Mathematics
- To lay a solid foundation for the concept of numeracy and scientific thinking
- To give the students, opportunities for developing, manipulative skills that will enable them function effectively in the society within the limits of their capacity
- To contribute to the development of students as Mathematical thinkers and to continue to grow in their chosen professions
- To enable the students to become lifelong learners and to function as productive citizens

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1	Our graduates will be academic, digital and information literates; creative, inquisitive, innovative and desirous for the "more" in all aspects
PEO 2	They will be efficient individual and team performers, exhibiting progress, flexibility, transparency and accountability in their professional work
PEO 3	The graduates will be effective managers of all sorts of real – life and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills
PEO 4	They will engage locally and globally, evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment

GRADUATE ATTRIBUTES (GA)

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

I. **SOCIAL COMPETENCE**	
GA 1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA 2	Hone creativity, passion for innovation and aspire excellence
GA 3	Enthusiasm towards emancipation and empowerment of humanity
GA 4	Potentials of being independent
GA 5	Intellectual competence and inquisitiveness with problem solving abilities befitting the field of research
GA 6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms
GA 7	Communicative competence with civic, professional and cyber dignity and decorum
GA 8	Integrity respecting the diversity and pluralism in societies, cultures and religions
GA 9	All – inclusive skill- sets to interpret, analyse and solve social and environmental issues in diverse environments
GA 10	Self-awareness that would enable them to recognise their uniqueness through continuous self-assessment in order to face and make changes building their strengths and improving on their weaknesses
GA 11	Finesse to co-operate exhibiting team-spirit while working in groups to achieve goals
GA 12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for

GA 13	Resilience to rise up instantly from their intimidating setbacks
GA 14	Virtuosity to use their personal and intellectual autonomy in being life-long learners
GA 15	Digital learning and research attributes
GA 16	Cyber security competence reflecting compassion, care and concern towards the marginalised
GA 17	Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario
II. **PROFESSIONAL COMPETENCE**	
GA 18	Optimism, flexibility and diligence that would make them professionally competent
GA 19	Prowess to be successful entrepreneurs and employees of trans-national societies
GA 20	Excellence in Local and Global Job Markets
GA 21	Effectiveness in Time Management
GA 22	Efficiency in taking up Initiatives
GA 23	Eagerness to deliver excellent service
GA 24	Managerial Skills to Identify, Commend and tap Potentials
III. **ETHICAL COMPETENCE**	
GA 25	Integrity and discipline in bringing stability leading a systematic life promoting good human behaviour to build better society
GA 26	Honesty in words and deeds
GA 27	Transparency revealing one's own character as well as self-esteem to lead a genuine and authentic life

GA 28	Social and Environmental Stewardship
GA 29	Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience
GA 30	Right life skills at the right moment

PROGRAMME OUTCOMES (PO)

The learners will be able to

PO 1	Apply acquired scientific knowledge to solve complex issues.
PO 2	Attain Analytical skills to solve complex cultural, societal and environmental issues.
PO 3	Employ latest and updated tools and technologies to analyse complex issues.
PO 4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of B.Sc. Mathematics programme, the graduates would be able to

PSO 1	Gain broad knowledge and understanding in pure Mathematics and applications of Mathematics.
PSO 2	Demonstrate a computational ability and apply logical thinking skills to solve problems that can be modelled Mathematically.
PSO 3	Read, understand, analyse and formulate Mathematical theorems.
PSO 4	Acquire proficiency in the use of technology to assist in learning and investigating, Mathematical ideas and in problem solving.
PSO 5	Communicate Mathematical concepts accurately, precisely and effectively with clarity and coherence both verbal and in written form

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

DEPARTMENT OF MATHEMATICS

For those who joined in June 2023 onwards

PROGRAMME CODE:

PART – I – TAMIL / FRENCH / HINDI– 12 CREDITS

PART – I – TAMIL

Offered by The Research Centre of Tamil

PART – I – FRENCH

Offered by The Department of French

PART – I – HINDI

Offered by The Department of Hindi

PART – II -ENGLISH – 12 CREDITS

Offered by The Research Centre of English

PART – III -MAJOR, ALLIED & ELECTIVES – 95 CREDITS

MAJOR CORE COURSES INCLUDING PRACTICALS : 60 CREDITS

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	23M1CC1	Algebra and Trigonometry	5	5	40	60	100
2.		23M1CC2	Differential Calculus	5	5	40	60	100
3.	II	23M2CC3	Analytical Geometry (Two & Three Dimensions)	5	5	40	60	100
4.		23M2CC4	Integral Calculus	5	5	40	60	100
5.	III	19M3CC5	Modern Algebra	6	4	40	60	100
6.		19M3CC6	Advanced Statisics	6	4	40	60	100
7.	IV	19M4CC7	Sequences and Series	6	4	40	60	100
8.		19M4CC8	Linear Algebra	6	4	40	60	100
9.	V	19M5CC9	Real Analysis	5	4	40	60	100
10.		19M5CC10	Statics	5	4	40	60	100
11.		19M5CC11	Linear Programming	5	4	40	60	100
12.		19M5CC12	Graph Theory	5	4	40	60	100
13.	VI	19M6CC13	Complex Analysis	5	4	40	60	100
14.		22M6CC14	Dynamics	5	4	40	60	100
15.		19M6CC15	Operations Research	5	4	40	60	100
			TOTAL	**83**	**60**			

ELECTIVES-15 CREDITS

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	I	23M1GEP1	Mathematics -I for Physics	5	3	40	60	100
2.		23M1GEC1	Mathematics- I for Chemistry	5	3	40	60	100
3.	II	23M2GEP2	Mathematics -II for Physics	5	3	40	60	100
4.		23M2GEC2	Mathematics- II for Chemistry	5	3	40	60	100
5.	V	23M5ME1/ 23M5ME2	Numerical Methods / Vector Calculus and Fourier Transforms	5	5	40	60	100
6.	VI	19M6ME3 /19M6ME4	Fuzzy Mathematics / Theory of Numbers	5	5	40	60	100
7.		19M6ME5 /19M6ME6	Lattices and Boolean Algebra / Discrete Mathematics	5	5	40	60	100
			TOTAL	**15**	**15**			

C

ALLIED COURSES OFFERED FOR OTHER DEPARTMENTS

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
2.	III	21M3ACC1	Allied Mathematics – I (offered to Chemistry Department)	5	5	40	60	100

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
3.	IV	21M4ACC2	Allied Mathematics – II (offered to Chemistry Department)	5	5	40	60	100
4.	III	21M3ACB1	Linear Programming (offered to Computer Science Department)	5	5	40	60	100
5.	IV	21M4ACB2	Algebra and Graph Theory (offered to Computer Science Department)	5	5	40	60	100

PART – IV – 20 CREDITS

- **VALUE EDUCATION**
- **ENVIRONMENTAL AWARENESS**
- **NON-MAJOR ELECTIVE**
- **SKILL BASED COURSES**

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	I	23G1VE	Personal Values	1	1	40	60	100
2.		23M1SE1	Quantitative Aptitude	2	2	40	60	100
3.		23M1FC	Bridge Mathematics	2	2	40	60	100
4.	II	23G2VE	Values for Life	1	1	40	60	100
5.		23M2SE2	Mathematics for Competitive Examinations	2	2	40	60	100
6.		23M2SE3	Data Interpretation	2	2	40	60	100
7.	III	21G3EE	Environmental Education	1	1	40	60	100

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
8.		19M3SB1	Applications of Calculus and Differential Equations	2	2	40	60	100
9.	IV	21G4EE	Gender Studies	1	1	40	60	100
10.		22M4SB2	Trigonometry	2	2	40	60	100
11.	V	21UAD5ES	Family Life Education	1	1	40	60	100
12.		19M5SB3	Data Interpretation & Analytical Aptitude	2	2	40	60	100
13.		19M5SB4	Cryptography	2	2	40	60	100
14.	VI	21UAD6ES	Life Skills	1	1	40	60	100
15.		19M6SB5	MATLAB	2	2	40	60	100
16.		19M6SB6	Combinatorial Mathematics	2	2	40	60	100
			PrTOTAL	**20**	**20**			

EXTRA CREDIT COURSES

COURSE CODE	COURSE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA MKS	ESE MKS	TOTAL MARKS
21UGME2SL	Mathematics and Economics for Competitive Exams	-	2	II	40	60	100
22UGMA4SL	Financial Mathematics	-	2	VI	40	60	100
19UGM6SL	History of Mathematics	-	2	VI	40	60	100
	MOOC COURSES / International Certified online Courses (Department Specific Courses/any other courses) * Students can opt other than the listed course from UGC-SWAYAM UGC / CEC	-	Minimum 2 Credits	I – VI	-	-	

OFF CLASS PROGRAMMES

21UGVAM1 – Value Added Crash Course (Verbal and Non-Verbal Reasoning)

22UGVACM1 – Value Added Crash Course (Quantitative and Qualitative Methods for Competitive Examinations)

PART – V – 1 CREDIT

OFF-CLASS PROGRAMMES - ALL PART-V

SHIFT - I

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	TOT. Mks
1.	I – IV	21S4PED	Physical Education	30/ SEM	1	100
2.		21S4NSS	NSS			
3.		21S4NCC	NCC			
4.		21S4WEC	Women Empowerment Cell			
5.		21S4ACUF	AICUF			

OFF-CLASS PROGRAMMES

ADD-ON COURSES

COURSE CODE	COURSE TITLE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA Mks	ESE Mks	TOTAL Mks
19UAD2CA	**COMPUTER APPLICATIONS** (offered by the department of PGDCA for Shift I)	40	2	I & II	40	60	100
19UADFCA	**ONLINE SELF LEARNING**	40	2	I	40	60	100

COURSE CODE	COURSE TITLE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA Mks	ESE Mks	TOTAL Mks
	COURSES-Foundation Course for Arts						
19UADFCS	**ONLINE SELF LEARNING COURSE**-Foundation Course for Science	40	2	II	40	60	100
21UADES3	Social & Professional Ethics	15	1	III	40	60	100
21UADES4	Personality Development	15	1	IV	40	60	100
21UADES5	Family Life Education	15	1	V	40	60	100
21UADES6	Life Skills	15	1	VI	40	60	100
19UAD5HR	**HUMAN RIGHTS**	15	2	V	100	-	100
19UADRS	**OUTREACH PROGRAMME**-	100	3	V & VI	100	-	100

COURSE CODE	COURSE TITLE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA Mks	ESE Mks	TOTAL Mks
	Reach Out to Society through Action **ROSA**						
19UADPR	**PROJECT**	30	4	VI	40	60	100
19UADRC	**READING CULTURE**	10/ Semester	1	II-VI	-	-	-
	TOTAL		**20**				

I B.Sc. Mathematics

SEMESTER – I

For those who joined in 2023 onwards

Employablility-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	23M1CC1	ALGEBRA & TRIGONOMETRY	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on Algebra and Trigonometry.

COURSE OBJECTIVES

Basic ideas on the Theory of Equations, Matrices. Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.

UNIT –I **(15 HRS.)**

Reciprocal Equations-Standard form–Increasing or decreasing the roots of a given equation-Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems.

UNIT –II **(15 HRS.)**

Summation of Series: Binomial– Exponential –Logarithmic series (Theorems without proof) – Approximations - related problems.

UNIT –III **(15 HRS.)**

Characteristic equation – Eigen values and Eigen Vectors-Similar matrices - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.

UNIT –IV **(15 HRS.)**

Expansions of sin nθ, cos nθ in powers of sinθ, cosθ - Expansion of tan nθ in terms of tan θ, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta \sin^n\theta$ – Expansions of $\tan(\theta_1+\theta_2+,\ldots,+\theta_n)$-Expansions of sinθ, cosθ and tanθ in terms of θ - related problems.

UNIT –V **(15 HRS.)**

Hyperbolic functions – Relation between circular and hyperbolic functions, Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series - related problems.

TEXT BOOKS:

1. W.S. Burnstine and A.W. Panton, Theory of equations David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007
2. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005
3. C. V. Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003
4. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.
5. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9thEdition, 2010.
6. S.Narayanan and T. K. Manickavachagam Pillay,

Website and e-Learning Source:

https://nptel.ac.in

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I				
1.1	Reciprocal Equations-Standard form–Increasing or decreasing the roots of a given equation	5	Chalk & Talk	Green Board
1.2	Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems.	10	Chalk & Talk	Green Board
UNIT -2				
2.1	Summation of Series: Binomial	5	Chalk & Talk	Green Board
2.2	Summation of Series: Exponential –Logarithmic series (Theorems without proof)	5	Chalk & Talk	Green Board
2.3	Approximations - related problems	5	Chalk & Talk	Green Board
UNIT -3				
3.1	Characteristic equation – Eigen values and Eigen Vectors-Similar matrices	5	Chalk & Talk and Discussion	Green Board
3.2	Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3	5	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Diagonalization of square matrices - related problems.	5	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				
4.1	Expansions of sin nθ, cos nθ in powers of sinθ, cosθ - Expansion of tan nθ in terms of tan θ, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta \sin^n\theta$ – Expansions of $\tan(\theta_1+\theta_2+,\ldots,+\theta_n)$-Expansions of sinθ, cosθ and tanθ in terms of θ - related problems.	4	Chalk & Talk	Green Board
4.2	Expansions of sin nθ, cos nθ in powers of sinθ, cosθ	3	Chalk & Talk	Green Board
4.3	Expansion of tan nθ in terms of tan θ, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta \sin^n\theta$	4	Chalk & Talk	Green Board
4.4	Expansions of $\tan(\theta_1+\theta_2+,\ldots,+\theta_n)$-Expansions of sinθ, cosθ and tanθ in terms of θ - related problems.	4	Chalk & Talk	Green Board
UNIT -5 FOURIER SERIES				
5.1	Hyperbolic functions – Relation between circular and hyperbolic functions.	5	Chalk & Talk	Green Board
5.2	Inverse hyperbolic functions, Logarithm of complex quantities	5	Chalk & Talk	Green Board
5.3	Summation of trigonometric series - related problems.	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES
CO 1	Classify and Solve reciprocal equations
CO 2	Find the sum of binomial, exponential and logarithmic series
CO 3	Find Eigen values, eigen vectors, verify Cayley – Hamilton theorem and diagonalize a given matrix
CO 4	Expand the powers and multiples of trigonometric functions in terms of sine and cosine
CO 5	Determine relationship between circular and hyperbolic functions and the summation of trigonometric series

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc. Mathematics

SEMESTER – I

For those who joined in 2023 onwards

Employablitiy-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	23M1CC2	DIFFERENTIAL CALCULUS	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on differential and integral calculus.

COURSE OBJECTIVES

To enable the students to learn higher derivatives, Curvature, Singular points, Envelopes, Asymptotes, Reduction formula, multiple integrals and Fourier series in Calculus.

UNIT –I SUCCESSIVE DIFFERENTIATION: **(15 HRS.)**

Introduction (Review of basic concepts) – The n^{th} n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} n^{th} derivative of a product – Feynman's method of differentiation

UNIT –II PARTIAL DIFFERENTIATION **(15 HRS.)**

Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions

UNIT –III PARTIAL DIFFERENTIATION (CONTINUED): **(15 HRS.)**

Homogeneous functions – Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers.

UNIT –IV ENVELOPE: **(15 HRS.)**

Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.

UNIT –V CURVATURE (15 HRS.)

Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutes – Radius of Curvature in Polar Co-ordinates.

TEXT BOOKS:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002
2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.
3. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.
4. Dr. S. Arumugam and A. Thangapandi Issac - Calculus (Differential and Integral Calculus) - New Gamma Publishing House, June 2014

REFERENCES:

1.R. Courant and F. John, Introduction to Calculus and Analysis Volumes I & II), Springer- Verlag, New York, Inc., 1989.
2.T. Apostol, Calculus, Volumes I and II.
3. S. Goldberg, Calculus and mathematical analysis.
4.Narayanan & Manickavasagam Pillai – Calculus - S.Viswanathan (Printer & Publishers) Pvt Ltd , 2008.

Website and e-Learning Source : https://nptel.ac.in

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Introduction(Review of basic concepts), The n^{th} Derivative, Standard results	3	Chalk & Talk	Green Board
1.2	Fractional expressions, Trigonometrical transformation	3	Chalk & Talk	Green Board
1.3	Formation of equations involving derivatives	3	Chalk & Talk	Green Board
1.4	Leibnitz formula for the n^{th} derivative of a product	3	Chalk & Talk	Green Board
1.5	Feynman's method of differentitation	3	Chalk & Talk	Green Board
UNIT -2				
2.1	Partial derivatives	3	Chalk & Talk	Green Board
2.2	Successive partial derivatives	3	Chalk & Talk	Green Board
2.3	Function of a function rule	3	Chalk & Talk	Green Board
2.4	Total differential coefficient	3	Chalk & Talk	Green Board
2.5	A special case, Implicit Functions	3	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3				
3.1	Homogeneous functions	4	Chalk & Talk and Discussion	Green Board
3.2	Partial derivatives of a function of two variables	4	Chalk & Talk	Green Board
3.3	Maxima and Minima of functions of two variables	4	Chalk & Talk	Green Board
3.4	Lagrange's method of undetermined multipliers	3	Chalk & Talk	Green Board
UNIT - 4				
4.1	Method of finding the envelope	5	Chalk & Talk	Green Board
4.2	Another definition of envelope	5	Chalk & Talk	Green Board
4.3	Envelope of family of curves which are quadratic in the parameter	5	Chalk & Talk	Green Board
UNIT -5				
5.1	Definition of Curvature	4	Chalk & Talk	Green Board
5.2	Circle, Radius and Centre of Curvature	4	Chalk & Talk	Green Board
5.3	Evolutes and Involutes	4	Chalk & Talk	Green Board
5.4	Radius of Curvature in Polar Co-ordinates	3	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES
CO 1	Find the nth derivative, form equations involving derivatives and apply Leibnitz formula
CO 2	Find the partial derivative and total derivative coefficient.
CO 3	Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers
CO 4	Find the envelope of a given family of curves
CO 5	Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc Physics

SEMESTER –I

For those who joined in 2023 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M1GEP1	MATHEMATICS – I FOR PHYSICS	Lecture	5	3

COURSE DESCRIPTION

This course provides the basic concepts in various branches of Mathematics

COURSE OBJECTIVES

To enable the Physics Major Students to develop the skills of Mathematical Reasoning and Analytical thinking in Algebra, Theory of equations, Trigonometry and Differential Calculus.

UNIT I: ALGEBRA (12 HRS.)

Exponential and Logarithmic series (Proof not expected) Summation and approximation using Binomial, Exponential and Logarithmic series.

UNIT II: THEORY OF EQUATIONS (12 HRS.)

Theory of Equation - An n th Degree equation has exactly n roots – Relation between roots and coefficients

UNIT III: ROOTS OF THE EQUATIONS (12 HRS.)

Newton's and Horner's methods of finding roots correct to two places of decimals.

UNIT IV: TRIGONOMETRY (12 HRS.)

Expansions of sin nx, cosnx, tan nx, $\sin^n x$, $\cos^n x$ - Series of sin x, cos x.

Hyperbolic functions**.**

UNIT V: DIFFERENTIAL CALCULUS (12 HRS.)

Derivatives of Hyperbolic functions – Successive differentiation - Leibnitz theorem.

TEXT BOOK:

Arumugam and Issac - Ancillary Mathematics - New Gamma Publishing House - 2004.

REFERENCE BOOK :

1. S. Natarajan, T. K. Manicavachagam Pillai and K. S. Ganapathy - Algebra Vol I - S. Viswanathan (Printers and Publishers), Pvt. Ltd. - 2008
2. S.Narayanan and T. K. Manicavachagam Pillai - Trigonometry, S. Viswanathan (Printers and Publishers), Pvt. Ltd. - 2008.

Digital Open Educational Resources

- www.tutorialspoint.com
- https://mathworld.wolfram.com

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Exponential	5	Chalk & Talk	Green Board
1.2	Logarithmic series(Proof not expected)	5	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.3	Summation and approximation using Binomial, Exponential and Logarithmic series.	5	Chalk & Talk	Green Board
UNIT -2				
2.1	Theory of Equation	5	Chalk & Talk	Green Board
2.2	An n^{th} Degree equation has exactly n roots	5	Chalk & Talk	Green Board
2.3	Relation between roots and coefficients	5	Chalk & Talk	Green Board
UNIT -3				
3.1	Newton's methods of finding roots correct to two places of decimals.	8	Chalk & Talk and Discussion	Green Board
3.2	Horner's methods of finding roots correct to two places of decimals.	7	Chalk & Talk	Green Board
UNIT - 4				
4.1	Expansions of sin nx, cosnx, tan nx, $\sin^n x$, $\cos^n x$	5	Chalk & Talk	Green Board
4.2	Series of sin x, cos x	5	Chalk & Talk	Green Board
4.3	Hyperbolic functions	5	Chalk & Talk	Green Board
UNIT -5				
5.1	Derivatives of Hyperbolic functions	5	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.2	Successive differentiation	5	Chalk & Talk	Green Board
5.3	Leibnitz theorem.	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Find summation of any series.	K1	PSO1
CO 2	Explain the concepts of theory of equations.	K1 & K2	PSO3
CO 3	Calculate roots of equations using different methods.	K1 & K3	PSO5
CO 4	Expand trigonometric functions	K1, K2 & K3	PSO4
CO 5	Apply the Leibnitz's theorem to find the n^{th} derivative	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3

CO4	**2**	**3**	**2**	**2**	**2**
CO5	**2**	**2**	**2**	**3**	**2**

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	**3**	**2**	**2**	**2**
CO2	**2**	**3**	**2**	**2**
CO3	**2**	**2**	**3**	**2**
CO4	**2**	**3**	**2**	**2**
CO5	**2**	**2**	**2**	**3**

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc Chemistry

SEMESTER –I

For those who joined in 2023 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M1GEC1	MATHEMATICS - I FOR CHEMISTRY	Lecture	5	3

COURSE DESCRIPTION

The course develops Mathematical knowledge needed by the chemistry students.

COURSE OBJECTIVES

To enable the students to understand mathematical concepts like matrices, higher derivatives of functions, solving differential equations, trigonometric series, measures of dispersion and moments.

UNIT I: MATRICES (12 HRS.)

Introduction – Matrices – Rank of a Matrix – Elementary Transformations – Simultaneous Linear Equations - Cayley Hamilton theorem. **(Only Problems)**

UNIT II: HIGHER DERIVATIVES OF FUNCTIONS (12 HRS.)

Derivatives of hyperbolic functions - Successive differentiation and Leibnitz theorem.

UNIT III : EXACT DIFFERENTIAL EQUATIONS AND HIGHER ORDER DIFFERENTIAL EQUATIONS (12 HRS.)

Exact equations - Linear equations of 2 nd order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S .

UNIT IV : TRIGONOMETRIC SERIES (12 HRS.)

Expansions of sin nx, cos nx, tan nx, $\sin^n x$, $\cos^n x$ - Series of sin x, cos x.

UNIT V : MEASURES OF DISPERSION AND MOMENTS (12 HRS.)

Mean, Median, Mode, Standard Deviation, Karl Pearson's coefficient of skewness, Moments, Skewness and Kurtosis using moments.

TEXT BOOKS:

1. S. Arumugam & Isaac, *Ancillary Mathematics*, New Gamma Publishing House, Nov 2004.
2. S. Arumugam & Isaac, *Statistics*, New Gamma Publishing House, 2006.
3. S. Arumugam & Isaac, *Calculus*, New Gamma Publishing House, 2005.

REFERENCE BOOK:

1. S.Narayanan and T. K. Manicavachagam Pillai, *Differential Equations and its Applications*, S. Viswanathan (Printers and Publishers), Pvt. Ltd, 2006.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Introduction, Matrices	3	Chalk & Talk	Green Board
1.2	Rank of a Matrix	3	Chalk & Talk	Green Board
1.3	Elementary Transformations	3	Chalk & Talk	Green Board
1.4	Simultaneous Linear Equations	3	Chalk & Talk	Green Board
1.5	Cayley Hamilton theorem	3	Chalk & Talk	Green Board
UNIT -2				
2.1	Derivatives of hyperbolic functions	5	Chalk & Talk	Green Board
2.2	Successive differentiation	5	Chalk & Talk	Green Board
2.3	Leibnitz theorem	5	Chalk & Talk	Green Board
UNIT -3				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Exact equations	8	Chalk & Talk and Discussion	Green Board
3.2	Linear equations of 2 nd order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S	7	Chalk & Talk	Green Board
UNIT - 4				
4.1	Expansions of sin nx, cos nx, tan nx, $\sin^n x$, $\cos^n x$	5	Chalk & Talk	Green Board
4.2	Series of sin x, cos x	5	Chalk & Talk	Green Board
UNIT -5				
5.1	Mean, Median, Mode, Standard Deviation	8	Chalk & Talk	Green Board
5.2	Karl Pearson's coefficient of skewness, Moments, Skewness and Kurtosis using moments.	7	Chalk & Talk	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Appraise rank of a matrix	K1	PSO1
CO 2	Obtain higher derivatives of functions	K1 & K2	PSO3
CO 3	Solve exact and higher order differential equations	K1 & K3	PSO5
CO 4	Expand trigonometric functions	K1, K2 & K3	PSO4
CO 5	Define Moments, kurtosis and to apply the same	K2 & K4	PSO2

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 HIGHER DERIVATIVES AND CURVATURE				
1.1	n^{th} Derivative of some standard functions	4	Chalk & Talk	Green Board
1.2	Leibnitz theorem	4	Chalk & Talk	Green Board
1.3	p-r equations	4	Chalk & Talk	Green Board
1.4	Curvature , centre and radius of curvature	4	Chalk & Talk	Green Board
1.5	Evolutes	4	Chalk & Talk	Green Board
UNIT -2 SINGULAR POINTS, ENVELOPES AND ASYMPTOTES				
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate points	4	Chalk & Talk	Green Board
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				
4.1	Jacobian	5	Chalk & Talk	Green Board
4.2	Double integrals	5	Chalk & Talk	Green Board
4.3	Triple integrals	5	Chalk & Talk	Green Board
4.4	Change of variables in double and triple integral	5	Chalk & Talk	Green Board
UNIT -5 FOURIER SERIES				
5.1	Fourier Series	5	Chalk & Talk	Green Board
5.2	Sine Series	5	Chalk & Talk	Green Board
5.3	Cosine Series	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc Mathematics

SEMESTER –I

For those who joined in 2023 onwards

Employability-40%

Skill Development-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M1SE1	QUANTITATIVE APTITUDE	Lecture	2	2

COURSE DESCRIPTION

This course is designed to help the students to appear in competitive examinations.

COURSE OBJECTIVES

To enable the students to do the problems using short cut methods on the topics – Problems on Ages, Profit & Loss, Partnership, Time & Work and Time & Distance.

UNIT I: PROBLEMS ON AGES **(6 HRS.)**

Problems related with ages

UNIT II: PROFIT AND LOSS **(6 HRS.)**

Profit and Loss: Cost Price – Selling Price – Profit or Gain – Loss – Gain percentage - Loss percentage.

UNIT III: PARTNERSHIP **(6 HRS.)**

Partnership – Ratio of Division of Gains – Working and Sleeping Partners.

UNIT IV: TIME & WORK **(6 HRS.)**

Time and Work: Important facts and formulae on time and work -Problems.

UNIT V: TIME & DISTANCE **(6 HRS.)**

`Time and Distance: Important facts and formulae on time and distance-Problems.

TEXT BOOK:

Dr.R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S. Chand & Company Ltd, Revised and Enlarged Edition 2017.

UNIT I : Chapter 8

UNIT II : Chapter 12

UNIT III : Chapter 14

UNIT IV : Chapter 17

UNIT V : Chapter 18

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 PROBLEMS ON AGES				
1.1	Problems related with ages	3	Chalk & Talk	Green Board
1.2	Problems related with ages	3	Chalk & Talk	Green Board
UNIT -2 PROFIT AND LOSS				
2.1	Cost Price – Selling Price	2	Chalk & Talk	Green Board
2.2	Profit or Gain – Loss	2	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.3	Gain percentage - Loss percentage	2	Chalk & Talk	Green Board
UNIT -3 PARTNERSHIP				
3.1	Partnership – Ratio of Division of Gains	4	Chalk & Talk and Discussion	Green Board
3.2	Working and Sleeping Partners	4	Chalk & Talk	Green Board
UNIT - 4 TIME & WORK				
4.1	Important facts and formulae on time and work	3	Chalk & Talk	Green Board
4.2	Problems	3	Chalk & Talk	Green Board
UNIT -5 TIME & DISTANCE				
5.1	Important facts and formulae on time and distance	3	Chalk & Talk	Green Board
5.2	Problems	3	Chalk & Talk	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve problems on ages	K1	PSO1
CO 2	Illustrate profit and loss with examples	K1, K2,	PSO3
CO 3	Explain partnership and related problems	K1 & K3	PSO5
CO 4	Discuss problems on time and work	K1, K2, K3	PSO4
CO 5	Solve problems on time and distance	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2

CO5	**2**	**2**	**2**	**3**	**2**

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc. Mathematics

SEMESTER – I

For those who joined in 2023 onwards

Employability-60%

Skill Development-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M1FC	FOUNDATION COURSE –BRIDGE MATHEMATICS	Lecture	2	2

COURSE DESCRIPTION

This course provides the basic concepts in various branches of Mathematics

COURSE OBJECTIVES

To bridge the gap and facilitate transition from higher secondary to tertiary education. To instil confidence among stakeholders and inculcate interest for Mathematics;

UNIT I: ALGEBRA **(6 HRS.)**

Binomial theorem, General term, middle term, problems based on these concepts

UNIT II: SEQUENCES AND SERIES (PROGRESSIONS) **(6 HRS.)**

Fundamental principle of counting. Factorial n.

UNIT III: PERMUTATIONS AND COMBINATIONS **(6 HRS.)**

Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups

UNIT IV: TRIGONOMETRY **(6 HRS.)**

Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles, sin(2A), cos(2A), tan(2A) etc., transformations sum into

product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule

UNIT V: CALCULUS **(6 HRS.)**

Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method.

TEXT BOOK:

1. NCERT class XI and XII text books.
2. Any State Board Mathematics text books of class XI and XII.

Website and e-Learning Source: https://nptel.ac.in

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ALGEBRA				
1.1	Binomial theorem, General term, middle term	3	Chalk & Talk	Green Board
1.2	problems based on these concepts	3	Chalk & Talk	Green Board
UNIT -2 SEQUENCES AND SERIES				
2.1	Fundamental principle of counting	3	Chalk & Talk	Green Board
2.2	Factorial n	3	Chalk & Talk	Green Board
UNIT -3 PERMUTATIONS AND COMBINATIONS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board
UNIT - 4 TRIGONOMETRY				
4.1	Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles	2	Chalk & Talk	Green Board
4.2	sin(2A), cos(2A), tan(2A) etc., transformations sum into product and product into sum formulae,	2	Chalk & Talk	Green Board
4.3	inverse trigonometric functions, sine rule and cosine rule	2	Chalk & Talk	Green Board
UNIT -5 CALCULUS				
5.1	Limits, standard formulae and problems	2	Chalk & Talk	Green Board
5.2	differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives	2	Chalk & Talk	Green Board
5.3	integration - product rule and substitution method	2	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Prove the binomial theorem and apply it to find the expansions of any $(x + y)^n$ and also, solve the related problems	K1	PSO1
CO 2	Find the various sequences and series and solve the problems related to them. Explain the principle of counting.	K1 & K2	PSO3
CO 3	Find the number of permutations and combinations in different cases. Apply the principle of counting to solve the problems on permutations and combinations	K1 & K3	PSO5
CO 4	Explain various trigonometric ratios and find them for different angles, including sum of the angles, multiple and submultiple angles, etc. Also, they can solve the problems using the transformations.	K1, K2 & K3	PSO4
CO 5	Find the limit and derivative of a function at a point, the definite and indefinite integral of a	K2 & K4	PSO2

	function. Find the points of min/max of a function.		

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2** ♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc. Mathematics

SEMESTER – II

For those who joined in 2023 onwards

Employability-

Skill Development-

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	23M2CC3	ANALYTICAL GEOMETRY (Two & Three Dimensions)	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on Analytical Geometry of two & Three Dimensions.

.

COURSE OBJECTIVES

Necessary skills to analyze characteristics and properties of two- and three-dimensional geometric shapes. To present mathematical arguments about geometric relationships. To solve real world problems on geometry and its applications.

UNIT –I **(15 HRS.)**

Pole, Polar - conjugate points and conjugate lines – diameters – conjugate diameters of an ellipse - semi diameters- conjugate diameters of hyperbola.

UNIT –II **(15 HRS.)**

Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola.

UNIT –III (15 HRS.)

System of Planes-Length of the perpendicular–Orthogonal projection.

UNIT –IV (15 HRS.)

Representation of line–angle between a line and a plane – co – planar lines–shortest distance between two skew lines –length of the perpendicular–intersection of three planes.

UNIT –V (15 HRS.)

Equation of a sphere-general equation-section of a sphere by a plane-equation of the circle-tangent plane- angle of intersection of two spheres- condition for the orthogonality- radical plane.

TEXT BOOKS:

1. S. L. Loney, Co-ordinate Geometry.
2. Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions.
3. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016.
4. Dr. S. Arumugam and A. Thangapandi Issac - Calculus (Differential and Integral Calculus) - New Gamma Publishing House, June 2014

REFERENCE BOOKS:

1. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
2. Robert C. Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York, 1961.
3. Earl W. Swokowski and Jeffery A. Cole, Algebra and Trigonometry with Analytic Geometry, Twelfth Edition, Brooks/Cole, Cengage Learning, CA, USA, 2010.
4. William H. McCrea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, New York, 2006.
5. John F. Randelph, Calculus and Analytic Geometry, Wadsworth Publishing Company, CA, USA, 1969.

6.Ralph Palmer Agnew, Analytic Geometry and Calculus with Vectors, McGraw-Hill Book Company, Inc. New York, 1962.

Website and e-Learning Source:

✔

https://nptel.ac.in

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Pole, Polar - conjugate points and conjugate lines	5	Chalk & Talk	Green Board
1.2	diameters – conjugate diameters of an ellipse	5	Chalk & Talk	Green Board
1.3	semi diameters- conjugate diameters of hyperbola	5	Chalk & Talk	Green Board
UNIT -2				
2.1	Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter	5	Chalk & Talk	Green Board
2.2	Equation of a straight line, circle, conic	5	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.3	Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola	5	Chalk & Talk	Green Board
UNIT -3				
3.1	System of Planes	5	Chalk & Talk and Discussion	Green Board
3.2	Length of the perpendicular	5	Chalk & Talk	Green Board
3.3	Orthogonal projection	5	Chalk & Talk	Green Board
UNIT - 4				
4.1	Representation of line–angle between a line and a plane	5	Chalk & Talk	Green Board
4.2	co – planar lines–shortest distance between two skew lines	5	Chalk & Talk	Green Board
4.3	length of the perpendicular–intersection of three planes	5	Chalk & Talk	Green Board
UNIT -5				
5.1	Equation of a sphere-general equation	5	Chalk & Talk	Green Board
5.2	section of a sphere by a plane-equation of the circle-tangent plane-	5	Chalk & Talk	Green Board
5.3	angle of intersection of two spheres- condition for the orthogonality- radical plane	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2**-Understand, **K3**-Apply, **K4**-Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES
CO 1	Find pole, polar for conics, diameters, conjugate diameters for ellipse and hyperbola
CO 2	Find the polar equations of straight line and circle, equations of chord, tangent and normal and to find the asymptotes of hyperbola

NO.	COURSE OUTCOMES
CO 3	Explain in detail the system of Planes
CO 4	Explain in detail the system of Straight lines
CO 5	Explain in detail the system of Spheres

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc. Mathematics

SEMESTER – II

For those who joined in 2023 onwards

Employablity-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	23M2CC4	INTEGRAL CALCULUS	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on Integral Calculus.

.

COURSE OBJECTIVES

Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals. Knowledge about Beta and Gamma functions and their applications. Skills to Determine Fourier series expansions.

UNIT –I . **(15 HRS.)**

Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula, Feynman's technique of integration.

UNIT –II **(15 HRS.)**

Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration.

UNIT –III **(15 HRS.)**

Triple integrals –applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces–change of variables - Jacobian.

UNIT –IV **(15 HRS.)**

Beta and Gamma functions – infinite integral - definitions–recurrence formula of Gamma functions – properties of Beta and Gamma functions- relation between Beta and Gamma functions - Applications.

UNIT –V **(15 HRS.)**

Geometric and Physical Applications of Integral calculus.

TEXT BOOKS:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
3. D. Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd.

4.P. Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2001 (second edition).

Website and e-Learning Source:

https://nptel.ac.in

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.1	Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions	5	Chalk & Talk	Green Board
1.2	integration of product of powers of algebraic and logarithmic functions	5	Chalk & Talk	Green Board
1.3	Bernoulli's formula, Feyman's technique of integration	5	Chalk & Talk	Green Board
UNIT -2				
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate points	4	Chalk & Talk	Green Board
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.1	Jacobian	5	Chalk & Talk	Green Board
4.2	Double integrals	5	Chalk & Talk	Green Board
4.3	Triple integrals	5	Chalk & Talk	Green Board
4.4	Change of variables in double and triple integral	5	Chalk & Talk	Green Board
UNIT -5 FOURIER SERIES				
5.1	Fourier Series	5	Chalk & Talk	Green Board
5.2	Sine Series	5	Chalk & Talk	Green Board
5.3	Cosine Series	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES
CO 1	Determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae
CO 2	Evaluate double and triple integrals and problems using change of order of integration
CO 3	Solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution
CO 4	Explain beta and gamma functions and to use them in solving problems of integration
CO 5	Explain Geometric and Physical applications of integral calculus

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5

CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc Physics

SEMESTER –II

For those who joined in 2023 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M2GEP2	MATHEMATICS –II FOR PHYSICS	Lecture	5	3

COURSE DESCRIPTION

This course provides the fundamentals concepts in various branches of Mathematics

COURSE OBJECTIVES

To enable the Physics Major Students to develop the skills of Mathematical reasoning and Analytical thinking in differential equation, Laplace transforms and Fourier series and Vector Calculus

UNIT I: DIFFERENTIAL EQUATIONS - I (12 HRS.)

Exact equations - Linear equations of 2^{nd} order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S.

UNIT II: DIFFERENTIAL EQUATIONS – II (12 HRS.)

Equations of second order with variable coefficients (Right hand side of the form e^{ax}, x^n, cosax, sin ax, $e^{ax}v$)

UNIT III: LAPLACE TRANSFORMS & FOURIER SERIES (12 HRS.)

Standard Transforms – Inverse Laplace Transforms – application of Laplace transform to differential equations - Fourier series.

UNIT IV: VECTOR CALCULUS-DIFFERENTIATION OF VECTORS(12HRS.)

Vector differentiation, velocity, acceleration, vector operators – gradient, divergence, curl(Self Study). Their simple properties, directional derivatives – solenoidal – irrotational vectors.

UNIT V: INTEGRATION OF VECTOR AND ITS APPLICATIONS (12 HRS.)

Line, surface and volume integrals – Gauss, Greens and Stokes theorems (statements of the theorems only) – simple problems.

TEXT BOOK:

Dr. S. Arumugam & Issac, *Ancillary Mathematics*, New Gamma Publishing House.

REFERENCES:

1. S.Narayanan and T. K. Manicavachagam Pillai, *Differential Equations and its*
2. *Applications*, S. Viswanathan (Printers and Publishers), Pvt. Ltd, 2006
3. N.Ch.S.N.Iyengar, *Differential Equations*, Anmol publications pvt.ltd – 2000.

Digital Open Educational Resources

- https://mathworld.wolfram.com
- www.britannica.com

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**HIGHER DERIVATIVES AND CURVATURE**			
1.1	n^{th} Derivative of some standard functions	4	Chalk & Talk	Green Board
1.2	Leibnitz theorem	4	Chalk & Talk	Green Board
1.3	p-r equations	4	Chalk & Talk	Green Board
1.4	Curvature , centre and radius of curvature	4	Chalk & Talk	Green Board
1.5	Evolutes	4	Chalk & Talk	Green Board
UNIT -2	**SINGULAR POINTS, ENVELOPES AND ASYMPTOTES**			
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate points	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				
4.1	Jacobian	5	Chalk & Talk	Green Board
4.2	Double integrals	5	Chalk & Talk	Green Board
4.3	Triple integrals	5	Chalk & Talk	Green Board
4.4	Change of variables in double and triple integral	5	Chalk & Talk	Green Board
UNIT -5 FOURIER SERIES				
5.1	Fourier Series	5	Chalk & Talk	Green Board
5.2	Sine Series	5	Chalk & Talk	Green Board
5.3	Cosine Series	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve linear differential equations.	K1	PSO1
CO 2	Solve second order linear differential equations with variable coefficient.	K1 & K2	PSO3
CO 3	Define Laplace transform and apply it to solve differential equation.	K1 & K3	PSO5
CO 4	Explain the concepts of gradient, divergence, curl and their properties	K1, K2 & K3	PSO4
CO 5	Apply line, volume and surface integrals to verify the Gauss divergence and Stoke's theorem.	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc Chemistry

SEMESTER –II

For those who joined in 2023 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M2GEC2	MATHEMATICS – II FOR CHEMISTRY	Lecture	5	3

COURSE DESCRIPTION

The course provides the mathematical skills needed by the chemistry students for advanced study.

COURSE OBJECTIVES

To enable the students to understand the mathematical concepts like groups, integration, Laplace transform, Correlation, Regression and curve fitting.

UNIT I: GROUPS (12 HRS.)

Groups - Definition and Examples - Elementary properties of Group - Equivalent Definitions of a group - Permutation group. (No proof for theorems).

UNIT II: INTEGRAL CALCULUS (12 HRS.)

Definite Integral - Integration by parts - Reduction Formula

UNIT III: LAPLACE TRANSFORMS (12 HRS.)

Definitions - Standard Laplace transforms - Inverse Laplace transforms - Applications to solutions of simple differential equations.

UNIT IV: CORRELATION AND REGRESSION (12 HRS.)

Correlation - Rank Correlation - Regression.

UNIT V: CURVE FITTING (12 HRS.)

Principle of Least Squares – Fitting a straight line – Fitting a second degree parabola.

TEXT BOOKS:

1. S. Arumugam & Isaac, *Ancillary Mathematics*, New Gamma Publishing House, 2006.
2. S. Arumugam & Isaac, *Statistics*, New Gamma Publishing House, 2006.

REFERENCE BOOKS:

1. S.C. Gupta and V.K Kapoor, *Fundamental of Applied Statistics*, third edition, Sultan Chand & Sons, New Delhi
2. Surgeet Singh, *Modern Algebra*,Vikas Publishing House-III Edition 2003.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 HIGHER DERIVATIVES AND CURVATURE				
1.1	n^{th} Derivative of some standard functions	4	Chalk & Talk	Green Board
1.2	Leibnitz theorem	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.3	p-r equations	4	Chalk & Talk	Green Board
1.4	Curvature , centre and radius of curvature	4	Chalk & Talk	Green Board
1.5	Evolutes	4	Chalk & Talk	Green Board
UNIT -2 SINGULAR POINTS, ENVELOPES AND ASYMPTOTES				
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate points	4	Chalk & Talk	Green Board
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.1	Jacobian	5	Chalk & Talk	Green Board
4.2	Double integrals	5	Chalk & Talk	Green Board
4.3	Triple integrals	5	Chalk & Talk	Green Board
4.4	Change of variables in double and triple integral	5	Chalk & Talk	Green Board
UNIT -5 FOURIER SERIES				
5.1	Fourier Series	5	Chalk & Talk	Green Board
5.2	Sine Series	5	Chalk & Talk	Green Board
5.3	Cosine Series	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %

K2	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**	22.5 %
K3	**3**	**3**	**-**	**-**	**5**	**11**	-	**11**	27.5 %
K4	**3**	**3**	**-**	**5**	**-**	**11**	-	**11**	27.5 %
Non Scholastic	**-**	**-**	**-**	**-**	-		**5**	**5**	12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the concepts of groups, subgroups and normal subgroups.	K1	PSO4
CO 2	Compute the definite integral and construct reduction formula.	K1 & K2	PSO3
CO 3	Solve differential equations using Laplace transforms.	K1 & K3	PSO5
CO 4	Explain the concepts of correlation, rank correlation coefficient and regression.	K1, K2 & K3	PSO1
CO 5	Apply the principle of least square a straight line and parabola.	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3

CO4	**2**	**3**	**2**	**2**	**2**
CO5	**2**	**2**	**2**	**3**	**2**

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	**3**	**2**	**2**	**2**
CO2	**2**	**3**	**2**	**2**
CO3	**2**	**2**	**3**	**2**
CO4	**2**	**3**	**2**	**2**
CO5	**2**	**2**	**2**	**3**

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc Mathematics

SEMESTER –II

For those who joined in 2023 onwards

Employablitiy-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CRED
UAMA	23M2SE2	Mathematics for Competitive Examinations	Lecture	2	2

COURSE DESCRIPTION

This course is designed to help the students to appear in competitive examinations.

COURSE OBJECTIVES:

Demonstrate the use of mathematical reasoning by justifying through numerical skills. Examine various techniques in solving the problems

UNIT I: SIMPLIFICATION (6 HRS.)

Problems related Simplification of numbers

UNIT II: PERCENTAGE (6 HRS.)

Percentage-Important facts and formulae-Problems.

UNIT III: PERMUTATION AND COMBINATION (6 HRS.)

Permutations and Combinations – formulae and problems.

UNIT IV: VERBAL REASONING-I (6 HRS.)

Blood Relations- Direction Sense Test-Problems

UNIT V: VERBAL REASONING-II (6 HRS.)

Arithmetical Reasoning – Problems

TEXT BOOK:

1.Dr. R. S. Aggarwal - Quantitative Aptitude for Competitive Examinations, S. Chand & Company Ltd, Revised and Enlarged Edition 2017.

UNIT I : Chapter 4

UNIT II : Chapter 11

UNIT III : Chapter 30

2. A Modern Approach to Verbal & Non-Verbal Reasoning, S Chand and Company Ltd, Revised Edition 2017.

UNIT IV : Section I-Chapter 5 & 8

UNIT V : Section I-Chapter15

REFERENCE BOOKS:

1. S.K .Arora , S. Bhasin , Manish Puri - Objective Mathematics for all Competitive Examinations.

2. R.Gupta - Super Quicker Arithmetic.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**HIGHER DERIVATIVES AND CURVATURE**			
1.1	n^{th} Derivative of some standard functions	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.2	Leibnitz theorem	4	Chalk & Talk	Green Board
1.3	p-r equations	4	Chalk & Talk	Green Board
1.4	Curvature , centre and radius of curvature	4	Chalk & Talk	Green Board
1.5	Evolutes	4	Chalk & Talk	Green Board
UNIT -2 SINGULAR POINTS, ENVELOPES AND ASYMPTOTES				
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate points	4	Chalk & Talk	Green Board
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 4	**MULTIPLE INTEGRALS**			
4.1	Jacobian	5	Chalk & Talk	Green Board
4.2	Double integrals	5	Chalk & Talk	Green Board
4.3	Triple integrals	5	Chalk & Talk	Green Board
4.4	Change of variables in double and triple integral	5	Chalk & Talk	Green Board
UNIT -5	**FOURIER SERIES**			
5.1	Fourier Series	5	Chalk & Talk	Green Board
5.2	Sine Series	5	Chalk & Talk	Green Board
5.3	Cosine Series	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT				
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	

K1	**2**	**2**	**-**	**-**	**-**	**4**	-	**4**	10 %
K2	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**	22.5 %
K3	**3**	**3**	**-**	**-**	**5**	**11**	-	**11**	27.5 %
K4	**3**	**3**	**-**	**5**	**-**	**11**	-	**11**	27.5 %
Non Scholastic	-	-	-	-	-		**5**	**5**	12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				**NON - SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks

C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOME

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Simplify the Problems	K1,K2&K3	PSO4
CO 2	Find the percentage	K2&K3	PSO5
CO 3	Identify Problems on Permutation and Combination	K1&k3	PSO3
CO 4	Solve Problems on blood relation and direction sense test.	K2&K3	PSO3

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3

CO4	**2**	**3**	**2**	**2**	**2**
CO5	**2**	**2**	**2**	**3**	**2**

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	**3**	**2**	**2**	**2**
CO2	**2**	**3**	**2**	**2**
CO3	**2**	**2**	**3**	**2**
CO4	**2**	**3**	**2**	**2**
CO5	**2**	**2**	**2**	**3**

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

I B.Sc. MATHEMATICS
SEMESTER – II

For those who joined in 2023 onwards

Employability-40%

Skill Development- 40%

Entrepreneurship-20%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M2SE2	DATA INTERPRETATION	Lecture	2	2

COURSE DESCRIPTION

This course helps the students to prepare for competitive examinations.

COURSE OBJECTIVES

To ensure that students learn to think critically about mathematical models for relationships between different quantities and to solve problems.

UNIT –I DATA INTERPRETATION (6 HRS.)

Tabulation, Bar Graphs, Pie Charts, Line Graphs

UNIT –II ANALOGY (6 HRS.)

Common Relationships, Completing the analogous pair, Direct/simple Analogy, Choosing the Analogous pair, Number Analogy.

UNIT –III CODING AND DECODING (6 HRS.)

Letter coding, Direct letter coding, Number/Symbol coding, Deciphering number and symbol codes for messages.

UNIT –IV DIRECTION SENSE & LOGICAL VENN DIAGRAMS (6 HRS.)

Direction sense & Logical Venn Diagrams

UNIT –V INSERTING THE MISSING CHARACTER AND MATHEMATICAL OPERATIONS **(6 HRS.)**

Inserting the missing Character and Mathematical operations

TEXT BOOK:

1. Dr. R. S. Aggarwal, Quantitative Aptitude, S.Chand & Company Ltd, New Delhi.

   UNIT I: Section II

2. Dr. R. S. Aggarwal, A Modern Approach to Verbal & Non- Verbal Reasoning, S. Chand & Company Ltd, New Delhi.

   UNIT II : Part- I-section I- chapter 2

   UNIT III: Part- I-section I- chapter 4

   UNIT IV: Part- I-section I- Chapter 8 (Page No.416- 421) & Chapter 9 (Ex-9A, 9B)

   UNIT V: Part- I-section I- Chapter 16 (Page No.628- 638) & Chapter 13 (Page No.569 - 578)

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**HIGHER DERIVATIVES AND CURVATURE**			
1.1	n^{th} Derivative of some standard functions	4	Chalk & Talk	Green Board
1.2	Leibnitz theorem	4	Chalk & Talk	Green Board
1.3	p-r equations	4	Chalk & Talk	Green Board
1.4	Curvature , centre and radius of curvature	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.5	Evolutes	4	Chalk & Talk	Green Board
UNIT -2 SINGULAR POINTS, ENVELOPES AND ASYMPTOTES				
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate points	4	Chalk & Talk	Green Board
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmx cosnx	2	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				
4.1	Jacobian	5	Chalk & Talk	Green Board
4.2	Double integrals	5	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.3	Triple integrals	5	Chalk & Talk	Green Board
4.4	Change of variables in double and triple integral	5	Chalk & Talk	Green Board
UNIT -5 FOURIER SERIES				
5.1	Fourier Series	5	Chalk & Talk	Green Board
5.2	Sine Series	5	Chalk & Talk	Green Board
5.3	Cosine Series	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %

Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks

C6 - Attendance - 5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve problems on Data Interpretation	K1	PSO1& PSO2
CO 2	Identify Analogy	K1, K2	PSO2& PSO3
CO 3	Classify coding and Decoding	K1 & K3	PSO5
CO 4	Solving Problems using ven diagram	K1, K2, K3	PSO4
CO 5	Identify missing numbers and character	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.A.Paulin Mary)

II B.Sc Mathematics

SEMESTER –III

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	19M3CC5	MODERN ALGEBRA	Lecture	6	4

COURSE DESCRIPTION

This course introduces the abstract concepts of modern algebra.

COURSE OBJECTIVES

To enable the students to study Groups, Rings and Fields with various conditions imposed on sets, which find application in different fields of science.

UNIT - I GROUPS (18 HRS.)

Definitions and Examples – Elementary properties of a group – Equivalent Definitions – Permutation Groups - Subgroups - Cyclic Groups - Order of an Element

UNIT II: NORMAL SUBGROUPS (18 HRS.)

Cosets and Lagrange's Theorem - Normal Subgroups and Quotient Groups - Isomorphism – Homomorphisms

UNIT III: RINGS (18 HRS.)

Definitions and examples – Elementary properties of rings – Isomorphism – Types of rings – Characteristic of a ring – **Subrings (**Self Study**)**.

UNIT IV: IDEALS (18 HRS.)

Ideals – Quotient Rings – Maximal and Prime Ideals – **Homomorphism of rings** (Self Study) – Field of quotients of an integral domain – Ordered Integral domain –Unique Factorization domain.

UNIT V: POLYNOMIAL RINGS (18 HRS.)

Euclidean domain – Every P.I.D is a U.F.D – Polynomial Rings – Polynomial Rings Over U.F.D – Polynomials Over Q

TEXT BOOK:

Dr. S. Arumugam and A.ThangaPandi Isaac. *Modern Algebra.*Scitech Publications (India) Private Limited - 2003**.**

UNIT I : Chapter : 3- Sections : 3.1 – 3.7.

UNIT II : Chapter :3- Sections : 3.8 – 3.11.

UNIT III :Chapter :4 -Sections : 4.1 – 4.6.

UNIT IV : Chapter :4 -Sections : 4.7-4.13

UNIT V: Chapter: 4 -Sections: 4.14- 4.18

REFERENCE BOOKS:

1. A.R.Vasishtha.*Modern Algebra*. Krishna Prakashan Media (P) Ltd.,Delhi-2006.
2. Surgeet Singh.*Modern Algebra*. Vikas Publishing House-III Edition 2003.
3. N.S. Gopalakrishnan. *University Algebra*. New Age International Limited- II, Edition – 2005.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 GROUPS				
1.1	Group - Definitions and Examples	3	Chalk & Talk	Black Board
1.2	Elementary properties of a group	3	Chalk & Talk	Black Board
1.3	Equivalent Definitions	2	Discussions	PPT
1.4	Permutation Groups	2	Chalk & Talk	Black Board
1.5	Subgroups	3	Chalk & Talk	Black Board
1.6	Cyclic Groups	3	Chalk & Talk	Black Board
1.7	Order of an Element	2	Chalk & Talk	Black Board
UNIT -2 NORMAL SUBGROUPS				
2.1	Cosets	3	Chalk & Talk	Black Board
2.2	Lagrange's Theorem	3	Chalk & Talk	Black Board
2.3	Normal Subgroups	3	Chalk & Talk	Black Board
2.4	Quotient Groups	3	Chalk & Talk	Black Board
2.5	Isomorphism	3	Chalk & Talk	Black Board
2.6	Homomorphisms	3	Discussions	PPT

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3	**RINGS**			
3.1	Definitions and examples – Rings	3	Chalk & Talk	Black Board
3.2	Elementary properties of rings	3	Chalk & Talk	Black Board
3.3	Isomorphism	3	Chalk & Talk	Black Board
3.4	Types of rings	3	Discussions	PPT
3.5	Characteristic of a ring	3	Chalk & Talk	Black Board
3.6	Subrings	**3**	Discussions	PPT
UNIT -4	**IDEALS**			
4.1	Ideals	3	Chalk & Talk	Black Board
4.2	Quotient Rings	3	Chalk & Talk	Black Board
4.3	Maximal and Prime Ideals	3	Chalk & Talk	Black Board
4.4	Homomorphism of rings	2	Discussions	PPT
4.5	Field of quotients of an integral domain	3	Chalk & Talk	Black Board
4.6	Ordered Integral domain	2	Chalk & Talk	Black Board
4.7	Unique Factorization domain	2	Chalk & Talk	Black Board
UNIT -5	**POLYNOMIAL RINGS**			
5.1	Euclidean domain	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.2	Every P.I.D is a U.F.D	2	Chalk & Talk	Black Board
5.3	Polynomial Rings	4	Discussions	PPT
5.4	Polynomial Rings Over U.F.D	4	Chalk & Talk	Black Board
5.5	Polynomials Over Q	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON – SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Classify groups and explain their properties	K1, K2 & K3	PSO1
CO 2	Describe cosets and Lagrange's theorem	K2 & K3	PSO2 & PSO3
CO 3	Explain the characteristics of different types of rings and their properties	K2 , K3 & K4	PSO3
CO 4	Classify various types of ideals	K1, K2 & K3	PSO4
CO 5	Construct polynomial rings over UFD	K2 & K4	PSO4 & PSO5

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	3	3	2	2
CO3	2	2	3	2	2
CO4	2	2	2	3	2
CO5	2	2	2	3	3

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	2	2	2	3
CO4	2	2	2	3
CO5	2	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. B. Vethamary Jacquline**
2. **Mrs. J. Annaal Mercy**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Mathematics

SEMESTER –III

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M3CC6	ADVANCED STATISTICS	Lecture	5	5

COURSE DESCRIPTION

This course provides a strong background in statistical tools which will be used in various physical and social sciences.

COURSE OBJECTIVES

To enable the students to know the concepts of discrete distributions, continuous distributions, Test of significance for large and small samples and analysis of variance.

UNIT I: DISCRETE DISTRIBUTIONS (15 HRS.)

Binomial distribution and Poisson distribution (Self Study)

UNIT II: CONTINUOUS DISTRIBUTION (15 HRS.)

Normal Distribution - Normal Distribution as a limiting form of binomial distribution – characteristics of Normal Distribution – Area property – Fitting of Normal Distribution.

UNIT III: TEST OF SIGNIFICANCE FOR LARGE SAMPLES (15 HRS.)

Concept of sampling distribution - Test of significance for large samples using normal distribution.

UNIT IV: TEST OF SIGNIFICANCE FOR SMALL SAMPLES (15 HRS.)

Student-t, $\chi^{2,}$ F distributions (no derivation for t, χ^2, F distributions), Test of significance for small samples using t, χ^2, F distributions.

UNIT V: ANALYSIS OF VARIANCE(15 HRS.)

Analysis of variance - One way and two way classification, Randomized block design - Latin square.

TEXT BOOKS:

1. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical statistics-Sultan Chand & Sons, Revised edition - June 2002 **for Unit I to IV**.
   UNIT I : Chapter : 8 - Sections : 8.1 – 8.5.
   UNIT II : Chapter : 9 - Sections : 9.1, 9.2.
   UNIT III : Chapter : 14 - Sections : 14.1 – 14.8.
   UNIT IV : Chapter : 15 - Sections : 15.1 - 15.6, Chapter : 16 - Sections : 16.1 – 16.8
2. S.P.Gupta, Statistical Mehthods-Sultan Chand & Sons, (Rev.2000) **for Unit V**.
   UNIT V: Chapter: 14

REFERENCES:

1. H.C.Saxena, *Elementary Statistics*,AbhirorPrakashan,New Delhi,2008.
2. S.C. Gupta and V.K Kapoor , *Fundamentals of Applied Statistics*, Sultan Chand & Sons,2004

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Classify discrete and continuous random variables and characteristics of Binomial distribution and Poisson distribution	K1	PSO1&POS2
CO 2	Explain and illustrate the properties of Normal distribution and solve variety of problems.	K1, K2	PSO3
CO 3	Distinguish between a population and a sample and explain testing of hypothesis.	K1 & K3	PSO5
CO 4	Explain chi square distribution, t-distribution and describe their various applications is Statistics.	K1, K2, K3	PSO4
CO 5	Define F- distribution and apply it to solve problems in analysis of variance	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	3	2	2	2
CO3	2	3	3	2	2
CO4	2	2	2	3	3
CO5	2	2	2	3	2

Mapping COs Consistency with POs

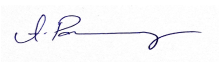
CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	2	2	3
CO3	3	2	2	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. Mrs. Nigila Ragavan

Forwarded By



(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Mathematics

SEMESTER –III

For those who joined in 2019 onwards

Skill Development-60%

Entrepreneurship-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	19M3SB1	APPLICATIONS OF CALCULUS AND DIFFERENTIAL EQUATIONS	Lecture	2	2

COURSE DESCRIPTION

This course deals with applications of calculus and differential equations.

COURSE OBJECTIVES

This course will enable students to develop a more profound understanding of Applications of calculus and differential equations and to solve related problems in Geometry, Physics, Chemistry, Mechanics etc.

UNIT I: BETA AND GAMMA FUNCTIONS (6 HRS.)

Introduction – Definition of Beta and Gamma Functions – Properties and results involving Beta and Gamma functions.

UNIT II: MAXIMA MINIMA OF FUNCTIONS OF TWO VARIABLES (6 HRS.)

The method of finding the Maxima Minima of functions of two variables.

UNIT III: TRAJECTORIES (6 HRS.)

Trajectories Introduction – Cartesian coordinates – Polar Coordinates; **Orthogonal trajectories(Self Study)**.

UNIT IV: THE BRACHISTOCHRONE PROBLEM (6 HRS.)

The Brachistochrone Problem – TautoChronous property of the Cycloid - Simple Electric Circuit.

UNIT V: FALLING BODIES AND DYNAMICAL PROBLEMS (6 HRS.)

Falling Bodies and other rate problems – Dynamical Problems with Variable Mass.

TEXT BOOKS:

1. Dr S. Arumugam and A. ThangapandiIssac - Calculus, New Gamma Publishing House 2006.

   UNIT I: Chapter 4(Part II)

   UNIT II: Chapter 3(Part I) - Section – 3.7

2. Dr S. Arumugam and A. Thangapandi Issac–Differential Equations and Applications, New Gamma Publishing House 2008.

   UNIT III: Chapter 6 - Sections – 6.1

   UNITIV: Chapter 6 - Sections – 6.4 to 6.6

   UNITV: Chapter 6 - Sections – 6.7, 6.12

REFERENCE BOOKS:

1. T.K. Manickavasagam Pillai, S. Narayanan - Calculus-S.Viswanathan (Printers & Publishers) Pvt Ltd , 2008.
2. T.K. Manickavasagam Pillai, S. Narayanan - Differential Equations and Applications–S. Viswanathan (Printers and Publishers) Pvt. Ltd.2006

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BETA AND GAMMA FUNCTIONS				
1.1	Introduction	1	Chalk & Talk	Black Board
1.2	Definition of Beta and Gamma Functions	1	Chalk & Talk	Black Board
1.3	Properties and results involving Beta functions	1	Chalk & Talk	Black Board
1.4	Properties and results involving Gamma functions	3	Chalk & Talk	Black Board
UNIT -2 MAXIMA MINIMA OF FUNCTIONS OF TWO VARIABLES				
2.1	The method of finding the Maxima of functions of two variables	3	Chalk & Talk	Black Board
2.2	The method of finding the Minima of functions of two variables	3	Chalk & Talk	Black Board
UNIT -3 TRAJECTORIES				
3.1	Introduction	1	Chalk & Talk	Black Board
3.2	Trajectories in Cartesian coordinates	1	Chalk & Talk	Black Board
3.3	Trajectories inpolar coordinates	1	Chalk & Talk	Black Board
3.4	Orthogonal trajectories (self study)	3	Discussion Chalk & Talk	Black Board
UNIT -4 THE BRACHISTOCHRONE PROBLEM				
4.1	The Brachistochrone Problem	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	TautoChronous property of the Cycloid	2	Chalk & Talk	Black Board
4.3	Simple Electric Circuit	2	Chalk & Talk	Black Board
UNIT -5 FALLING BODIES AND DYNAMICAL PROBLEMS				
5.1	Falling Bodies and other rate problems	3	Chalk & Talk	Black Board
5.2	Dynamical Problems with Variable Mass	3	Chalk & Talk	Black Board

COURSE CONTENTS & LECTURE SCHEDULE:

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain Beta and Gamma functions and their properties.	K1 & K2	PSO1
CO 2	Solve the problems in Maxima minima of functions of two variables.	K1, K2 & K3	PSO3
CO 3	Describe trajectories and orthogonal trajectories.	K2 & K3	PSO5
CO 4	Solve Brachistochrone problems	K2, K3 & K4	PSO4
CO 5	Discuss dynamical problems with variable mass	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	2	2	2	3
CO4	2	3	3	2

CO5	**3**	**2**	**2**	**2**

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs.M.Teresa Nirmala**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Chemistry

SEMESTER –III

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	21M3ACC1	ALLIED MATHEMATICS – I	Lecture	5	5

COURSE DESCRIPTION

The course develops Mathematical knowledge needed by the chemistry students.

COURSE OBJECTIVES

To enable the students to understand mathematical concepts like matrices, higher derivatives of functions, solving differential equations, trigonometric series, measures of dispersion and moments.

UNIT I: MATRICES (15 HRS.)

Introduction – Matrices – Rank of a Matrix – Elementary Transformations – Simultaneous Linear Equations - Cayley Hamilton theorem – Eigen Values and Eigen Vectors. **(Only Problems)**

UNIT II: HIGHER DERIVATIVES OF FUNCTIONS (15 HRS.)

Derivatives of hyperbolic functions - Successive differentiation and Leibnitz theorem.

UNIT III : EXACT DIFFERENTIAL EQUATIONS AND HIGHER ORDER DIFFERENTIAL EQUATIONS (15 HRS.)

Differential Equations of first order – Variable separable - Exact equations - Linear equations of 2 nd order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S .

UNIT IV : TRIGONOMETRIC SERIES (15 HRS.)

Expansions of sin nx, cos nx, tan nx, $\sin^n x$, $\cos^n x$ - Series of sin x, cos x.

UNIT V : MEASURES OF DISPERSION AND MOMENTS (15 HRS.)

Mean, Median, Mode, Standard Deviation **(self study)**, Karl Pearson's coefficient of skewness, Moments, Skewness and Kurtosis using moments.

TEXT BOOKS:

4. S. Arumugam & Isaac, *Ancillary Mathematics*, New Gamma Publishing House, Nov 2004.
5. S. Arumugam & Isaac, *Statistics*, New Gamma Publishing House, 2006.
6. S. Arumugam & Isaac, *Calculus*, New Gamma Publishing House, 2005.

REFERENCE BOOK:

2. S.Narayanan and T. K. Manicavachagam Pillai, *Differential Equations and its Applications*, S. Viswanathan (Printers and Publishers), Pvt. Ltd, 2006.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**MATRICES**			
1.1	Matrices	3	Chalk & Talk	Black Board
1.2	Rank of a Matrix	2	Chalk & Talk	Black Board
1.3	Elementary Transformations	2	Chalk & Talk	Black Board
1.4	Simultaneous Linear Equations	2	Chalk & Talk	Black Board
1.5	Cayley Hamilton theorem	3	Chalk & Talk	Black Board
1.6	Eigen Values and Eigen Vectors	3	Chalk & Talk	Black Board
UNIT -2	**HIGHER DERIVATIVES OF FUNCTIONS**			
2.1	Derivatives of hyperbolic functions	8	Chalk & Talk	Black Board
2.2	Successive differentiation and Leibnitz theorem	7	Chalk & Talk	Black Board
UNIT -3	**EXACT DIFFERENTIAL EQUATIONS AND HIGHER ORDER DIFFERENTIAL EQUATIONS**			
3.1	Exact equations	2	Chalk & Talk	Black Board
3.2	Linear equations of 2 nd order with constant coefficient with erms of the form $e^{ax}v$ on R.H.S	13	Chalk & Talk	Black Board
UNIT -4	**TRIGONOMETRIC SERIES**			
4.1	Expansions of sin nx, cos nx, tan nx, $\sin^n x$, $\cos^n x$	8	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	Series of sin x, cos x	7	Chalk & Talk	Black Board
UNIT -5	**MEASURES OF DISPERSION AND MOMENTS**			
5.1	Mean, Median, Mode, Standard Deviation	7	Chalk & Talk	Black Board
5.2	Karl Pearson's coefficient of skewness	3	Chalk & Talk	Black Board
5.3	Moments	1	Chalk & Talk	Black Board
5.4	Skewness and Kurtosis using moments	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Appraise rank of a matrix, Eigen value and Eigen vectors	K1	PSO1
CO 2	Obtain higher derivatives of functions	K1 & K2	PSO3
CO 3	Solve exact and higher order differential equations	K1 & K3	PSO5
CO 4	Expand trigonometric functions	K1, K2 & K3	PSO4
CO 5	Define Moments, kurtosis and to apply the same	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	3	3	2

CO2	2	3	2	2
CO3	2	3	2	2
CO4	2	2	2	3
CO5	3	2	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. C.Prasanna Devi**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc. Computer Science

SEMESTER –III

For those who joined in 2019 onwards

Employability-60%

Skill Development-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	21M3ACB1	LINEAR PROGRAMMING	Lecture	5	5

COURSE DESCRIPTION

The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modeled by objective function and linear constraints.

COURSE OBJECTIVES

To enable the students to convert real life problems into a Mathematical problem and to solve them using different techniques like graphical method, simplex method, Big – M method, Two - phase method and dual simplex method and also to obtain optimality in transportation, assignment problems.

UNIT I: INTRODUCTION TO LPP (15HRS.)

Formulation – Classification - Graphical Solutions of LPP - Simple examples of LPP - Slack and Surplus variables - Standard form of LPP - Definition of objective function-Linear and Non-negative Constraints - Feasible Solution - Basic Feasible Solution - Optimum Basic Feasible Solution - Degenerate solution.

UNIT II: SIMPLEX METHOD (15 HRS.]

Computational procedure of the simplex method - Tie for entering basis vector and leaving basis vector - Unbounded Solution - Solution using Artificial Variables - Charne's method of penalties and Two Phase Simplex method - Restricted and unrestricted variables – Infeasible solution - Inverse of a matrix using Simplex method.

UNIT III: DUALITY & DUAL SIMPLEX METHOD (15 HRS.)

Concept of Duality – Statement of Dual of a given Primal - The form of the Dual when the primal has restricted variables and / or unrestricted variables and when primal is in mixed form - How to obtain optimum solution to Dual form that of Primal and vice-versa - Solution of LPP by Dual Simplex method.

UNIT IV: TRANSPORTATION PROBLEM (15 HRS.)

Mathematical formulation - existence of feasible solution - Feasible solution by North West Corner rule - **Matrix Minima method (Self-Study)** - Vogel's Approximation method - Optimal solution to a TP by Modified Distribution method - Degeneracy in TP - **Unbalanced TP (Self-Study).**

UNIT V: ASSIGNMENT PROBLEM (15 HRS.)

Mathematical formulation - Assignment algorithm rule for finding optimal assignment - **Unbalanced AP (Self-Study)** - Travelling salesman problem as an AP.

TEXT BOOK:

Kanti Swarup and others, *Operation Research*, Sultan Chand and sons – 14th Edition 2008.

UNIT I - Chapters 2, 3

UNIT II - Chapter 4

UNIT III - Chapter 5

UNIT IV - Chapter 10

UNIT V - Chapter 11

REFERENCE BOOKS:

1. Sankaranarayanan and Mangaldoss, *Linear Programming*
2. R.K.Gupta, *Operations Research*

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 INTRODUCTION TO LPP				
1.1	Formulation Classification	2	Chalk & Talk	Black Board
1.2	Graphical Solutions of LPP - Simple examples of LPP	4	Chalk & Talk	Black Board
1.3	Slack and Surplus variables	2	Chalk & Talk	Black Board
1.4	Standard form of LPP - Definition of objective function	2	Chalk & Talk	Black Board
1.5	Linear and Non-negative Constraints	1	Chalk & Talk	Black Board
1.6	Feasible Solution - Basic Feasible Solution	1	Chalk & Talk	Black Board
1.7	Optimum Basic Feasible Solution	2	Chalk & Talk	Black Board
1.8	Degenerate solution	1	Chalk & Talk	Black Board
UNIT -2 SIMPLEX METHOD				
2.1	Computational procedure of the simplex method Tie for entering basis vector and leaving basis vector Unbounded Solution Solution using Artificial Variables	7	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.2	Charne's method of penalties and Two Phase Simplex method Restricted and unrestricted variables Infeasible solution Inverse of a matrix using Simplex method.	8	Chalk & Talk	Black Board
UNIT -3 DUALITY & DUAL SIMPLEX METHOD				
3.1	Concept of Duality Statement of Dual of a given Primal The form of the Dual when the primal has restricted variables and / or unrestricted variables and when primal is in mixed form	7	Chalk & Talk	Black Board
3.2	How to obtain optimum solution to Dual form that of Primal and vice-versa Solution of LPP by Dual Simplex method.	8	Chalk & Talk	Black Board
UNIT -4 TRANSPORTATION PROBLEM				
4.1	Mathematical formulation	2	Chalk & Talk	Black Board
4.2	Existence of feasible solution - Feasible solution by North West Corner rule	1	Chalk & Talk	Black Board
4.3	Matrix Minima method	**1**	Discussion, Seminar	Black Board
4.4	Vogel's Approximation method	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.5	Optimal solution to a TP by Modified Distribution method	4	Chalk & Talk	Black Board
4.6	Degeneracy in TP	3	Chalk & Talk	Black Board
4.7	Unbalanced TP	**3**	Discussion, Seminar	Black Board
UNIT -5 ASSIGNMENT PROBLEM				
5.1	Mathematical formulation	2	Chalk & Talk	Black Board
5.2	Assignment algorithm rule for finding optimal assignment	6	Chalk & Talk	Black Board
5.3	Unbalanced AP	**3**	Discussion, Seminar	Black Board
5.4	Travelling salesman problem as an AP	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment

	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assign ment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total

10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Define basic concepts of Linear Programming problems	K1	PSO1&PSO2
CO 2	Apply various simplex methods to solv linear programming problems	K1 & K2	PSO3
CO 3	Construct dual problem and solve the problem	K1 & K3	PSO5
CO 4	Solve transportation problems	K1, K2 & K3	PSO4
CO 5	Distinguish assignment problem and travelling salesman problem	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3

CO2	3	2	2	2
CO3	2	2	2	3
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. NIGILA RAGAVAN**
2. **Dr. Mrs. K AMUTHA**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Mathematics

SEMESTER –IV

For those who joined in 2019 onwards

Employablitiy-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M4CC7	SEQUENCES AND SERIES	Lecture	6	4

COURSE DESCRIPTION

This course introduces the concept of sequence and series and to enable the students to understand the fundamental ideas in Real Analysis.

COURSE OBJECTIVES

To enable the students to learn theorem and problems in sequences and series which is essential for learning higher Mathematics.

UNIT I: SEQUENCES (20 HRS.)

Sequences – Bounded Sequences – Monotonic Sequences – Convergent Sequences – Divergent and Oscillating Sequences – The Algebra of Limits – **Behaviour of Monotonic Sequences (self study)**

UNIT II: LIMITS AND SUBSEQUENCES (15 HRS.)

Some Theorems on Limits – Subsequences – Limit Points – Cauchy Sequences – The upper and Lower Limits of a Sequence.

UNIT III: SERIES OF POSITIVE TERMS (20 HRS.)

Infinite Series - Comparison Test – Kummer's Test – Root test and Condensation Test – **Integral Test (self study).**

UNIT IV: ALTERNATING SERIES (20 HRS.)

Alternating Series – Absolute Convergence – Tests for Convergence of series of arbitrary terms.

UNIT V: REARRANGEMENT OF SERIES (15 HRS.)

Rearrangement of series – Multiplication of series – Power Series.

TEXT BOOK:

S. Arumugam and A. Thangapandi Issac, *Sequences and Series*, New Gamma Publishing House 2002.

Unit – I: Chapter 3 (Sec 3.1 – 3.7)

Unit – II: Chapter 3 (Sec 3.8 – 3.12)

Unit – III Chapter 4

Unit – IV Chapter 5 (Sec 5.1 – 5.3)

Unit – V Chapter 5 (Sec 5.4 – 5.6)

REFERENCE BOOK:

M. K. Venkatraman and Mrs. Manoramma Sridhar, *Sequences and Series*, The National Publishing Company 2002.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**SEQUENCES**			
1.1	Sequences	3	Chalk & Talk	Black Board
1.2	Bounded Sequences	3	Chalk & Talk	Black Board
1.3	Monotonic Sequences	3	Chalk & Talk	Black Board
1.4	Convergent Sequences	3	Chalk & Talk	Black Board
1.5	Divergent and Oscillating Sequences	2	Chalk & Talk	Black Board
1.6	The Algebra of Limits	3	Chalk & Talk	Black Board
1.7	Behaviour of Monotonic Sequences	3	Discussion	Black Board
UNIT -2	**LIMITS AND SUBSEQUENCES**			
2.1	Some Theorems on Limits	3	Chalk & Talk	Black Board
2.2	Sub sequences	3	Chalk & Talk	Black Board
2.3	Limit Points	3	Chalk & Talk	Black Board
2.4	Cauchy Sequences	3	Chalk & Talk	Black Board
2.5	The upper and Lower Limits of a Sequence.	3	Chalk & Talk	Black Board
UNIT -3	**SERIES OF POSITIVE TERMS**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Infinite Series	4	Chalk & Talk	Black Board
3.2	Comparison Test —— **Integral Test**	6	Chalk & Talk & Discussion	Black Board
3.3	Kummer's Test	4	Chalk & Talk	Black Board
3.4	Root test and Condensation Test	4	Chalk & Talk	Black Board
3.5	Root test and Condensation Test	**2**	Chalk & Talk	Black Board
UNIT -4 TITLE				
4.1	Alternating Series	6	Chalk & Talk	Black Board
4.2	Absolute Convergence	6	Chalk & Talk	Black Board
4.3	Tests for Convergence of series of arbitrary terms	8	Chalk & Talk	Black Board
UNIT -5 REARRANGEMENT OF SERIES				
5.1	Rearrangement of series	5	Chalk & Talk	Black Board
5.2	Multiplication of series	5	Chalk & Talk	Black Board
5	Power Series	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Define basic concepts of sequences	K1	PSO1&
CO 2	Explain subsequences and Cauchy sequences	K1, K2,	PSO3
CO 3	Differentiate various convergence test series and use them to solve problems	K1 & K3	PSO5
CO 4	Recognize alternating, convergent, conditionally and absolutely convergent series	K1, K2 & K3	PSO4
CO 5	Distinguish the behaviour of series an power series	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	2	2	3
CO3	2	2	2	3
CO4	2	2	3	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. Dr. C. Prasanna Devi

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Mathematics

SEMESTER –IV

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M4CC8	LINEAR ALGEBRA	Lecture	6	4

COURSE DESCRIPTION

This course will focus on matrix as linear transformations relative to a basis of a vector space

COURSE OBJECTIVES

To enable the students to understand matrix and vector space concepts which can be applied in Graph Theory, Linear Programming, Physics and Chemistry etc.,

UNIT –I VECTOR SPACES (18 HRS.)

Definition and Examples of Vector spaces – Subspaces – Linear Transformation – Span of a set.

UNIT -II BASIS AND DIMENSION (18 HRS.)

Linear Independence – Basis and Dimension – Rank and Nullity - Matrix of a Linear Transformation.

UNIT -III INNER PRODUCT SPACES (18 HRS.)

Definition and Examples of inner product spaces – Orthogonality – Orthogonal Complement

UNIT - IV THEORY OF MATRICES (18 HRS.)

Algebra of Matrices – Types of Matrices – The Inverse of a Matrix (Self Study) – Elementary Transformations. Rank of a Matrix – Simultaneous Linear Equations – Characteristic Equation and Cayley Hamilton Theorem, Eigen Values and Eigen Vectors.

UNIT -V BILINEAR FORMS (18 HRS.)

Bilinear forms – Quadratic forms.

TEXT BOOK:

Dr. S. Arumugam and A..Thanga Pandi Isaac **-** Modern Algebra – Scitech Publications (India) Private Limited - 2003**.**

UNIT I Chapter 5: 5.0-5.5

UNIT II Chapter 5 : 5.6 – 5.8

UNIT III Chapter 6

UNIT IV Chapter 7

UNIT V Chapter 8

REFERENCE BOOKS:

1. Surgeet Singh, *Modern Algebra*, Vikas Publishing House-III Edition 2003.
2. N.S. Gopalakrishnan ,*University Algebra* , New Age International Limited- II Edition - 2005.
3. Alan Doerr & Kenneth Levasseur – *Applied Discrete Structures for Computer Science* - Galgotia Publications Pvt. Ltd. - Edition 1989.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 VECTOR SPACES				
1.1	Definition and Examples of Vector spaces	4	Chalk & Talk	Black Board
1.2	Subspaces	4	Chalk & Talk	Black Board
1.3	Linear Transformation	4	Lecture	PPT & White board
1.4	Span of a set	2	Chalk & Talk	Black Board
UNIT -2 BASIS AND DIMENSION				
2.1	Linear Independence	5	Chalk & Talk	Black Board
2.2	Basis and Dimension	4	Chalk & Talk	Black Board
2.3	Rank and Nullity	4	Chalk & Talk	Black Board
2.4	Matrix of a Linear Transformation.	5	Chalk & Talk	Black Board
UNIT -3 INNER PRODUCT SPACES				
3.1	Definition and Examples of inner product spaces	6	Chalk & Talk	Black Board
3.2	Orthogonality	**6**	Chalk & Talk	Black Board
3.3	Orthogonal Complement	**6**	Chalk & Talk	Black Board
UNIT -4 THEORY OF MATRICES				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.1	Algebra of Matrices		Chalk & Talk	Black Board
4.2	Types of Matrices		Chalk & Talk	Black Board
4.3	Inverse of a Matrix		Chalk & Talk	Black Board
4.4	Elementary Transformations		Chalk & Talk	Black Board
4.5	Rank of a Matrix		Chalk & Talk	Black Board
4.6	Simultaneous Linear Equations		Chalk & Talk	Black Board
4.7	Characteristic Equation and Cayley Hamilton Theorem		Chalk & Talk	Black Board
4.8	Eigen Values and Eigen Vectors.		Chalk & Talk	Black Board
UNIT -5 BILINEAR FORMS				
5.1	Bilinear forms		Chalk & Talk	Black Board
5.2	Quadratic forms		Chalk & Talk	Black Board
5.3	Quadratic forms to diagonal forms		Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Define Vector Space and explain its various concepts	K1, K2	PSO1
CO 2	Illustrate Inner Product Spaces	K3, K4	PSO2
CO 3	Define basic concepts of matrices and linear equations	K1, K2 & K3	PSO2 & PSO3
CO 4	Appraise Eigen Value and Eigen Vectors of matrices	K2, K3 & K4	PSO4 & PSO5
CO 5	Describe bilinear forms and quadratic	K2 & K4	PSO4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	3	2	2	2
CO3	2	3	3	2	2
CO4	2	2	2	3	3
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	2	2	3
CO3	3	2	2	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. Mrs. Nigila Ragavan

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Mathematics

SEMESTER –IV

For those who joined in 2022 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	22M4SB2	TRIGONOMETRY	Lecture	2	2

COURSE DESCRIPTION

This course helps the students to develop their problem solving skills.

COURSE OBJECTIVES

To enable the students learn some basic concepts of Trigonometry and to solve problems.

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UNIT I: EXPANSIONS -I [6 HRS]

Expansion of sinnx, cosnx, tannx

UNIT II : EXPANSIONS -II [6 HRS]

Expansion of $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$

UNIT III: EXPANSIONS -III [6 HRS]

Expansions of $\cos\theta$, $\sin\theta$ and $\tan\theta$ in a series of ascending powers of θ

UNIT III: HYPERBOLIC FUNCTIONS [6 HRS]

Hyperbolic functions , Relations between hyperbolic functions,Inverse Hyperbolic functions.

UNITV:LOGARITHMS OF COMPLEX QUANTITIES [6 HRS]

Logarithms of complex quantities, Definition, Logarithm of x+iy, General value of logarithm of x+iy

TEXT BOOKS:

1. S. Narayanan and T. K. Manicavachagam Pillai - Trigonometry , S. Viswanathan (Printers and Publishers), Pvt. Ltd, 2008.

   UNIT I, II & III Chapter 3

   UNIT IV Chapter 4

   UNIT V Chapter 5(Section 5.1 & 5.2)

REFERENCE BOOKS:

1. P.R.Vittal & V.Malini - Algebra & Trigonometry, Margham Publications, 2008.
2. Sudhir K Pundir singh- Algebra & Trigonometry, Meerat Pragathi prakashan,2003

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recall some expansions of Trigonometric functions in sinnx, cosnx, tannx.	K1	PSO1& PSO2
CO 2	Recall some expansions of Trigonometric functions in $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$	K2 & K3	PSO3
CO 3	Recall some expansions of Trigonometric functions in $\cos\theta$, $\sin\theta$ and $\tan\theta$ in a series of ascending powers of θ	K1 & K2	PSO4
CO 4	Do the problems in hyperbolic functions	K1 & K4	PSO5
CO 5	Explain Logarithms of Complex quantities.	K2 & K4	PSO3

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	3	2	2	2
CO3	2	3	3	2	2
CO4	2	2	2	3	3
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	2	2	3
CO3	3	2	2	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. Mrs. Nigila Ragavan

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc Chemistry

SEMESTER –IV

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	21M4ACC2	ALLIED MATHEMATICS – II	Lecture	5	5

COURSE DESCRIPTION

The course provides the mathematical skills needed by the chemistry students for advanced study.

COURSE OBJECTIVES

To enable the students to understand the mathematical concepts like groups, integration, Laplace transform, Correlation, Regression and curve fitting.

UNIT I: GROUPS (15 HRS.)

Groups - Definition and Examples - Elementary properties of Group - Equivalent Definitions of a group - Permutation group - subgroups - cyclic groups - order of an element - Cosets and Lagrange's theorem. (No proof for theorems).

UNIT II: INTEGRAL CALCULUS (15 HRS.)

Definite Integral (self study) - Integration by parts - Reduction Formula

UNIT III: LAPLACE TRANSFORMS (15 HRS.)

Definitions - Standard Laplace transforms - Inverse Laplace transforms - Applications to solutions of simple differential equations.

UNIT IV: CORRELATION AND REGRESSION (15 HRS.)

Correlation - Rank Correlation - Regression.

UNIT V: CURVE FITTING (15 HRS.)

Principle of Least Squares – Fitting a straight line – Fitting a second degree parabola.

TEXT BOOKS:

3. S. Arumugam & Isaac, *Ancillary Mathematics*, New Gamma Publishing House, 2006.
4. S. Arumugam & Isaac, *Statistics*, New Gamma Publishing House, 2006.

REFERENCE BOOKS:

3. S.C. Gupta and V.K Kapoor, *Fundamental of Applied Statistics*, third edition, Sultan Chand & Sons, New Delhi
4. Surgeet Singh, *Modern Algebra*,Vikas Publishing House-III Edition 2003.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 GROUPS				
1.1	Groups, Elementary properties of Group, Equivalent Definitions of a group	5	Chalk & Talk	Black Board
1.2	Permutation group – subgroups	4	Chalk & Talk	Black Board
1.3	cyclic groups, order of an element	3	Chalk & Talk	Black Board
1.4	Cosets and Lagrange's theorem.	3	Chalk & Talk	Black Board
UNIT - 2 INTEGRAL CALCULUS				
2.1	Definite Integral	7	Discussion	Black Board
2.2	Integration by parts	5	Chalk & Talk	Black Board
2.3	Reduction Formula	3	Chalk & Talk	Black Board
UNIT - 3 LAPLACE TRANSFORMS				
3.1	Standard Laplace transforms	4	Chalk & Talk	Black Board
3.2	Inverse Laplace transforms	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Applications to solutions of simple differential equations	6	Chalk & Talk	Black Board
UNIT - 4	**CORRELATION AND REGRESSION**			
4.1	Correlation	5	Chalk & Talk	Black Board
4.2	Rank Correlation	5	Chalk & Talk	Black Board
4.3	Regression	5	Chalk & Talk	Black Board
UNIT - 5	**CURVE FITTING**			
5.1	Principle of Least Squares	5	Chalk & Talk	Black Board
5.2	Fitting a straight line	5	Chalk & Talk	Black Board
5.3	Fitting a second degree parabola	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the concepts of groups, subgroups and normal subgroups.	K1	PSO4
CO 2	Compute the definite integral and cons reduction formula.	K1 & K2	PSO3
CO 3	Solve differential equations using Lapl transforms.	K1 & K3	PSO5
CO 4	Explain the concepts of correlation, rank correlation coefficient and regression.	K1, K2 & K3	PSO1
CO 5	Apply the principle of least squares to straight line and parabola.	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	2	3	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	3	2	2	2	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	3	3	2	2
CO4	2	2	2	3
CO5	3	2	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. Dr. C. Prasanna Devi

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

II B.Sc. Computer Science

SEMESTER –IV

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	21M4ACB2	ALGEBRA AND GRAPH THEORY	Lecture	5	5

COURSE DESCRIPTION

This course enables the students to have better application of abstract concepts through Graph Theory.

COURSE OBJECTIVES

To study the concepts of functions, matrices and graph theory.

UNIT I: RELATIONS AND FUNCTIONS (15 HRS.)

Properties of Relations – Inverse Relations – Equivalence Classes – Partition of a set – Fundamental theorem on Equivalence Relations – Graphs of Relations and Hasse Diagram – Composition of Relations – Relation Matrix - Closure Operations of Relations – Minsets, Maxsets – Duality Principle – Functions – Types of Functions – Inverse Function – Theorems on Functions – Permutations and Combinations.

UNIT II: THEORY OF MATRICES (15 HRS.)

Matrix inversion – System of Equations – Consistency of Systems of Linear Equations (Self-study) – Eigen Values, Eigen Vectors – Diagonalization Process – Induction Principle – Peano's Postulates.

UNIT III: INTRODUCTION (15 HRS.)

What is a Graph? – Application of Graphs – Finite and infinite Graphs – Incidence and Degree – Isolated vertex, Pendant Vertex and Null Graph – Brief History of Graph Theory – Isomorphism – Subgraphs – Isomorphism

UNIT IV: PATHS AND CIRCUITS (15 HRS.)

Walks, Paths and Circuits – Connected Graphs Disconnected Graphs and Components – Euler Graphs – Hamiltonian Paths and Circuits

UNIT V: TREES AND FUNDAMENTAL CIRCUIT (15 HRS.)

Trees – Some Properties of Trees – **Pendant Vertices in a Tree (Self-study)** – Spanning Tree – Cut Sets – Some Properties of a Cut Set

TEXT BOOKS:

1. Prof. V.Sundaresan, K.S. Ganapathy Subramanian, K. Ganesan, *Discrete Mathematics for B.E. (Computer Science & Engineering)*, Meenakshi Agency, Nov.2002
   UNIT I : Chapter 1 (pages 1.11 – 1.39)
   UNIT II : Chapter 2 (pages 2.23 – 2.35)
2. Narsingh Deo *Graph theory with Applications to Engineering and Computer Science, Prentice* Hall of India Private Limited, New Delhi, 2008.
   UNIT III : Chapter 1 (Sec 1.1 – 1.5), Chapter 2 (Sec 2.1 – 2.2)
   UNIT IV : Chapter 2 (Sec 2.4 – 2.6, 2.9)
   UNIT V : Chapter 3 (Sec 3.1 – 3.3, 3.7), Chapter 4 (Sec 4.1, 4.2)

REFERENCE BOOKS:

1. F.Harary Addison, *Graph theory*, Wesley Publishing Company, 1972.
2. Trembley J.P and Manohar, *Discrete Mathematical structure with Applications to Computer Science*, R.P.Mcgraw-Hill, 1975.
3. Doerr, A.E. Levasseur, *Applied Discrete Structures of Computer Science*, Galgotia Publications Pvt. Ltd., 1986.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 RELATIONS AND FUNCTIONS				
1.1	Properties of Relations Inverse Relations	2	Chalk & Talk	Black Board
1.2	Equivalence Classes Partition of a set	3	Chalk & Talk	LCD
1.3	Fundamental theorem on Equivalence Relations	2	Lecture	PPT & White board
1.4	Graphs of Relations and Hasse Diagram Composition of Relations	1	Lecture	Smart Board
1.5	Relation Matrix Closure Operations of Relations	2	Lecture	Black Board
1.6	Minsets, Maxsets Duality Principle Functions	1	Discussio n	Google classroom
1.7	Functions Types of Functions Inverse Function	2	Specimen	Microscope
1.8	Theorems on Functions Permutations and Combinations.	2	Discussio n	Black Board
UNIT -2 THEORY OF MATRICES				
2.1	Matrix inversion System of Equations Consistency of Systems of Linear Equations Eigen Values	**6**	Discussio n and Seminar	Green Board Charts
2.2	Eigen Vectors Diagonalization Process Induction Principle Peano's Postulates.	9	Chalk & Talk	Green Board
UNIT -3 INTRODUCTION TO GRAPHS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	What is a Graph? Application of Graphs Finite and infinite Graphs Incidence and Degree Isolated vertex	7	Chalk & Talk	Green Board
3.2	Pendant Vertex and Null Graph Brief History of Graph Theory Isomorphism Subgraphs Isomorphism	8	Chalk & Talk	Green Board
UNIT -4 PATHS AND CIRCUITS				
4.1	Walks, Paths and Circuits	5	Chalk & Talk	Green Board
4.2	Connected Graphs, Disconnected Graphs and Components	5	Chalk & Talk	Black Board
4.3	Euler Graphs ,Hamiltonian Paths and Circuits	5	Chalk & Talk	Black Board
UNIT -5 TREES AND FUNDAMENTAL CIRCUITS				
5.1	Trees Some Properties of Trees	4	Chalk & Talk	Black Board
5.2	Pendant Vertices in a Tree	**1**	Discussio n and Seminar	Black Board
5.3	Spanning Tree	4	Chalk & Talk	Black Board
5.4	Cut Sets Some Properties of a Cut Set	6	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recall relations and functions	K1	PSO1&PSO2
CO 2	Appraise Eigen values and Eigen Vectors	K2	PSO3
CO 3	Define various types of graphs	K1 & K3	PSO5
CO 4	List out the characterization of trees	K2 & K3	PSO4
CO 5	Apply different algorithms to find the shortest path in graphs	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	2	3	2
CO3	2	2	2	3
CO4	2	2	3	2
CO5	3	2	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. Nigila Ragavan**
2. **Dr. Mrs. K. Amutha**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M5CC9	REAL ANALYSIS	Lecture	5	4

COURSE DESCRIPTION

This course introduces the basic concepts in analysis and to enable the students to understand fundamental ideas and theorems on metric spaces.

COURSE OBJECTIVES

To study the fundamental concepts and techniques of open sets, closed sets, continuous functions, compactness and connectedness.

UNIT –I METRIC SPACES (15 HRS.)

Countable sets - Uncountable sets - Metric spaces, definition, **examples (self study)** - Bounded sets in a metric space – Open ball in a metric space - open sets- Subspaces.

UNIT –II COMPLETE METRIC SPACES (15 HRS.)

Interior of a set - Closed sets - Closure - Limit point - Dense sets - Completeness – Baire's Category theorem.

UNIT –III CONTINUITY (15 HRS.)

Continuity - Definition and examples of a Continuous function – **Homeomorphism – Isometry (self study)** - Uniform Continuity - Discontinuous functions on R.

UNIT –IV CONNECTEDNESS (15 HRS.)

Definition and Examples – Connected subsets of R – Connectedness and Continuity.

UNIT –V COMPACTNESS (15 HRS.)

Definition and examples – Compact space - Compact subsets of R – Compactness and Continuity.

TEXT BOOK:

1. Dr. S. Arumugam and A. Thangapandi Issac, *Modern Analysis*, New Gamma Publishing house – Edition 2010.

   UNIT I : Chapters: 1 (sec 1.1 – 1.3), 2 (sec 2.1 – 2.3)

   UNIT II : Chapters: 2 (sec 2.6 – 2.10), 3

   UNIT III : Chapter: 4

   UNIT IV : Chapter: 5

   UNIT V : Chapter: 6 (sec 6.0 - 6.2, 6.4)

REFERENCES:

1. Copson, *Metric spaces*, Universal book stall, New Delhi – 1989
2. Walter Rudin, *Mathematical Analysis*, MC-craw hill international – Third edition

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**METRIC SPACES**			
1.1	Countable sets and examples	1	Chalk & Talk	Black Board
1.2	Theorems	2	Chalk & Talk	Black Board
1.3	Problems	1	Chalk & Talk	Black Board
1.4	Uncountable sets	2	Chalk & Talk	Black Board
1.5	Metric spaces	4	Chalk & Talk Discussion	Black Board
1.6	Bounded sets	1	Chalk & Talk	Black Board
1.7	Open ball	1	Chalk & Talk	Black Board
1.8	Open sets	2	Chalk & Talk	Black Board
1.9	Subspaces	1	Chalk & Talk	Black Board
UNIT -2	**COMPLETE METRIC SPACES**			
2.1	Interior of a set	2	Chalk & Talk	Black Board
2.2	Closed sets and Closure	4	Chalk & Talk	Black Board
2.3	Limit point	3	Chalk & Talk	Black Board
2.4	Dense sets and Completeness	4	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	Board
2.5	Baire's category theorem	2	Chalk & Talk	Black Board
UNIT - 3 CONTINUITY				
3.1	Continuity	3	Chalk & Talk	Black Board
3.2	Definition and examples of a Continuous function	4	Chalk & Talk	Black Board
3.3	Homeomorphism – isometry	3	Discussion	Black Board
3.4	Uniform continuity	2	Chalk & Talk	Black Board
3.5	Discontinuous functions on R	3	Chalk & Talk	Black Board
UNIT - 4 CONNECTEDNESS				
4.1	Connectedness	5	Chalk & Talk	Black Board
4.2	Connected subsets of R	6	Chalk & Talk	Black Board
4.3	Connectedness and continuity - Theorems.	4	Chalk & Talk	Black Board
UNIT - 5 COMPACTNESS				
5.1	Compact metric spaces	4	Chalk & Talk	Black Board
5.2	Compact subsets of R	7	Chalk & Talk	Black Board
5.3	Compactness and continuity	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe fundamental ideas and theorems on Metric spaces	K1	PSO1& PSO3
CO 2	Distinguish the continuity, discontinuity and uniform continuity of functions	K1 & K2	PSO5
CO 3	Demonstrate the connectedness and its properties	K1 & K3	PSO3
CO 4	Explain the concept of compactness and their roles in the real line	K1, K2 & K3	PSO3
CO 5	Organize theorems in a correct mathematical way	K2 & K4	PSO5

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	3	2	2
CO2	2	2	2	2	3
CO3	2	2	3	2	2

CO4	2	2	3	2	2
CO5	2	2	2	2	3

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	3	2	2	3
CO4	2	2	2	3
CO5	2	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. C. Prasanna Devi**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/	CREDITS

				WEEK	
UAMA	**19M5CC10**	**STATICS**	**Lecture**	**5**	**4**

COURSE DESCRIPTION

This course describes laws, principles, and postulates governing the statics of the system in physical reality.

COURSE OBJECTIVES

Enable the students to develop critical thinking skills necessary to solve problems of statics which deals with forces acting on rigid bodies, parallel forces and moments, couples, equilibrium of three forces acting on a rigid body and friction.

UNIT –I INTRODUCTION & FORCES ACTING AT A POINT (15 HRS.)

Introduction – Resultant and components: Definition – Simple cases of finding the resultant – parallelogram of Forces – Analytical expression for the resultant of two forces acting at a point – Triangle of forces – Perpendicular Triangle of Forces – Converse of the triangle of forces – The polygon of Forces – Lami's Theorem – An extended form of the parallelogram law of forces: Theorem – Resolution of forces – Components of a force along two given directions – Theorem on Resolved parts – Resultant of any number of forces acting at a point: Graphical method - Resultant of any number of coplanar forces acting at a point: Analytical method – Condition of equilibrium of any number of forces acting up on a particle.

UNIT –II PARALLEL FORCES AND MOMENTS (15 HRS.)

Introduction – To find the resultant of two like parallel forces acting on a rigid body - To find the resultant of two unlike and unparallel forces acting on a rigid body - Resultant of a number of parallel forces acting on a rigid body – Condition of equilibrium of three coplanar parallel forces – Centre of two parallel forces – Moment of a force – Physical signification of the moment of a force – Geometrical representation of a moment – Sign of the moment – Unit of moment – Varigon's theorem of moments – Generalized

theorems of moments – Moment of a force about an axis.

UNIT –III COUPLES AND EQUILIBRIUM OF THREE FORCES ACTING ON A RIGID BODY (15 HRS.)

Couples: Definition – Equilibrium of two couples – Equivalence of two couples – Couples in parallel planes – Representation of a couple by a vector – Resultant of coplanar couples - Resultant of a couple and a force. Rigid body subjected to any three forces – Three coplanar forces – Conditions of equilibrium - Procedure – Two trigonometrically theorem – Some artifices.

UNIT –IV FRICTION (15 HRS.)

Introduction – Experimental results – Statical, dynamical and limiting friction – Laws of friction – Friction a passive force – Coefficient of friction – Angle of friction – Cone of friction –Numerical values(Self Study) – Equilibrium of particle on a rough inclined plane – Equilibrium of body on a rough inclined plane under a force parallel to the plane – Equilibrium of body on a rough inclined plane under any force – problems on friction.

UNIT –V EQUILIBRIUM OF STRINGS (15 HRS.)

Uniform string under the action of gravity – Equation of the common catenary – Definitions – Tension at any point – Important formulae – Geometrical properties of the common catenary – Approximation to the shape of the catenary – The parabolic catenary – Suspension bridges.

TEXT BOOK:

1. Dr.M.K. Venkataraman, Statics, Agasthiar Publications-2007.
   UNIT I : Chapters I & II
   UNIT II : Chapters III
   UNIT III: Chapter IV& V
   UNIT IV: Chapter VII

UNIT V : Chapter XI

REFERENCES:

1. P. Duraipandian and Lakshmi Duraipandian - Mechanics, S. Chand & Co., Fourth edition, Reprint 2003.
2. M.L. Khanna - Statics, Fourth edition, South Asian Books, 1900.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**INTRODUCTION & FORCES ACTING AT A POINT**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.1	Introduction, Resultant and components: Definition, Simple cases of finding the resultant	2	Chalk & Talk	Black Board
1.2	Parallelogram of Forces, Analytical expression for the resultant of two forces acting at a point.	2	Chalk & Talk	Black Board
1.3	Triangle of forces, Perpendicular Triangle of Forces, Converse of the triangle of forces, The polygon of Forces and related problems.	4	Chalk & Talk	Black Board
1.4	Lami's Theorem and related problems.	2	Chalk & Talk	Black Board
1.5	An extended form of the parallelogram law of forces: Theorem – Resolution of forces and related problems.	1	Chalk & Talk	Black Board
1.6	Components of a force along two given directions – Theorem on Resolved parts and related problems	1	Chalk & Talk	Black Board
1.7	Resultant of any number of forces acting at a point: Graphical method - Resultant of any number of coplanar forces acting at a point: Analytical method and related problems	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.8	Condition of equilibrium of any number of forces acting up on a particle and related problems	1	Chalk & Talk	Black Board
UNIT -2	**PARALLEL FORCES AND MOMENTS**			
2.1	The resultant of two like parallel forces acting on a rigid body and related problems.	3	Chalk & Talk	Black Board
2.2	The resultant of two unlike and unparallel forces acting on a rigid body and related problems.	2	Chalk & Talk	Black Board
2.3	Resultant of a number of parallel forces acting on a rigid body and related problems.	3	Chalk & Talk	Black Board
2.4	Condition of equilibrium of three coplanar parallel forces Centre of two parallel forces and related problems.	3	Chalk & Talk	Black Board
2.5	Moment of a force, Physical signification of the moment of a force Geometrical representation of a moment, Sign of the moment, Unit of moment, Varigon's theorem of moments, Generalized theorems of moments, Moment of a force about an axis and related problems.	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3	**COUPLES AND EQUILIBRIUM OF THREE FORCES ACTING ON A RIGID BODY**			
3.1	Couples- Definition, Equilibrium of two couples, Equivalence of two couples and related problems.	3	Chalk & Talk	Black Board
3.2	Couples in parallel planes – Representation of a couple by a vector – Resultant of coplanar couples, resultant of a couple and a force and related problems.	5	Chalk & Talk	Black Board
3.3	Rigid body subjected to any three forces, Three coplanar forces, Conditions of equilibrium Procedure Two trigonometrically theorem Some artifices and related problems.	7	Chalk & Talk	Black Board
UNIT -4	**FRICTION**			
4.1	Experimental results, Statical, dynamical and limiting friction, Laws of friction Friction a passive form, Coefficient of friction, Angle of friction, Cone of friction, Numerical values(self study)	7	Discussion	Black Board
4.2	Equilibrium of particle on a rough inclined plane, Equilibrium of body on a rough inclined plane under a force parallel to the	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	plane.			
4.3	Equilibrium of body on a rough inclined plane under any force problems on friction.	6	Chalk & Talk	Black Board
UNIT -5 EQUILIBRIUM OF STRINGS				
5.1	Uniform string under the action of gravity, Equation of the common catenary and related problems.	4	Chalk & Talk	Black Board
5.2	Definitions, Tension at any point, Important formulae, Geometrical properties of the common catenary and related problems.	6	Chalk & Talk	Black Board
5.3	Approximation to the shape of the catenary, The parabolic catenary, Suspension bridges and related problems.	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT				
	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	

K1	**2**	**2**	**-**	**-**	**-**	**4**	-	**4**	10 %
K2	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**	22.5 %
K3	**3**	**3**	**-**	**-**	**5**	**11**	-	**11**	27.5 %
K4	**3**	**3**	**-**	**5**	**-**	**11**	-	**11**	27.5 %
Non Scholastic	**-**	**-**	**-**	**-**	**-**		**5**	**5**	12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				**NON - SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S	PSOs ADDRESSED

		TAXONOMY)	
CO 1	Explain the concept of the forces and static equilibrium conditions.	K1	PSO1& PSO2
CO 2	Describe the perception of parallel forces and moments.	K1 & K2	PSO2
CO 3	Classify a thorough force analysis of rigid bodies and simple structures in equilibrium.	K1 & K3	PSO5
CO 4	Illustrate and give examples ofcouplesand equilibrium of three forces acting on a rigid body.	K1, K2 & K3	PSO3 &PSO4
CO 5	Solve problems related to friction forces in various applications.Summarize the concept of equilibrium of strings to prepare and demonstrate the models.	K2 & K4	PSO2& PSO4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	3	2	2	2
CO3	2	2	2	2	3

CO4	2	2	3	3	2
CO5	2	3	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	2	2	3
CO3	2	3	2	2
CO4	2	2	2	3
CO5	3	3	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs.M.Teresa Nirmala**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS

UAMA	**19M5CC11**	**LINEAR PROGRAMMING**	**Lecture**	**5**	**4**

COURSE DESCRIPTION

The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modeled by objective function and linear constraints.

COURSE OBJECTIVES

To enable the students to convert real life problems into a Mathematical problem and to solve them using different techniques like graphical method, simplex method, Big–M method, Two-phase method and dual simplex method. Also to solve problems in transportation, assignment and game theory.

UNIT –I MATHEMATICAL FORMULATION OF LPP (15 HRS)

Mathematical Formulation – Classification - Graphical Solutions of LPP- Simple examples of LPP - Slack and Surplus variables - Standard form of LPP.

UNIT –II SOLUTIONS OF LPP (15 HRS)

Definition of objective function - Linear and Non-negative Constraints - Feasible Solution - Basic Feasible Solution - Optimum Basic Feasible Solution - Degenerate solution - Evaluation and Net Evaluation - Unbounded Solutions and conditions for Optimality of a Feasible Solution in terms of net Evaluations (no proof) - Pivotal element - Computational procedure of the simplex method - Tie for entering basis vector and leaving basis vector-Solution using artificial variables.Charne's method of penalities and Two Phase Simplex method - Restricted and unrestricted variables - **Inverse of a matrix using Simplex method (Self Study)**.

UNIT –III DUALITY IN LINEAR PROGRAMMING (15 HRS)

Introduction – General Primal-Dual pair-Formulating a Dual Problem, Primal-Dual pair in matrix form, Duality theorems – Complementary Slackness theorems- Duality and Simplex method- Dual Simplex method .

UNIT –IV TRANSPORTATION & ASSIGNMENT PROBLEM (15 HRS)

Mathematical formulation - existence of feasible solution - **Feasible solution by North West Corner rule** - **Matrix Minima method (self study)** - Vogel's Approximation method -Optimal solution to a TP by modified distribution method - Degeneracy in TP-Unbalanced TP.Mathematical formulation - Assignment algorithm rule for finding optimal assignment - Unbalanced AP - Travelling salesman problem as an AP.

UNIT –V GAMES AND STRATEGIES (15HRS.)

Introduction – Two person zero sum games – Some basic terms - The maximin-minimax principle(self study) – Games without saddle points – mixed strategies – Graphical solution of 2 x n and m x 2 games – Dominance property – Arithmetic method for n x n game – General solution of m x n rectangular games.

TEXT BOOK:

1. Kanti Swarup, P.K.Gupta, Man Mohan ,*Operations Research*, Sultan Chand and Sons, New Delhi - 11th Edition, 2003.

   UNIT I : Chapters II & III

   UNIT II : Chapters IV (sec. 4.1 - 4.7)

   UNIT III : Chapter V

   UNIT IV : Chapter X (Sec. 10.1 – 10.15) & Chapter XI

   UNIT V : Chapter XVII (17.1 – 17.9)

REFERENCES:

1. P.K.Gupta, Man Mohan ,*Problems in Operations Research*, Sultan Chand and sons, New Delhi - 11th Edition, 2007.
2. Prem Kumar Gupta & D. S. Hira, *Operations Research,* S. Chand and Company, Ram Nagar, New Delhi, Edition 2007

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**MATHEMATICAL FORMULATION OF LPP**			
1.1	Mathematical Formulation of LPP- Introduction.	1	Chalk & Talk	Black Board
1.2	Related Problems.	4	Chalk & Talk	Black Board
1.3	Graphical solution - Related problems problems.	4	Chalk & Talk	Black Board
1.4	General LPP - Definition, slack, surplus, standardcanonical form, problems.	6	Chalk & Talk	Black Board
UNIT -2	**SOLUTIONS OF LPP**			
2.1	Definition of objective function, Linear and Non-negative Constraints, Feasible Solution, Basic Feasible Solution, Optimum Basic Feasible Solution, relevant problems.	2	Chalk & Talk	Black Board
2.2	Degenerate solution, Evaluation and Net Evaluation, Unbounded Solutions and conditions for Optimality of a Feasible Solution in terms of net Evaluations.	3	Chalk & Talk	Black Board
2.3	Pivotal element,	3	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Computational procedure of the simplex method, Tie for entering basis vector and leaving basis vector, problems.		Talk	Board
2.4	Solution using artificial variables. Charne's method of penalities, problems.	3	Chalk & Talk	Black Board
2.5	Two Phase Simplex method - Restricted and unrestricted variables, problems.	2	Chalk & Talk	Black Board
2.6	Inverse of a matrix using Simplex method (Self Study).	2	Chalk & Talk Discussion	Black Board
UNIT -3	**DUALITY IN LINEAR PROGRAMMING**			
3.1	General Primal-Dual pair-Formulating a Dual Problem, related Problems	3	Chalk & Talk	Black Board
3.2	Primal-Dual pair in matrix form, Duality theorems, Complementary Slackness theorem,	3	Chalk &Talk	Black Board
3.3	Duality and Simplex method, related problems	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.4	Dual Simplex method, problems.	4	Chalk & Talk	Black Board
UNIT -4	**TRANSPORTATION & ASSIGNMENT PROBLEM**			
4.1	Mathematical formulation, existence of feasible solution	1	Chalk & Talk	Black Board
4.2	Feasible solution by North West Corner rule and Matrix Minima method (self study)	2	Chalk & Talk Discussion	Black Board
4.3	Vogel's Approximation method, problems.	3	Chalk & Talk	Black Board
4.4	Optimal solution to a TP by modified distribution method, problems	3	Chalk & Talk	Black Board
4.5	Degeneracy in TP, Unbalanced TP problems.	2	Chalk & Talk	Black Board
4.6	Mathematical formulation, Assignment algorithm rule for finding optimal assignment, Unbalanced AP, Travelling salesman problem as an AP, problems.	4	Chalk & Talk	Black Board
UNIT -5	**GAMES AND STRATEGIES**			
5.1	Introduction, Two person zero sum games, Some basic	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	terms, The maximin-minimax principle, problems.(Self Study)		Discussio n	
5.2	Games without saddle points, mixed strategies, Graphical solution of 2 x n and m x 2 games, problems.	4	Chalk & Talk	Black Board
5.3	Dominance property, problems.	3	Chalk & Talk	Black Board
5.4	Arithmetic method for n x n game, problems.	2	Chalk & Talk	Black Board
5.5	General solution of m x n rectangular games, problems.	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT				

	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL	PSOs ADDRESSED

		(ACCORDING TO REVISED BLOOM'S TAXONOMY)	
CO 1	Formulate linear programming problems and solve by graphical method	K1	PSO1& PSO2
CO 2	Classify simplex, two phase and Big - M method to solve linear programming problems	K1 & K2	PSO4
CO 3	Illustrate Duality in Linear programming	K1 & K3	PSO5
CO 4	Recognize and formulate transportation, assignment problems and find the optimal solution	K1, K2 & K3	PSO2& PSO4
CO 5	Define two person zero sum game, saddle point and solve problems.	K2 & K4	PSO1& PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	2	3	2
CO3	2	2	2	2	3
CO4	2	3	2	3	2

CO5	3	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	3	2
CO2	2	3	2	2
CO3	2	2	2	3
CO4	2	2	3	2
CO5	3	2	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. A. Jenovi Rosary Deepa**
2. **Ms. J. Annaal Mercy**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Nam

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

Employability-40%

Skill Development-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M5CC12	GRAPH THEORY	Lecture	5	4

COURSE DESCRIPTION

This course is designed to introduce the students the basics of graph theory.

COURSE OBJECTIVES

Enable the students to have knowledge on graphs, sub graphs, Eulerian and Hamiltonian graphs, trees, planar graphs and coloring.

UNIT –I GRAPHS AND SUBGRAPHS (15 HRS.)

Definition and Examples – Degrees – Subgraphs – Isomorphism – Ramsey Numbers – Independent Sets and Coverings – Intersection Graphs - **Line Graphs** – **Matrices (Self-Study)** – Operations on Graphs.

UNIT –II DEGREE SEQUENCES AND CONNECTEDNESS (15 HRS.)

Degree Sequences – Graphic Sequences – Walks, Trails and Paths – Connectedness and Components – **Blocks (Self-Study)** – Connectivity.

UNIT –III EULERIAN AND HAMILTONIAN GRAPHS (15 HRS.)

Eulerian Graphs – Hamiltonian Graphs.

UNIT –IV TREES AND MATCHINGS (15 HRS.)

Characterization of Trees – **Centre of a Tree (Self-Study)** – Matchings – Matchings in Bipartite Graphs .

UNIT –V PLANARITY AND COLOURABILITY (15 HRS.)

Definition and Properties – Characterization of Planar Graphs – **Thickness, Crossing and Outer Planarity (Self-Study)** – Chromatic Number and Chromatic Index – The Five Colour Theorem.

TEXT BOOK:

1. Arumugam S and Ramachandran S, Invitation to Graph Theory – Scitech

Publications (India) Pvt. Ltd, 2012.

UNIT I : Chapters: 2

UNIT II : Chapters: 3, 4

UNIT III : Chapter: 5

UNIT IV : Chapters: 6, 7

UNIT V : Chapter: 8, 9.1 & 9.2

REFERENCES:

1. Choudum S A, A first Course in Graph Theory, MACMILLAN INDIA LIMITED, Chennai, First Edition, 1987.
2. Harary, Graph Theory , Narosa Publishing House, 2001.
3. Kumaravelu S and Susheela Kumaravelu,Graph Theory , First Edition, 1999.
4. Chartrand & Pinzang ,Introduction to graph Theory, Tata Mcgraw-Hill Publishing Company Limited , Edition 2006.
5. John Clark, A first look at Graph Theory, Affliated to East West Press, Pvt Ltd 1995.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 1 GRAPHS AND SUBGRAPHS				
1.1	Definition and Examples – Degrees	1	Chalk & Talk	Black Board
1.2	Subgraphs	2	Chalk & Talk	Black Board
1.3	Isomorphism	2	Chalk & Talk	Black Board
1.4	Ramsey Numbers	2	Chalk & Talk	Black Board
1.5	Independent Sets and Coverings	3	Chalk & Talk	Black Board
1.6	Intersection Graphs	2	Chalk & Talk	Black Board
1.7	Line Graphs , Matrices	**1**	Discussion, Seminar	Black Board
1.8	Operations on Graphs	2	Chalk & Talk	Black Board
UNIT - 2 DEGREE SEQUENCES AND CONNECTEDNESS				
2.1	Degree Sequences	1	Chalk & Talk	Black Board
2.2	Graphic Sequences	3	Chalk & Talk	Black Board
2.3	Walks, Trails and Paths	3	Chalk & Talk	Black Board
2.4	Connectedness and Components	3	Chalk & Talk	Black Board
2.5	Blocks	**3**	Discussion, Seminar	Black Board
2.6	Connectivity	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 3 EULERIAN AND HAMILTONIAN GRAPHS				
3.1	Eulerian Graphs	8	Chalk & Talk	Black Board
3.2	Hamiltonian Graphs	7	Chalk & Talk	Black Board
UNIT - 4 TREES AND MATCHINGS				
4.1	Characterization of Trees	4	Chalk & Talk	Black Board
4.2	Centre of a Tree	**2**	Discussion, Seminar	Black Board
4.3	Matchings	5	Chalk & Talk	Black Board
4.4	Matchings in Bipartite Graphs	4	Chalk & Talk	Black Board
UNIT - 5 PLANARITY AND COLOURABILITY				
5.1	Definition and Properties Characterization of Planar Graphs	7	Chalk & Talk	Black Board
5.2	Thickness, Crossing and Outer Planarity	**1**	Discussion, Seminar	Black Board
5.3	Chromatic Number and Chromatic Index	5	Chalk & Talk	Black Board
5.4	The Five Colour Theorem	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED	PSOs ADDRESSED

		BLOOM'S TAXONOMY)	
CO 1	Define graphs and operations on graphs.	K1& K2	PSO 1
CO 2	Summarize and understand various techniques in proving theorems on connectedness.	K4	PSO 3
CO 3	Create examples and counter examples to illustrate Eulerian and Hamiltonian graphs with examples.	K2	PSO 2
CO 4	List out the characterization of trees and construct various matchings for a graph.	K3	PSO 5
CO 5	Solve problems involving planarity and colourability.	K3	PSO 4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	3	2	2	2
CO4	2	2	2	2	3
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4

CO1	3	2	2	2
CO2	2	2	2	3
CO3	2	2	2	3
CO4	2	2	3	2
CO5	3	3	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. Nigila Ragavan**
2. **Mrs. R. Jenovi Rosary Deepa**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. Mathematics

SEMESTER –V

For those who joined in 2023 onwards

Employability-40%

Skill Development-40%

Entrepreneurship-20%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M5ME1	NUMERICAL METHODS	UG-Elective	5	5

COURSE DESCRIPTION

This course enables the students to solve equations using various Numerical Methods.

COURSE OBJECTIVE

To enable the students to solve Algebraic, Transcendental, Differential Equations using various Numerical methods like Bisection, Runge-Kutta, Euler and Taylor.

UNIT I: ALGEBRAIC AND TRANSCENDENTAL EQUATIONS [15 HRS]

Introduction - Bisection method - Iteration method – Regula-falsi method – Newton-Raphson method. (No derivations).

UNIT II: SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS [15 HRS]

Introduction- – Gauss Elimination method – Gauss Jordan method – Calculation of inverse of a matrix – Gauss Jacobi Iteration method – Gauss-Seidel iteration method.(No derivations).

UNIT III: FINITE DIFFERENCES & INTERPOLATION [15 HRS]

Difference operators – Other difference operators- Relation between the operators -Newton's forward Interpolation formula- Newton's backward Interpolation formula – Gauss forward Interpolation formula - Gauss backward Interpolation formula - Lagrange's interpolation formula – Divided difference – Newton's Divided difference formula – Inverse interpolation. (No derivations).

UNIT IV: NUMERICAL DIFFERENTIATION AND INTEGRATION [15 HRS]

Derivatives using Newton's forward difference formula- Derivatives using Newton's backward difference formula- Derivatives using Central difference formula-Maxima and minima of the interpolating polynomial- Numerical Integration – Trapezoidal Rule – Simpson's one third rule. (No derivations).

UNIT V: NUMERICAL SOLUTION OF DIFFERENTIAL EQUATION [15 HRS]

Taylor series method – Picard's method – Euler's method – Modified Euler's method-Runge -Kutta methods –Second order Runge-Kutta method-Higher order Runge-Kutta method.

TEXT BOOK:

Dr. M.K. Venkataraman, *Numerical Methods in Science and Engineering*, The National publishing company, fifth edition.

Unit I : Chapter III -Sections 1 to 5

Unit II: Chapter IV- Sections 1,2,3,6

Unit III: Chapter V-Sections 1 to 12, 14 to 18

Chapter VI - Sections 1 to 5.

Chapter VII-Sections 1 to 5.

Chapter VIII - Sections 1 to 5

Unit IV: Chapter IX- Sections 1 to 8, 10

Unit V : Chapter XI-Sections 6,9,10,12,13,14,16.

REFERENCE BOOKS:

1) S. Arumugam, S. Thangapandi Isaac and A. Soma Sundaram, *Numerical Analysis*, New Gamma Publishing House 2007.

2) S.S.Sastry, *Introductory methods of Numerical analysis*, Prentice Hall of India Private Limited 1991.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve algebraic and transcendental equations using various methods.	K2 ,K3	PSO1
CO 2	Identify the various methods of solving simultaneous linear algebraic equations.	K2, K3	PSO3
CO 3	Recognize difference operators and apply the concept of interpolation.	K4	PSO5
CO 4	Compute the values of the derivatives at some point using numerical differentiation and integration.	K2, K5	PSO2
CO 5	Solve problems on higher order differential equations using Euler's, Runge- kutta and Predictor- Corrector methods.	K2	PSO4

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

EVALUATION PATTERN

UG CIA Components

					Nos			
	SCHOLASTIC				**NON – SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4

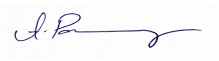
CO1	2	2	2	3
CO2	3	2	2	2
CO3	2	3	2	2
CO4	2	2	2	3
CO5	2	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Forwarded By



(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. Mathematics

SEMESTER –V

For those who joined in 2023 onwards

Employability-20%

Skill Development-40%

Entrepreneurship-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	23M5ME2	VECTOR CALCULUS AND FOURIER TRANSFORMS	UG-Elective	5	5

COURSE DESCRIPTION

This course emphasizes the fundamental concepts of vector calculus and Fourier transforms.

COURSE OBJECTIVE

To enable the students to learn the concepts of differentiation of vectors, line and surface integrals, applications of Green, Gauss and Stokes theorems and Fourier transform.

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UNIT I: DIFFERENTIATION OF VECTORS **[15 HRS]**

Differentiation of vectors – Gradient – geometrical interpretation of gradient Directional derivative.

UNIT II: DIVERGENCE AND CURL **[15 HRS]**

Divergence and Curl – solenoidal and irrotational vectors.

UNIT III: LINE AND SURFACE INTEGRALS **[15 HRS]**

Line integrals – Surface integrals – Theorems of Green, Gauss and Stokes.

UNIT IV: FOURIER TRANSFORMS - FINITE TRANSFORM **[15 HRS]**

Introduction - Fourier transforms - Fourier cosine transform - Fourier sine transform Alternative form of Fourier complex integral formula - Relationship between Fourier transform and Laplace transform.

UNIT V: PROPERTIES OF FOURIER AND FINITE TRANSFORM **[15 HRS]**

Linear property - Shifting property - Modulation theorem - Conjugate symmetry property - Transform of derivatives – Derivatives of the transform-Convolution theorem - Parsevel's identity (without proof).

TEXT BOOKS:

1. Arumugam & Issac - Analytical Geometry 3D, Vector calculus & Trigonometry –New Gamma Publishing House, January 2006.

   UNIT I: Chapter 5: Sections – 5.0 - 5.3

UNIT II: Chapter 5: Section – 5.4

UNIT III: Chapter 7: Sections – 7.0 - 7.3

2. T. Veerarajan - Engineering Mathematics III Edition - Tata Mcgrew- Hill publishing Company Limited, New Delhi.

UNIT IV: Chapter 6: Sections - 6.1 - 6.5, 6.7(Example 1 – 7)

UNIT V: Chapter 6: Sections - 6.6, 6.7 (Finite Fourier Transforms of derivatives, Examples 8, 9, 10)

REFERENCE BOOKS:

1. S. Narayanan & T. K. Manicavachagam Pillay - Vector algebra & Analysis – South India Saiva Siddanta Works Publishing Society – Fourth Edition – 1986.
2. Goyal & Gupta - Integral Transforms – Pragati Prakashan, Meerut, 1987.

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the concept of differentiation of vectors	K2 ,K3	PSO1
CO 2	Compute divergence and curl of vectors.	K2, K3	PSO3
CO 3	Solve problems on line and surface integrals	K4	PSO5
CO 4	Compute Fourier sine and cosine transforms.	K2, K5	PSO2
CO 5	Describe the properties of Fourier transforms.	K2	PSO4

CIA	
Scholastic	**35**
Non Scholastic	**5**

	40

EVALUATION PATTERN

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks

	SCHOLASTIC				NON – SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	3	2	2	2
CO3	2	3	2	2
CO4	2	2	2	3
CO5	2	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

Employability-40%

Skill Development-40%

Entrepreneurship-20%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M5SB3	DATA INTERPRETATION AND ANALYTICAL APTITUDE	Lecture	2	2

COURSE DESCRIPTION

This course helps the students to prepare for competitive examinations.

COURSE OBJECTIVES

To ensure that students learn to think critically about mathematical models for relationships between different quantities and to solve problems.

UNIT –I DATA INTERPRETATION (6 HRS.)

Tabulation, Bar Graphs, Pie Charts, Line Graphs

UNIT –II ANALOGY (6 HRS.)

Common Relationships, Completing the analogous pair, Direct/simple Analogy, Choosing the Analogous pair, Number Analogy.

UNIT –III CODING AND DECODING (6 HRS.)

Letter coding, Direct letter coding, Number/Symbol coding, Deciphering number and symbol codes for messages.

UNIT –IV DIRECTION SENSE & LOGICAL VENN DIAGRAMS (6 HRS.)

Direction sense & **Logical Venn Diagrams (Self Study)**

UNIT –V INSERTING THE MISSING CHARACTER AND MATHEMATICAL OPERATIONS (6 HRS.)

Inserting the missing Character and Mathematical operations

TEXT BOOK:

3. Dr.R.S.Aggarwal, Quantitative Aptitude, S.Chand & Company Ltd, New Delhi.

   UNIT I: Section II

4. Dr.R.S.Aggarwal, A Modern Approach to Verbal & Non- Verbal Reasoning, S.Chand & Company Ltd, New Delhi.

   UNIT II : Part- I-section I- chapter 2

   UNIT III: Part- I-section I- chapter 4

   UNIT IV: Part- I-section I- Chapter 8 (Page No.416- 421) & Chapter 9 (Ex-9A, 9B)

   UNIT V: Part- I-section I- Chapter 16 (Page No.628- 638) & Chapter 13 (Page No.569 - 578)

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**DATA INTERPRETATION**			
1.1	Tabulation – problems	2	Chalk & Talk	Black Board
1.2	Bar Graphs – problems	2	Chalk & Talk	Black Board
1.3	Pie Charts – problems	1	Chalk & Talk	Black Board
1.4	Line Graphs – problems	1	Chalk & Talk	Black Board
UNIT -2	**ANALOG**			
2.1	Common Relationship-problems	2	Chalk & Talk	Black Board
2.2	Completing the analogous pair, Direct/simple Analog-problems	2	Chalk & Talk	Black Board
2.3	Choosing the Analogous pair-problems	1	Chalk & Talk	Black Board
2.4	Number Analog - problems.	1	Chalk & Talk	Black Board
UNIT -3	**CODING AND DECODING**			
3.1	Letter coding, Direct letter coding - problems.	2	Chalk & Talk	Black Board
3.2	Number/Symbol coding - problems.	2	Chalk & Talk	Black Board
3.3	Deciphering number and symbol codes for messages - problems.	2	Chalk & Talk	Black Board
UNIT -4	**DIRECTION SENSE & LOGICAL VENN DIAGRAM**			
4.1	Direction sense – problems.	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	Logical Venn Diagram	3	Discussion	Black Board
UNIT -5 INSERTING THE MISSING CHARACTER AND MATHEMATICAL OPERATIONS				
5.1	Inserting the missing Character – problems.	3	Chalk & Talk	Black Board
5.2	Inserting the Mathematical operations – problems.	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total

10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve problems on Data Interpretation	K1	PSO1& PSO2
CO 2	Identify Analogy	K1, K2	PSO2& PSO3
CO 3	Classify coding and Decoding	K1 & K3	PSO5
CO 4	Solving Problems using ven diagram	K1, K2, K3	PSO4
CO 5	Identify missing numbers and character	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	3	3	2	2
CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4

CO1	3	3	2	2
CO2	2	3	2	2
CO3	2	3	2	2
CO4	3	3	2	2
CO5	2	3	2	2

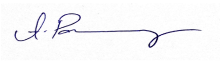
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. V. Vanitha**

Forwarded By



(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	19M5SB4	CRYPTOGRAPHY	Lecture	2	2

COURSE DESCRIPTION

This course provides important tools for ensuring the privacy, authenticity and integrity of the sensitive information involved in modern digital systems.

COURSE OBJECTIVES

To enable the students understand the fundamentals of Cryptography and to acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.

UNIT –I CLASSICAL ENCRYPTION TECHNIQUES (6 HRS.)

Symmetric Cipher Model: Cryptography – Cryptanalysis and Brute-Force Attack.

UNIT –II SUBSTITUTION TECHNIQUES (6 HRS.)

Caesar Cipher – Monoalphabetic Ciphers – **Playfair Cipher** – **Hill Cipher** – Polyalphabetic Ciphers – One-time Pad.

UNIT –III TECHNIQUES AND STEGANOGRAPHY (6 HRS.)

Transposition Techniques – Rotor Machines – Steganography

UNIT –IV BLOCK CIPHERS (6 HRS.)

Traditional Block Cipher Structure: Stream Ciphers and Block Ciphers-Motivation for the Feistal Cipher Structure – The Feistel Cipher.

UNIT –V DATA ENCRYPTION STANDARD (6 HRS.)

The Data Encryption Standard: DES Encryption –The Strength of DES – Block Cipher Design Principles.

TEXT BOOK:

1. W. Stallings, *Cryptography and Network Security Principles and Practices*, 6 th Edition, Pearson Publications, 2014.

   UNIT I : Chapter 1: 7-13

   UNIT II : Chapter 1: 14-28

   UNIT III : Chapter 1: 29-34

   UNIT IV : Chapter 2: 41-52

   UNIT V : Chapter 2: 52-60

REFERENCES:

1. Bruce Schneier, *Applied Cryptography*, John Wilsey & Sons, Inc.,2001
2. C.Pfleeger and S.L. Pfleeger, *Security in Computing*, 3 rd Editon, Prentice-Hall of India 2007.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 CLASSICAL ENCRYPTION TECHNIQUES				
1.1	Symmetric Cipher Model: Cryptography	2	Chalk & Talk	Black Board
1.2	Cryptanalysis	2	Chalk & Talk	Black Board
1.3	Brute-Force Attack	2	Chalk & Talk	Black Board
UNIT -2 SUBSTITUTION TECHNIQUE				
2.1	Caesar Cipher , Monoalphabetic Ciphers.	2	Chalk & Talk	Black Board
2.2	Playfair Cipher – Hill Cipher (self study)	2	Discussion	Black Board
2.3	Polyalphabetic Ciphers, One-time Pad.	2	Chalk & Talk	Black Board
UNIT -3 TECHNIQUES AND STEGANOGRAPHY				
3.1	Transposition Technique	2	Chalk & Talk	Black Board
3.2	Rotor Machine	2	Chalk & Talk	Black Board
3.3	Steganograph	2	Chalk & Talk	Black Board
UNIT -4 BLOCK CIPHER				
4.1	Traditional Block Cipher Structure: Stream Cipher and Block Cipher	3	Chalk & Talk	Black Board
4.2	Motivation for the Feistal Cipher Structure , The Feistel Cipher.	3	Chalk & Talk	Black Board
UNIT -5 DATA ENCRYPTION STANDARD				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	The Data Encryption Standard: DES Encryption The Strength of DE	3	Chalk & Talk	Black Board
5.2	Block Cipher Design Principle	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the fundamentals of cryptography	K1	PSO1& PSO2
CO 2	Describe Security Services	K1, K2	PSO4
CO 3	Explain Symmetric Cipher Model	K1 & K3	PSO5
CO 4	Discuss Block Ciphers	K1, K2, K3	PSO2& PSO3
CO 5	Explain Block Cipher Design Principles	K2 & K4	PSO4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5

CO1	3	3	2	2	2
CO2	2	2	2	3	2
CO3	2	2	2	2	3
CO4	2	3	3	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	2	2	3
CO3	2	2	2	3
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. A. Sheela Roselin**
2. **Dr. E. Helena**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6CC13	COMPLEX ANALYSIS	Lecture	5	4

COURSE DESCRIPTION

This course provides various concepts in complex analysis of one variable

COURSE OBJECTIVES

Enable the students to learn complex number system, Analytic functions, conformal mapping, Taylor and Laurent Series expansions, Complex integration which can be applied in almost every branch of Mathematics.

UNITS

UNIT –I ANALYTIC FUNCTIONS (15 HRS.)

Introduction - Functions of a complex variable – Limits – Theorems on limit – Continuous functions – Differentiability - The Cauchy – Riemann equations – Analytic functions – Harmonic functions – Conformal mapping.

UNIT –II BILINEAR TRANSFORMATIONS (15 HRS.)

Introduction– Elementary transformations – **Bilinear transformations – Cross ratio (self study)** – Fixed points of bilinear transformations.

UNIT – III COMPLEX INTEGRATION (15 HRS.)

Definite integral – Cauchy's theorem – Cauchy's integral formula - Higher derivatives.

UNIT –IV EXPANSION OF SERIES (15 HRS.)

Introduction - Taylor's series – **Laurent's series (self study)**– Zeros of an analytic function – singularities.

UNIT –V CALCULUS OF RESIDUES (15 HRS.)

Introduction – Residues – Cauchy's residue theorem – Evaluation of definite

integrals.

TEXT BOOK:

1. S.Arumugam, A. Thangapandi Isaac & A.Somasundaram, *Complex Analysis*, SciTech Publications (India) Pvt.Ltd-2009.

   UNIT-I : Chapter: 2-sections 2.0 to 2.9

   UNIT-II : Chapter 3-sections 3.0 to 3.4

   UNIT-III: Chapter: 6-sections 6.1 to 6.4

   UNIT-IV: Chapter: 7-sections 7.0 to 7.4

   UNIT-V : Chapter 8-sections 8.0 to 8.3

REFERENCES:

1.T. K. Manicavachagam Pillay,Dr. S. P.Rajagopalan and Dr .S. Sattanathan- S.Viswanathan (Printers & Publishers),*Complex Analysis,*Pvt.Ltd., 2007.

2.P.Duraipandian, Laxmi Duraipandian& D. Muhilan, *Complex Analysis,*Emerald Publishers, 1986.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ANALYTIC FUNCTIONS				
1.1	Introduction, Functions of a complex variable, definitions and examples.	1	Chalk & Talk	Green Board
1.2	Limits, Theorems on limit Continuous functions, definitions, examples and theorems.	2	Chalk & Talk	Green Board
1.3	Differentiability, The Cauchy – Riemann equations, definitions, problems and theorems.	6	Chalk & Talk	Green Board
1.4	Analytic functions, Harmonic functions, definitions, problems and theorems.	4	Chalk & Talk	Green Board
1.5	Conformal mapping, definitions, example problems and theorems.	2	Chalk & Talk	Green Board
UNIT -2 BILINEAR TRANSFORMATIONS				
2.1	Introduction, Elementary	5	Chalk & Talk	Green

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	transformations, definitions and theorems.			Board
2.2	Bilinear transformations, Cross ratio	3	Discussion	Green Board
2.3	Fixed points of bilinear transformations, definitions, theorems and problems	7	Chalk & Talk	Green Board
UNIT -3 COMPLEX INTEGRATION				
3.1	Definite integral, definitions and problems.	5	Chalk & Talk	Green Board
3.2	Cauchy's theorem, Cauchy's integral formula, theorems and problems	6	Chalk & Talk	Green Board
3.3	Higher derivatives, theorems and problems.	4	Chalk & Talk	Green Board
UNIT -4 EXPANSION OF SERIES				
4.1	Taylor's series, theorems and problems	6	Chalk & Talk	Green Board
4.2	Laurent's series, theorems and problems	5	Discussion	Green Board
4.3	Zeros of an analytic function, singularities,	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	definitions, theorems and problems			
UNIT -5 CALCULUS OF RESIDUES				
5.1	Residues, Cauchy's residue theorem, theorems and problems.	9	Chalk & Talk	Green Board
5.2	Evaluation of definite integrals, problems.	6	Chalk & Talk	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	35
Non Scholastic	5
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the concept of bilinear transformations.	K1	PSO1
CO 2	Identify continuous, differentiable and analytic functions	K1, K2	PSO2
CO 3	Solve problems on complex integration	K1 & K3	PSO4
CO 4	Compute analytic functions in series form and classify singularities	K1, K2, K3	PSO4& PSO5
CO 5	Evaluate definite integrals using Residues.	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3

CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	2	2	2	3
CO3	2	3	2	2
CO4	3	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.E.Helena**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME	COURSE	COURSE	CATEGORY	HRS/	CREDITS

CODE	CODE	TITLE		WEEK	
UAMA	22M6CC14	DYNAMICS	Lecture	5	4

COURSE DESCRIPTION

This course will provide a sound knowledge of the concepts and principles in Dynamics.

COURSE OBJECTIVES

The aim of the course is to help the students to understand the behaviour of projectiles, collision of elastic bodies, Simple harmonic motion and its properties, motion under the action of central forces.

UNIT –I PROJECTILES (15 HRS.)

Definitions-Path of a Projectile-Characteristic of the motion of a Projectile – Velocity of the projectile in magnitude and direction- Range on an Inclined Plane– Motion on the surface of a smooth inclined plane - Enveloping parabola.

UNIT –II IMPULSIVE FORCES (10 HRS.)

Impulse-Impulsive forces-Impact of two bodies- -Loss of Kinetic Energy in impact - Motion of a Shot and Gun – Impact of water on a surface.

UNIT –III COLLISION OF ELASTIC BODIES (15 HRS.)

Introduction-Definitions-Fundamental laws of impact-Impact of a Smooth Sphere on a Fixed Smooth Plane-Direct Impact of Two Smooth Spheres-Loss of kinetic energy due to direct impact of smooth spheres-oblique impact of two smooth spheres-Loss of kinetic energy due to oblique impact of two smooth spheres-Dissipation of energy due to impact- Compression and Restitution.

UNIT –IV MOTION UNDER THE ACTION OF CENTRAL FORCES

(20 HRS.)

Velocity and acceleration in polar coordinates-Equations of motion in polar

coordinates-Differential equation of the central orbit-Pedal Equation of some of the well known curves – Velocities in a central orbit – Apses and apsidal distances – **Law of the inverse square-Law of the inverse cube (Self Study)**.

UNIT –V MOMENT OF INERTIA (15 HRS.)

Definition-The Theorem of Parallel Axes- The Theorem of Perpendicular Axes Moment of Inertia in some particular cases- Dr. Routh's Rule –Equimomental systems.

TEXT BOOK:

1. Dr.M.K. Venkataraman, *A Text Book of Dynamics*, Agasthiar Publications-2007.

   UNIT I : Chapter 6

   UNIT II : Chapter 7

   UNIT III : Chapter 8

   UNIT IV : Chapter 11

   UNIT V : Chapter 12

REFERENCES:

1. P. Duraipandian & Lakshmi Duraipandian, *Mechanics*, S. Chand & Co., Fourth edition, Reprint 2003.
2. M.L. Khanna, *Dynamics of a rigid body*, Jai Prakash Nath & Co., Meerut, 1975.
3. Kaushal Kumar Singh, *A Text book of Dynamics*, Asoke K.Ghosh ,PHI Learning Private Limited-2011.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**PROJECTILES**			
1.1	Definitions-Path of a Projectile-Characteristic of the motion of a Projectile, Velocity of the projectile in magnitude and direction, theorems and problems.	6	Chalk & Talk	Black Board
1.2	Range on an Inclined Plane, Motion on the surface of a smooth inclined plane and related problems.	5	Chalk & Talk	Black Board
1.3	Enveloping parabola and related problems.	4	Chalk & Talk	Black Board
UNIT -2	**IMPULSIVE FORCES**			
2.1	Impulse, Impulsive forces, Impact of two bodies and problems.	3	Chalk & Talk	Black Board
2.2	Loss of Kinetic Energy in impact, derivations and problems.	2	Chalk & Talk	Black Board
2.3	Motion of a Shot and Gun- Problems	3	Chalk & Talk	Black Board
2.4	Impact of water on a surface- problems	2	Chalk & Talk	Black Board
UNIT -3	**COLLISION OF ELASTIC BODIES**			
3.1	Definitions, Fundamental laws of impact, Impact of a Smooth Sphere on a Fixed Smooth Plane and problems.	4	Chalk &Talk	Black Board
3.2	Direct Impact of Two	4	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Smooth Spheres, Loss of kinetic energy due to direct impact of smooth spheres, derivations and problems.		Talk	Board
3.3	oblique impact of two smooth spheres, Loss of kinetic energy due to oblique impact of two smooth spheres, derivations and problems.	4	Chalk & Talk	Black Board
3.4	Dissipation of energy due to impact, Compression and Restitution – problems.	3	Chalk & Talk	Black Board
UNIT -4	**SIMPLE HARMONIC MOTION**			
4.1	Simple harmonic motion in a straight line, General solution of the S.H.M. equation, derivations and problems.	3	Chalk & Talk	Black Board
4.2	Geometrical representation of a S.H.M., Change of origin, derivations and problems.	2	Chalk & Talk	Black Board
4.3	Composition of two Simple harmonic motions of the same period and in the same straight line, Composition of two simple harmonic motions of the same period in two perpendicular directions (self study)	2	Discussion	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.4	Simple pendulum-Period of oscillation of a simple pendulum, derivations and problems.	5	Chalk & Talk	Black Board
4.5	Equivalent simple pendulum, The seconds pendulum, derivations and problems.	3	Chalk & Talk	Black Board
UNIT -5	**MOTION UNDER THE ACTION OF CENTRAL FORCES**			
5.1	Velocity and acceleration in polar coordinates, Equations of motion in polar coordinates and derivations.	4	Chalk & Talk	Black Board
5.2	Differential equation of the central orbit Pedal Equation of some of the well known curves, Velocities in a central orbit, derivations and problems.	7	Chalk & Talk	Black Board
5.3	Apses and apsidal distances related problems.	4	Chalk & Talk	Black Board
5.4	Law of the inverse square, Law of the inverse cube, derivations and problems.(self study)	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment

	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assign ment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total

10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the behaviour related to projectiles.	K1	PSO1& PSO2
CO 2	Apply the laws and principles governing dynamics of the system in physical reality.	K2, K3	PSO2
CO 3	Describe the collision of elastic bodies.	K1 & K3	PSO4
CO 4	Explain Simple harmonic motion and its properties.	K1, K2, K3	PSO4&PSO5
CO 5	Explain the motion under the action of central forces.	K2 & K4	PSO4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	3	2	2	2
CO3	2	2	2	3	2

CO4	2	2	2	3	3
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	3	2	2	2
CO3	2	2	2	3
CO4	2	2	2	3
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. A. Paulin Mary**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS

UAMA	**19M6CC15**	**OPERATIONS RESEARCH**	**UG**	**5**	**4**

COURSE DESCRIPTION

This helps in solving problems in different environments that needs decisions.

COURSE OBJECTIVES

To aim at familiarizing the students with quantitative tools and techniques, which are frequently applied to business decision making and to provide a formal quantitative approach to problem solving.

UNITS

UNIT –I SEQUENCING PROBLEM (15 HRS.)

Introduction – problem of sequencing – Basic terms used in sequencing - Processing n jobs through two machines – Processing n jobs through k machines - Processing 2 jobs through k machines.

UNIT –II DECISION ANALYSIS (15 HRS.)

Introduction – decision making environment – decisions under uncertainity – the Laplace criterion – **the Maximin or Minimax criterion** – **the Maximax or Minimin criterion (self study)** – the Savage criterion – the Hurwicz criterion.

UNIT –III INVENTORY CONTROL (15 HRS.)

Introduction – Types of Inventories-Reasons for carrying inventories-The Inventory decisions – Cost associated with inventories – Factors affecting inventory control - Economic Order Quantity(EOQ) – Deterministic inventory problems with no shortages - Deterministic inventory problems with shortages . **(Only Problems, No derivation).**

UNIT –IV QUEUING THEORY (15 HRS.)

Introduction- Queuing system – Elements of Queuing system – Operating

characteristics of queuing system –Deterministic queuing system – Probability distributions in queuing systems – Classification of queuing models – Definition of transient and steady states – Poisson queuing systems –Model I (M/M/1): (∞ / FIFO) – Model II (M/M/I): (∞/SIRO) - Model III (M/M/1): (N/FIFO).

UNIT –V NETWORK SCHEDULING BY PERT/CPM (15 HRS.)

Introduction – Network and basic components – Logical sequencing – Rules of network construction – Critical path analysis – probability considerations in PERT.

TEXT BOOK:

1. Kanti Swarup, P.K Gupta and Man Mohan –-Operations Research - Sultan Chand & Sons - 2015

   UNIT I - Chapter 12: Sections 12.1 to 12.6

   UNIT II - Chapter 16: Sections 16.1, 16.4 & 16.5

   UNIT III - Chapter 19: Sections 19.1 to 19.4, 19.6, 19.7, 19.9-19.11.

   UNIT IV - Chapter 21: Sections 21.1 to 21.9 (Upto model III)

   UNIT V - Chapter 25:Sections 25.1 to 25.4, 25.6, 25.7

REFERENCES:

1. Prem Kumar Gupta and D.S Hira - Problems in Operations Research, Sultan Chand & Sons - 2007
2. P.K Gupta and Man Mohan - Problems in Operations Research, Sultan Chand & Sons - 2007

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**SEQUENCING PROBLEM**			
1.1	Introduction, problem	5	Chalk &	Green

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	of sequencing, Basic terms used in sequencing, Processing n jobs through two machines and related problems.		Talk	Board
1.2	Processing n jobs through k machines – problems.	4	Chalk & Talk	Green Board
1.3	Processing 2 jobs through k machines- Problems.	6	Chalk & Talk	Green Board
UNIT -2 DECISION ANALYSIS				
2.1	Introduction, decision making environment, decisions under uncertainity and related problems.	3	Chalk & Talk	Green Board
2.2	The Laplace criterion and related problems	2	Chalk & Talk	Green Board
2.3	The Maximin or Minimax criterion,	4	Discussion	Green Board
2.4	The Maximax or Minimin criterion	4	Discussion	Green Board
2.5	TheSavage criterion, the Hurwicz criterion and related problems.	2	Chalk & Talk	Green Board
UNIT -3 INVENTORY CONTROL				
3.1	Introduction, Types of Inventories, Reasons for carrying inventories, The Inventory decisions.	3	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.2	Cost associated with inventories – Factors affecting inventory control - Economic Order Quantity (EOQ)	2	Chalk & Talk	Green Board
3.3	Deterministic inventory problems with no shortages	5	Chalk & Talk	Green Board
3.4	Deterministic inventory problems with shortages	5	Chalk & Talk	Green Board
UNIT -4 QUEUEING THEORY				
4.1	Introduction, Queuing system, Elements of Queuing system, Operating characteristics of queuing system.	2	Chalk & Talk	Green Board
4.2	Deterministic queuing system, Probability distributions in queuing systems, Classification of queuing models, Definition of transient and steady states.	2	Chalk & Talk	Green Board
4.3	Poisson queuing systems, Model I (M/M/1): (∞ / FIFO)- derivations and problems.	6	Chalk & Talk	Green Board
4.4	Model II (M/M/I): (∞/SIRO), Model III (M/M/1): (N/FIFO)- derivations and problems.	5	Chalk & Talk	Green Board
UNIT -5 NETWORK SCHEDULING BY PERT/CPM				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	Introduction, Network and basic components, Logical sequencing, Rules of network construction	4	Chalk & Talk	Green Board
5.2	Critical path analysis- Problems.	6	Chalk & Talk	Green Board
5.3	probability considerations in PERT – problems.	5	Chalk & Talk	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT				

	10 Mks.	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL	PSOs ADDRESSED

		(ACCORDING TO REVISED BLOOM'S TAXONOMY)	
CO 1	Define sequencing problem and apply it to solve real life problems.	K1	PSO1& PSO5
CO 2	Solve problems in decision making.	K1, K2	PSO4
CO 3	Apply inventory control to solve practical problems.	K1 & K3	PSO5
CO 4	Classify queuing models.	K1, K2, K3	PSO3
CO 5	Explain CPM and PERT to plan schedule and control project activities.	K2 & K4	PSO4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	3

CO2	2	2	2	3	2
CO3	2	2	2	2	3
CO4	2	2	3	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	3	3	2	2
CO3	3	2	2	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:
1.Mrs.M.Teresa Nirmala

2.Dr.V.Vanitha

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6ME3	FUZZY MATHEMATICS	Lecture	5	5

COURSE DESCRIPTION

This course discusses the fundamentals of fuzzy set theory and fuzzy logic.

COURSE OBJECTIVES

To enable the students to understand the basic concepts of the theory of fuzzy sets, fuzzy logic, fuzzy operations, fuzzy relations and ordering.

UNIT –I FUZZY SETS AND FUZZY LOGIC (15 HRS.)

Introduction - Crisp Sets - The Notion of Fuzzy Sets - Basic concepts of Fuzzy Sets - Classical Logic - Fuzzy Logic.

UNIT –II OPERATIONS ON FUZZY SETS (15 HRS.)

Fuzzy Complement - Fuzzy Union - Fuzzy Intersection-Combinations of Operations - General Aggregation Operations.

UNIT –III FUZZY RELATIONS (15 HRS.)

Crisp and Fuzzy Relations - Binary Relations - Binary Relations on a Single set - Equivalence and Similarity Relations.

UNIT –IV FUZZY RELATION EQUATION (15 HRS.)

Compatibility or Tolerance Relations – Orderings – Morphisms – Fuzzy Relation Equations.

UNIT –V α – CUT PROPERTIES AND FUZZY NUMBERS (15 HRS.)

Additional properties of α – cuts, Fuzzy Numbers, Arithmetic Operations on Intervals, Arithmetic Operations on Fuzzy Numbers, Lattice of Fuzzy Numbers.

TEXT BOOKS:

1. George J. Klir and Tina A. Folger, *Fuzzy sets, Uncertainty and Information*, Prentice Hall of India, 2005.
2. George J. Klir /Bo Yuan, *Fuzzy sets and Fuzzy Logic, Theory and Applications* Prentice Hall of India, 2004.

UNIT I : Chapter: 1 (From Text Book 1)

UNIT II : Chapter: 2 (2.2 to 2.6) (From Text Book 1)

UNIT III : Chapter: 3 (3.1 to 3.4) (From Text Book 1)

UNIT IV : Chapter: 3 (3.5 to 3.8) (From Text Book 1)

UNIT V : Chapter:2(sec 2.1) & Chapter:4 (4.1, 4.3 to 4.5) (From Text Book 2)

REFERENCES:

1. Zimmermann, *Fuzzy Set Theory and its applications*, Affiliated East West Press Pvt Ltd, 2nd Edition 1996.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**FUZZY SETS AND FUZZY LOGIC**			
1.1	Introduction.	1	Chalk & Talk	Black Board
1.2	Crisp Sets , The Notion of Fuzzy Sets , Basic concepts of Fuzzy Sets , related theorems and problems.	5	Chalk & Talk	Black Board
1.3	Classical Logic, examples and problems.	4	Chalk & Talk	Black Board
1.4	Fuzzy Logic, theorems, examples and problems.	5	Chalk & Talk	Black Board
UNIT -2	**OPERATIONS ON FUZZY SETS**			
2.1	Fuzzy Complement, theorems and example problems.	3	Chalk & Talk	Black Board
2.2	**Fuzzy Union , Fuzzy Intersection, Combinations of Operations, theorems and example problems.(Self Study)**	5	Discussion	Black Board
2.3	General Aggregation Operations, theorems and example problems.	7	Chalk & Talk	Black Board
UNIT -3	**FUZZY RELATIONS**			
3.1	Crisp and Fuzzy Relations, theorems and example problems.	5	Chalk & Talk	Black Board
3.2	Binary Relations , Binary Relations on a Single set, theorems and example problems.	5	Chalk & Talk	Black Board
3.3	Equivalence and Similarity Relations, theorems and example problems.	5	Chalk & Talk	Black Board
UNIT -4	**FUZZY RELATION EQUATION**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.1	Compatibility or Tolerance Relations, related theorems and problems. Ordering related theorems and example problems.	6	Chalk & Talk	Black Board
4.2	Morphism theorems and example problems	4	Chalk & Talk	Black Board
4.3	Fuzzy Relation Equation theorems and example problems	5	Chalk & Talk	Black Board
UNIT -5	**$\alpha-$ CUT PROPERTIES AND FUZZY NUMBER**			
5.1	Additional properties of $\alpha-$ cuts, definitions, related theorems and example problems	3	Chalk & Talk	Black Board
5.2	Fuzzy Numbers, Arithmetic Operations on Intervals, theorems and examples	5	Chalk & Talk	Black Board
5.3	Arithmetic Operations on Fuzzy Numbers, theorems and examples	5	Chalk & Talk	Black Board
5.4	**Lattice of Fuzzy Numbers, theorems and examples (Self Study)**	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the difference between crisp set and fuzzy set theory.	K1	PSO1
CO 2	Identify the methods of fuzzy logic.	K1, K2	PSO5
CO 3	Recognize the operations on fuzzy sets and combination of fuzzy operations.	K1 & K3	PSO2
CO 4	Illustrate and give examples related to fuzzy relations.	K1, K2, K3	PSO4
CO 5	Build sufficient understanding of fuzzy numbers and $\alpha-$ cuts	K2 & K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	2
CO2	2	2	2	2	3
CO3	2	3	2	2	2
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	2	2	3
CO5	2	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. Sr. Fatima Mary**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS

SEMESTER –VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6ME4	THEORY OF NUMBERS	Lecture	5	5

COURSE DESCRIPTION

The students are introduced about the basic topics of Number Theory which includes Divisibility, Primes, Congruences, positive divisors, Fermat's and Wilson's theorem, Quadratic reciprocity.

COURSE OBJECTIVES

To present the students an introduction to an area of the pure Mathematics which has intrigued non professionals as well as the greatest minds of human kind since the dawn of history.

UNIT –I DIVISIBILITY THEORY (15 HRS.)

Divisibility of integers – Division Algorithm **- Greatest Common Divisor** – Euclidean Algorithm, Least Common Multiple.

UNIT –II PRIME AND COMPOSITE NUMBERS (15 HRS.)

Prime number – Composite number – Coprime – Twin Primes – Siamese Twin – The Sieve of Erastosthenes – Positional representation of an integer – Divisors of an integer – Arithmetic functions – Product of Divisors.

UNIT –III CONGRUENCES (15 HRS.)

Congruences –Residues – Residue Classes - Complete Residue System - Reduced Residue system – Divisibility Tests - Linear Congruence - Chinese Remainder Theorem .

UNIT –IV FERMAT'S THEOREM AND ITS APPLICATIONS (10 HRS.)

Introduction - Fermat's Theorem – Euler's Extension of Fermat's Theorem – nverse modulo m – Wilson's Theorem-Converse of Wilson's Theorem.

UNIT –V QUADRATIC RESIDUES (20 HRS.)

Quadratic Residues –Euler's Criterion- Legendre Symbols - Quadratic Reciprocity Law – Jacobi Symbol.

TEXT BOOK:

1. Kumaravelu , Susheela Kumaravelu ,First Edition, January 2002.

   UNIT I - Chapter 3

   UNIT II - Chapter 4 (Section 77 to 97)

   UNIT III- Chapter 6

   UNIT IV- Chapter 7 (Section 191 to 209)

   UNIT V- Chapter 10 (Section 255 to 286)

REFERENCES:

1. David.M.Burton, *Elementary Number Theory*, McGraw Hill Book Company, 7th Edition, 2006.
2. Pundir Pundir , *Theory of Numbers* ,A Pragathi Edition , 2006

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**DIVISIBILITY THEORY**			
1.1	Divisibility of integers, Division Algorithm, theorems and problems.	5	Chalk & Talk	Black Board
1.2	Greatest Common Divisor (self study).	3	Discussion	Black Board
1.3	Euclidean Algorithm, Least Common Multiple, theorems and problems.	7	Chalk & Talk	Black Board
UNIT -2	**PRIME AND COMPOSITE NUMBERS**			
2.1	Prime number, Composite number, Coprime (Self Study)	2	Chalk & Talk	Black Board
2.2	Twin Primes, Siamese Twin, The Sieve of Erastosthenes, theorems and problems.	5	Chalk & Talk	Black Board
2.3	Positional representation of an integer, Divisors of an integer, theorems and problems.	5	Chalk & Talk	Black Board
2.4	Arithmetic functions, Product of Divisors, theorems and problems.	3	Chalk & Talk	Black Board
UNIT -3	**CONGRUENCES**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Congruences, Residues, Residue Classes, theorems and problems.	2	Chalk & Talk	Black Board
3.2	Complete Residue System, Reduced Residue system, theorems and problems.	7	Chalk &Talk	Black Board
3.3	Divisibility Tests, Linear Congruence, theorems and problems.	4	Chalk & Talk	Black Board
3.4	Chinese Remainder Theorem and problems.	2	Chalk & Talk	Black Board
UNIT -4 FERMAT'S THEOREM AND ITS APPLICATIONS				
4.1	Introduction , Fermat's Theorem	3	Chalk & Talk	Black Board
4.2	Euler's Extension of Fermat's Theorem	3	Chalk & Talk	Black Board
4.3	Inverse modulo m, Wilson's Theorem, Converse of Wilson's Theorem.	4	Chalk & Talk	Black Board
UNIT -5 QUADRATIC RESIDUES				
5.1	Quadratic Residues, Euler's Criterion, theorems and problems	5	Chalk & Talk	Black Board
5.2	Legendre Symbols theorems and problems.	5	Chalk & Talk	Black Board
5.3	Quadratic Reciprocity Law, theorems and problems	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.4	Jacobi Symbol, theorems and problems	5	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC	NON - SCHOLASTIC	MARKS

C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain prime number and its distributions.	K1	PSO1& PSO2
CO 2	Define and interpret the concepts of divisibility, greatest common divisor, relatively prime integers and Fibonacci sequence.	K1 & K2	PSO3
CO 3	Recognize the congruences, properties of congruences, special divisibility tests and Chinese remainder theorem.	K1 & K3	PSO5
CO 4	Explain the Law of Quadratic reciprocity, Quadratic Congruence with Prime and Composite Modulus.	K1, K2 & K3	PSO4
CO 5	Explain Fermat's theorem and its applications.	K2 & K4	PSO3

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2

CO3	2	2	2	2	3
CO4	2	2	2	3	2
CO5	2	2	3	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	2	2	3	2
CO4	2	2	2	3
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs.Nigila Ragavan**
2. **Dr.K.Amutha**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Employability-40%

Skill Development-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6ME5	LATTICES AND BOOLEAN ALGEBRA	Lecture	5	5

COURSE DESCRIPTION

This course helps the students to know more about Lattices and Boolean Algebra and their usefulness in other areas of Mathematics.

COURSE OBJECTIVES

To enable the students understand the computational aspects of Sets, Relations, Mathematical logic, Graphs, Trees and Algebraic structure in the field of Mathematics.

UNIT –I POSETS AND LATTICES (20 HRS.)

Diagrammatical representation of a poset – Isomorphisms – Duality – Product of two Posets – Semi Lattices – Complete Lattices – Sub Lattices.

UNIT –II IDEALS (10 HRS.)

Dual Ideals – Principal Ideals – Principal Dual Ideals – Prime Ideals – Complements – Length and Covering Conditions.

UNIT –III MODULAR AND DISTRIBUTIVE LATTTICES (20 HRS.)

Direct Products – Ideal lattice – Isomorphism Theorem – **Distributive Lattices** – Direct Product.

UNIT –IV BOOLEAN ALGEBRA (15 HRS.)

Boolean Algebra – Boolean Rings – Boolean Functions – Conjunctive Normal Form – **Disjunctive Normal Form**.

UNIT –V SWITCHING CIRCUITS (10 HRS.)

Switching Circuits – Representation of Circuits – **Simplification of Circuits – Design of Circuits** – Don't Care Conditions – Design of n-terminal Circuits – Non-Series-Parallel Circuits.

TEXT BOOK:

1. Vijay K. Khanna, *Lattices and Boolean Algebras*, Vicas Publishing house Pvt Ltd – Second Edition, 2008

   UNIT I : Chapter 2

   UNIT II : Chapter 3 (pages 38 – 57)

   UNIT III : Chapter 4

   UNIT IV : Chapter 5 (pages 96 – 99 and 107 – 125)

   UNIT V **:** Chapter 5 (pages 125 – 145)

REFERENCES:

1. Mendelson Elliott, *Theory and problems of Boolean Algebra*, Schaums Outline Series, New York McGraw Hill Publications, 1970.
2. Whitesitt. J Eldon, *Boolean Algebra and its Applications*, Massachusetts: Adition Wesley, 1962.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**POSETS AND LATTICES**			
1.1	Diagrammatical representation of a poset, Isomorphisms – Theorems	5	Chalk & Talk	Black Board
1.2	Duality, Product of two Posets – Theorems.	4	Chalk & Talk	Black Board
1.3	Semi Lattices – Theorems	4	Chalk & Talk	Black Board
1.4	Complete Lattices – Theorems	3	Chalk & Talk	Black Board
1.5	Sub Lattices – Theorems	4	Chalk & Talk	Black Board
UNIT -2	**POSETS AND LATTICES**			
2.1	Dual Ideals and theorems.	2	Chalk & Talk	Black Board
2.2	Principal Ideals and theorems.	2	Chalk & Talk	Black Board
2.3	Principal Dual Ideals, Prime Ideals and theorems.	3	Chalk & Talk	Black Board
2.4	Complements, Length and Covering Conditions and theorems.	3	Chalk & Talk	Black Board
UNIT -3	**MODULAR AND DISTRIBUTIVE LATTTICES**			
3.1	Direct Products and theorems.	4	Chalk & Talk	Black Board
3.2	Ideal lattice and theorems.	4	Chalk & Talk	Black Board
3.3	Isomorphism Theorem .	4	Chalk & Talk	Black Board
3.4	**Distributive Lattices (self study)**	2	Discussion	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.5	Direct Product and theorems.	6	Chalk & Talk	Black Board
UNIT -4 BOOLEAN ALGEBRA				
4.1	Boolean Algebra and theorems.	4	Chalk & Talk	Black Board
4.2	Boolean Rings and theorems.	3	Chalk & Talk	Black Board
4.3	Boolean Functions and theorems.	3	Chalk & Talk	Black Board
4.4	Conjunctive Normal Form and theorems.	3	Chalk & Talk	Black Board
4.5	**Disjunctive Normal Form(self study)**	2	Discussion	Black Board
UNIT -5 SWITCHING CIRCUITS				
5.1	Switching Circuits , Representation of Circuits and theorems.	2	Chalk & Talk	Black Board
5.2	Simplification of Circuits , Design of Circuits	1	Discussion	Black Board
5.3	**Don't Care Conditions , Design of n-terminal Circuits and theorems (Self Study)**	3	Chalk & Talk	Black Board
5.4	Non-Series, Parallel Circuits and theorems.	4	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Recall Posets and classify Lattices.	K1	PSO1& PSO2
CO 2	Identify ideals and dual ideals in Lattices.	K1, K2	PSO3
CO 3	Classify Modular and Distributive Lattices.	K1 & K3	PSO5
CO 4	Explain the concepts of Boolean Rings and Boolean Functions.	K1, K2, K3	PSO3
CO 5	Apply Switching Circuits in real life situations.	K2 & K4	PSO4

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	2	3
CO4	2	2	3	2	2
CO5	2	2	2	3	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	3	2
CO2	2	3	2	2
CO3	2	3	2	2
CO4	2	2	2	3
CO5	3	2	2	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. Sr. Fatima Mary**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6ME6	DISCRETE MATHEMATICS	Lecture	5	5

COURSE DESCRIPTION

This course strengthens and increases the understanding of some concepts in Discrete Mathematics.

COURSE OBJECTIVES

To enable the students learn Tautology, Recursion, Logical premises and Some more special functions.

UNITS

UNIT –I MATHEMATICAL LOGIC (15 HRS.)

Connectives, Statement Formulas and Truth Tables, Equivalence of Formulas, Tautological Implication, Normal Forms.

UNIT –II INFERENCE THEORY FOR STATEMENT CALCULUS AND PREDICATE CALCULUS (15 HRS.)

Validity using truth tables, Rules of Inference, Consistency of Premises and Indirect Method of Proof, Automatic theorem Proving, Predicates, The Statement Function, Variables and Quantifiers, Predicate Formulas, Free and Bound Variables, Universe of Discourse, Inference Theory forPredicate Calculus.

UNIT –III RECURSION (15 HRS.)

Characteristic function, Primitive recursive function, partial recursive function, Ackermann's function.

UNIT –IV RECURRENCE RELATIONS AND GENERATING FUNCTIONS

(15 HRS.)

Polynomial Expression, Sequences or Discrete Functions, Recurrence Relations, Generating Functions.

UNIT –V LATTICES AND BOOLEAN ALGEBRA (15 HRS.

Posets, Least upper bound, Greatest lower bound, lattices, principle of duality of lattices, Basic properties of Boolean Algebra.

TEXT BOOKS:

1. J.P. Tremblay & R. Manohar, *Discrete Mathematical Structures with applications to Computer Science*, Tata McGraw – Hill publishing, New Delhi, Reprint 2013.
   UNIT I : Chapter 1: 1.2.1-1.2.14, 1.3.1-1.3.5
   UNIT II : Chapter 1: 1.4, 1.5, 1.6
   UNIT III : Chapter 2 (2.4.5), Chapter 2 (2.6.1)
2. Prof. V Sundaresan, K S Ganapathy Subramanian, KGanesan , *Discrete Mathematics* A R Publications, Nagapattinam District., Edition 2002.
   UNIT IV : Chapter 3
   UNIT V **:** Chapter 6 (6.1 - 6.4)

REFERENCES:

1. Dr.S.Arumugam, A.T.Isaac, *Modern Algebra*, SciTech Publications India Pvt. Ltd, 2016.
2. Dr. N. Vijayarangan **-** *Foundations of Mathematics* – Scitech Publications (India) Pvt. Ltd

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 MATHEMATICAL LOGIC				
1.1	Connectives	2	Chalk & Talk	Black Board
1.2	Statement Formulas and Truth Tables	3	Chalk & Talk	Black Board
1.3	Equivalence of Formulas, Tautological Implication	5	Chalk & Talk	Black Board
1.4	Normal Forms	5	Chalk & Talk	Black Board
UNIT -2 INFERENCE THEORY FOR STATEMENT CALCULUS AND PREDICATE CALCULUS				
2.1	Validity using truth tables	2	Chalk & Talk	Black Board
2.2	Rules of Inference, Consistency of Premises	3	Chalk & Talk	Black Board
2.3	Indirect Method of Proof	**3**	Discussion, Seminar	Black Board
2.4	Automatic theorem Proving	2	Chalk & Talk	Black Board
2.5	Predicates, The Statement Function, Variables and Quantifiers, Predicate Formulas, Free and Bound Variables, Universe of Discourse, Inference Theory forPredicate Calculus.	5	Chalk & Talk	Black Board
UNIT -3 RECURSION				
3.1	Characteristic function	**1**	Discussion, Seminar	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.2	Primitive recursive function, partial recursive function	13	Chalk & Talk	Black Board
3.3	Ackermann's function	**1**	Discussion, Seminar	Black Board
UNIT -4 RECURRENCE RELATIONS AND GENERATING FUNCTIONS				
4.1	Polynomial Expression, Sequences or Discrete Functions,	5	Discussion	Black Board
4.2	Recurrence Relations, Generating Functions	5	Discussion	Black Board
UNIT -5 LATTICES AND BOOLEAN ALGEBRA				
5.1	**Posets, Least upper bound, Greatest lower bound**,	2	Discussion, Seminar	Black Board
5.2	lattices, principle of duality of lattices,	2	Discussion	Black Board
5.3	Basic properties of Boolean Algebra.	2	Discussion	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment

	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assign ment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	**2**	**2**	**-**	**-**	**-**	**4**	-	**4**	10 %
K2	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**	22.5 %
K3	**3**	**3**	**-**	**-**	**5**	**11**	-	**11**	27.5 %
K4	**3**	**3**	**-**	**5**	**-**	**11**	-	**11**	27.5 %
Non Scholastic	**-**	**-**	**-**	**-**	-		**5**	**5**	12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe any statement formula in normal forms	K3	PSO4
CO 2	Analyse the consistency of premises	K4	PSO5
CO 3	Classify various functions	K1,K2	PSO3
CO 4	Solve Recurrence Relations	K4	PSO1
CO 5	Distinguish Posets and Lattices	K3,K4	PSO2

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	2	2	3	2
CO2	2	2	2	2	3
CO3	2	2	3	2	2
CO4	3	2	2	2	2
CO5	2	3	2	2	2

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	2	3	2	2
CO4	3	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

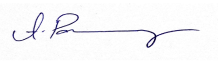
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1.Mrs. Nigila Ragavan

2.Mrs. R Jenovi Rosary Deepa

Forwarded By



(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6SB5	MATLAB	Lecture	2	2

COURSE DESCRIPTION

This course provides knowledge of basic concepts in MATLAB.

COURSE OBJECTIVES

To enable the students write simple programs using MATLAB

LIST OF MATLAB PROGRAMS:

1. To evaluate the arithmetic operators namely addition, subtraction, multiplication, division, unary minus, unary plus, exponentiation.
2. To calculate the sum of the series.
3. To use various arithmetic operations on matrices such as addition, subtraction, multiplication, division, exponentiation.
4. To find some useful commands related to matrices such as determinant, rank, eigen vectors, orthogonal.
5. To compute characteristic polynomial of a matrix, polynomial differentiation, polynomial integration.
6. To compute polynomial addition, subtraction, multiplication, division and root of a polynomial.
7. To solve a set of linear algebraic equations.
8. To find the mean, median, standard deviation, cumulative sum, cumulative product ofa given statistical data
9. To plot a bar graph , horizontal bar graph for a given data
10. To obtain the differentiation of a given expression and evaluating thedefinite integral.

TEXT BOOKS:

1. Rajkumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma, *MATLAB and its applications in Engineering*
2. Rudra Pratap, Getting started with MATLAB – *A quick introduction for scientists and Engineers*

TEXT BOOK-1

Sections 2.5.1, 2.9, 3.9, 3.10.1, 4.4, 4.5, 4.6, 4.7, 4.9, 4.10, 4.11, 6.7.4, 6.7.5, 9.3.2.1, 9.3.2.3

TEXT BOOK -2

Sections 5.1.1, 5.3

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve scientific problems using MATLAB	K1	PSO1& PSO2
CO 2	Explain Operators in MATLAB	K1, K2	PSO5
CO 3	Apply MATLAB in Data Analysis	K1 & K3	PSO2
CO 4	Construct MATLAB programs for Mathematical Calculations	K1, K2, K3	PSO4
CO 5	Describe MATLAB tools.	K2 & K4	PSO5

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	2	2	3
CO3	2	2	3	2	2
CO4	2	2	2	3	2
CO5	2	2	2	2	3

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	3	2	2
CO2	2	2	2	3
CO3	3	2	2	2
CO4	2	2	2	3
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. A. Sheela Roselin**
2. **Dr. E. Helena**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

Employability-60%

Skill Development-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6SB6	COMBINATORIAL MATHEMATICS	Lecture	2	2

COURSE DESCRIPTION

This course enables to study of different enumeration techniques of finite but large sets.

COURSE OBJECTIVES

To learn the basic terminology and results concerning combinatorics and to learn proof techniques for combinatorial problems.

UNIT –I BASIC COMBINATORIAL NUMBERS (6 HRS.)

Basic combinatorial numbers – Stirling numbers of the second kind - Recurrence formula for P_n^m.

UNIT –II GENERATING FUNCTIONS AND RECURRENCE RELATIONS

(6 HRS.)

Generating functions – Recurrence relations.

UNIT –III INCLUSION AND EXCLUSION PRINCIPLE (6 HRS.)

Multinomials – Multinomials theorems – **Inclusion and Exclusion principle (Self Study)**.

UNIT –IV PERMUTATIONS WITH FORBIDDEN POSITIONS (6 HRS.)

Permutations with forbidden positions – the Menage problem - Problem of

Fibonacci.

UNIT –V NECKLACE PROBLEM AND BURNSIDE'S LEMMA (6 HRS.)

Necklace problem - Burnside's lemma.

TEXT BOOK:

1. V. Krishnamurthy, Combinatorics: Theory and Applications, East West Press pvt. Ltd 2002

   UNIT I: Chapter1:Section 1 (pages 5 – 8, 15 - 22)

   UNIT II: Chapter1:Section 2 (pages 29 – 48)

   UNIT III: Chapter1:Section 4 (pages 66 – 69), 5 (pages 73 - 77)

   UNIT IV: Chapter1:Section 6 (pages 87 – 97)

   UNIT V:Chapter2:Section 1 **(**pages 103 – 111)

REFERENCES:

1. V.K. Balakrishnan, *Theory and problems of Combinatorics*, Schaums outline series, McGraw Hill Professional, 1995
2. C.L. Liu, *Elements of Discrete Mathematics*, McGraw Hill Book Company, Second Edition, 1977.
3. Dr. M. K. Venkataraman, Dr. N. Sridharan, N. Chandrasekaran, *Discrete Mathematics*, The National publishing company, 2000

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**BASIC COMBINATORIAL NUMBERS**			
1.1	Basic combinatorial numbers – problems.	2	Chalk & Talk	Black Board
1.2	Stirling numbers of the second kind – problems	2	Chalk & Talk	Black Board
1.3	Recurrence formula for P_n^m - problems.	2	Chalk & Talk	Black Board
UNIT -2	**GENERATING FUNCTIONS AND RECURRENCE RELATIONS**			
2.1	Generating function – problems	4	Chalk & Talk	Black Board
2.2	Recurrence relations – problems	2	Chalk & Talk	Black Board
UNIT -3	**INCLUSION AND EXCLUSION PRINCIPLE**			
3.1	Multinomials, Multinomials theorems and problems.	3	Chalk & Talk	Black Board
2.1	Inclusionand Exclusion principle(self study)	3	Discussion	Black Board
UNIT -4	**PERMUTATIONS WITH FORBIDDEN POSITIONS**			
4.1	Permutations with forbidden positions and problems.	2	Chalk & Talk	Black Board
4.2	The Menage problem	2	Chalk & Talk	Black Board
4.3	Problem of Fibonacci.	2	Chalk & Talk	Black Board
UNIT -5	**NECKLACE PROBLEM AND BURNSIDE'S LEMMA**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	Necklace problem	3	Chalk &Talk	Black Board
5.2	Burnside's lemma.	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholastic	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

✔ **The levels of CIA Assessment based on Revised Bloom's Taxonomy are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

	SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the concepts of various combinatorial numbers.	K1	PSO1& PSO2
CO 2	Identify solutions by the technique of generating functions and recurrence relation	K1, K2	PSO3
CO 3	Solve problems on principle of inclusion and exclusion.	K1 & K3	PSO4
CO 4	Identify Euler's function and the Menage problem.	K1, K2, K3	PSO2&PSO4
CO 5	Explain Burnside's lemma and solve problems on Fibonacci numbers.	K2 & K4	PSO5

Mapping COs Consistency with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	2	2
CO2	2	2	3	2	2
CO3	2	2	2	3	2
CO4	2	3	2	3	2
CO5	2	2	2	2	3

Mapping COs Consistency with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	2	2	2	3
CO2	2	3	2	2
CO3	3	3	2	2
CO4	2	3	2	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**
♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs. M. Teresa Nirmala**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

SELF LEARNING COURSE FOR I UG

For those who joined in 2021 onwards

Employability-60%

Entrepreneurship-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	21UGME2SL	Mathematics And Economics For Competitive Exams	Lecture	-	2

COURSE DESCRIPTION

This course is designed to extend skills in problem solving and to foster mathematical creativity

COURSE OBJECTIVES

To enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations

Unit I: BASIC NUMERACY AND DATA INTERPRETATION

HCF and LCM of Numbers – Fraction – Percentage – Average – Ratio and Proportion – Problems on Simple Equations – Chain Rule – Data Interpretation

Unit II: LOGICAL REASONING AND ANALYTICAL ABILITY

Introduction – Reasoning based on Ranking - Reasoning based on Team Formations– Quantitative Reasoning – Sequences and Series – Blood Relations –Direction Test – Puzzles Test – Non-verbal Reasoning

Unit III: GENERAL MENTAL ABILITY

Introduction – Syllogisms – Logical Deductions – Statement and Conclusions –Assertion and Reason – Mathematical operations – Set theory, Venn diagrams and Network diagrams – Permutations and Combinations

Unit IV: SOCIO-ECONOMIC PROBLEMS OF INDIA

Demography of India – National Population Policy – Targets of NPP-features. Poverty – Types- Poverty line – Parameters to measure poverty – Way to reduce poverty – Tendulkar committee report. Employment and Unemployment- underemployment – measures of unemployment in India- unemployment rate – Types of unemployment.

Unit V: MONEY, BANKING AND CAPITAL MARKETS

Money – Indian Financial Market –Money market – functions – call money market- Bill market – Commercial bills – Treasury bills – Types – promissory note – certificate of deposit – Measures of money supply in India.

Banking sector – RBI – Administration – functions – credit control by RBI – Scheduled commercial banks – foreign banks- Scheduled cooperative banks

Capital Market**:** Meaning – Industrial securities market-stock exchange in India- stock market indices- National stock exchange – indices of NSE – Bombay stock exchange- indices

References:

1. General Studies Paper II for Civil Services Preliminary Examination, Arun Sharma, Madhukar Kumar Bhagat, Abhijit Guha, McGraw Hill Education India Pvt. Limited, 2012
2. Test of Reasoning for Competitive Examinations, Edgar Thorpe, Tata McGraw Hill Education India Pvt. Limited, 2007
3. Numerical Ability and Quantitative Aptitude, P. K. Mittal, Galgotia Publications, Pvt Limited, 2004

COURSE OUTCOME

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Solve some real life problems on numbers	K2 & K4	PSO1
CO 2	Ability to understand logical reasoning	K3	PSO2
CO 3	Solve problems involving Permutations and Combinations	K2 & K4	PSO4
CO 4	Awareness on overall social and economic problems of India.	K1, K2 & K3	PSO3
CO 5	Gained knowledge on the functions of banking sector, money market and capital market	K2 & K4	PSO5

Mapping of COs with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	2
CO2	2	3	2	2	2
CO3	2	2	2	3	2
CO4	2	2	3	2	2
CO5	2	2	2	2	3

Mapping of COs with POs

CO/ PO	PO1	PO2	PO3	PO4
CO1	3	3	2	2
CO2	2	3	2	2
CO3	3	3	2	2
CO4	2	2	3	2
CO5	2	2	2	3

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

All department staff members

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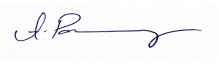

(Dr.A.Paulin Mary)

HOD's

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SELF LEARNING COURSE FOR II UG

For those who joined in 2022 onwards

Employability-20%

Entrepreneurship-80%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	22UGMA4SL	FINANCIAL MATHEMATICS	Lecture	-	2

COURSE DESCRIPTION

The course provides the mathematical and commerce concepts needed by the students for advanced study.

COURSE OBJECTIVE

To enable the students to understand the concepts like structure of interest rates, basic models for asset prices, elementary statistical analysis and estimation of the distribution.

UNIT –I FINANCIAL CALCULUS

Introduction – Examples, Cashflows, interest rates, prices and returns, Bonds and the term structure of interest rates, Asset returns, Some basic models for asset prices.

UNIT –II FINANCIAL CALCULUS (CONTINUED)

Elementary statistical analysis of returns, Measuring location, Measuring dispersion and risk, Value-at-risk, Expected shortfall, lower partial moments and coherent risk measures, Measuring skewness and kurtosis, Estimation of the distribution, Testing for normality, Financial instruments, Contingent claims, Spot contracts and forwards, Futures contracts, Options, Barrier options, Financial engineering.

UNIT III INTRODUCTION TO ACCOUNTANCY

Introduction- meaning and definition of accounting- rules of double entry book keeping- debit and credit- accounting concepts- journal, ledger, trial balance, final accounts.

UNIT IV APPLICATION OF ACCOUNTING

Accounting ratios, Investment accounts- cum interest and ex interest calculation

UNIT V MODERN ACCOUNTING CONCEPTS

Inflation accounting- introduction – purpose- CPP- CAA methods.

TEXT BOOK:

1. Ansgar Steland *Financial statistics and Mathematical Finance – Methods, Models and Applications,* First Edition 2012 - John Wiley & Sons, Ltd

2. Hanif and Mukerjee, *Advanced Accountancy*, Tata Mc Graw Hill Co., New Delhi

REFERENCE BOOK:

1. Amber Habib, *The Calculus of Finance*, Universities Press, January 2011

2. S. Chandra, S. Dharmaraja, Aparna Mehra, R. Chemchandani, *Financial Mathematics: An introduction*, Narosa Publishing House, Reprint 2014

3. R.L.Gupta , M.Radhaswamy, *Advanced Accounting,* S.Chand and Sons.

COURSE OUTCOME

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED

CO 1	Classify various concepts in structure of interest rate and basic models for asset prices.	K2 & K4	PSO4
CO 2	Explain elementary statistical analysis of returns and estimation of the distribution.	K3	PSO5
CO 3	Gain thorough Knowledge in preparing journal, ledger, Trial Balance	K2 & K4	PSO3
CO 4	Extensively apply knowledge on Accounting Ratios and Investment Accounts	K1, K2 & K3	PSO3
CO 5	Have an understanding on inflation Accounting .	K2 & K4	PSO5

III B.Sc. MATHEMATICS

SELF LEARNING COURSE
SEMESTER- VI

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	19UGM6SL	HISTORY OF MATHEMATICS	Lecture	-	2

COURSE DESCRIPTION

This course helps the learners to study the historical development of mathematics. The emphasis will be on mathematical concepts, problem solving, and pedagogy from a historical perspective.

COURSE OBJECTIVES

Students will demonstrate their knowledge of basic historical facts; they wil demonstrate understanding of the development of mathematics and mathematical thought.

UNIT I: FOUNDATION OF MATHEMATICS

The Axiomatic Method- Geometry according to Euclid- Euclid's Common Notions-Euclid's Postulates- Non-Euclidean Geometry –The formal Axiomatic Method-The Formal Axiomatic Method aplied to arithmetic –The Traditional axiomatic method(Eulid's) applied to geometry- Description of the formal axiomatic method- Analysis of axiomatic method- Consistency of an axiom system- Completeness of an axiom system- Categoricalness of an axiom system- Advantages and Disadvantages of an axiomatic method.

UNIT II: THE ANCIENT, MEDIEVAL PERIOD AND MIDDLE AGE

The Beginnings- The Ancient and Medieval Period- Mesopotamia –Egypt, Grece: Thales and Pythagoras- Pythagorean arithmetic – Pythagorean geometry- The Athenian School-Hellenistic Mathematics –Alexandria Euclid, Archimedes and Apollonius- Pappus and Diophantus- The Middle Ages.

UNIT III: THE MODERN AGES

The Modern Period – The Sixteenth century: The rise of analysis- The Seventeenth Century: Dascartes, Pascal, Newton Leibniz- Kepler's Laws-Newton- Leibniz – The Bernoullis – The Eighteenth Century- The Nineteenth Century- Twentieth Century: Ramanujan.

UNIT IV: HISTORY OF ALGEBRA, GEOMETRY AND CALCULUS

Algebra- Geometry- Euclidean geometry – Analytic geometry-Non-Euclidean geometry-Projective geometry- Topology and Measure theory-Calculus.

UNIT V: MEN OF MATHEMATICS

Archimedes – Aristotle – Aryabhata I – Aryabhata II- Bhaskara I-Bhaskara II-Boole-Brahmagupta- Cantor- Euler – Gauss- Hilbert- Mahavira –Narayana Pandita- Newton – Ramanujan- Riemann- Bertrand Russell-Sridhara- Varahamihira.

TEXT BOOK :

1. History of Mathematics by Narayanan .K.S and Narashimhan.K

REFERENCES:

1. History of Mathematics by Boyar, Carl B
2. History of Mathematics by Tabak , John
3. History of Mathematics by Sundaram. M

COURSE OUTCOME

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED	PSOs ADDRESSED

		BLOOM'S TAXONOMY)	
CO 1	Describe the development of mathematics across and within civilizations around the world	K2 & K4	PSO4
CO 2	Explain how different cultures have affected and been affected by the history of mathematics.	K3	PSO5
CO 3	Recognize the distinction between formal and intuitive mathematics	K2 & K4	PSO3
CO 4	Research historical mathematical concepts and present the conclusions of them.	K1, K2 & K3	PSO3
CO 5	Present the history of mathematics in written forms.	K2 & K4	PSO5

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	3	2

CO2	**2**	**2**	**2**	**2**	**3**
CO3	**2**	**2**	**3**	**2**	**2**
CO4	**2**	**2**	**3**	**2**	**2**
CO5	**2**	**2**	**2**	**2**	**3**

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5
CO1	**2**	**2**	**3**	**2**	**2**
CO2	**2**	**3**	**2**	**2**	**2**
CO3	**2**	**2**	**3**	**2**	**2**
CO4	**2**	**2**	**2**	**3**	**2**
CO5	**2**	**3**	**2**	**2**	**2**

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

B.Vethamary Jacquline

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VALUE ADDED CRASH COURSE

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	21UGVAM1	VERBAL AND NON-VERBAL REASONING	Lecture	2	2

COURSE OUTCOME :

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

CO1 : Develop General Mental Ability

CO2 : Apply Analytical Reasoning

CO3 : Understand Pattern

UNIT I VERBAL REASONING – GENERAL MENTAL ABILITY

Analogy, Classification, Series Completion, Coding and Decoding, Blood Relations, Puzzle Test, Direction Sense Test, Arithmetical Reasoning

UNIT II NON VERBAL REASONING-I

Analogy, Classification, Analytical Reasoning, Mirror images, Water images

UNIT III NON VERBAL REASONING-II

Completion of Incomplete Pattern, Figure Matrix, Paper Folding, Paper Cutting

REFERENCES

A Modern Approach to Verbal and Non verbal Reasoning, R.S.Aggarwal, S.Chand&Company Ltd,2010

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VALUE ADDED CERTIFICATE COURSE

Employability-60%

Skill Development-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAMA	22UGVACM1	QUANTITATIVE AND QUALITATIVE METHODS	Lecture	4	2

COURSE OUTCOME:

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

CO 1: Construct the Problems on Ages quantitatively and Solve.

CO 2: Distinguish Profit and Loss problems and Solve

CO 3: Solve Partnership Problems in Business

CO 4: Identify Problems on Time, Work and Distance and Solve

CO 5: Classify Simple Interest and Compound Interest problems and Solve.

UNIT I: PROBLEMS ON AGES, NUMBERS AND SIMPLIFICATION

[10 HRS]

Problems related with ages and numbers, Simplification of numbers

UNIT II: PROFIT AND LOSS, PERCENTAGE, RATIO AND PROPORTION

[12 HRS]

Profit and Loss: Cost Price – Selling Price – Profit or Gain – Loss – Gain percentage - Loss percentage – Ratio and proportion.

UNIT III: PARTNERSHIP, PERMUTATION AND COMBINATION [12 HRS]

Partnership – Ratio of Division of Gains – Working and Sleeping Partners, Permutations and Combinations – formulae and problems.

UNIT IV: TIME & WORK, TIME AND DISTANCE [12 HRS]

Time and Work: Important facts and formulae on time and work –Problems, Time and Distance: Important facts and formulae on speed, time and distance – Problems

UNIT V: SIMPLE INTEREST & COMPOUND INTEREST [14 HRS]

Simple Interest: Important facts and formulae on interest , sum, rate and time. Compound Interest: Important facts and formulae on amount when interest is compound: annually-Half-yearly-Quarterly

TEXT BOOK:

R.S. Aggarwal - Quantitative Aptitude for Competitive Examinations, S. Chand & Company Ltd, Revised Edition 2008.

UNIT I : Chapter 4, 7 and 8

UNIT II : Chapter 10, 11 and 12

UNIT III : Chapter 13 and 30

UNIT IV : Chapter 15 and 17

UNIT V : Chapter 21 and 22

REFERENCE BOOKS:

1. S.K .Arora , S. Bhasin , Manish Puri - Objective Mathematics for all Competitive Examinations.

2. R.Gupta - Super Quicker Arithmetic.

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