FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
74th Rank in India Ranking 2020 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT: MATHEMATICS

NAME OF THE PROGRAMME : B.Sc

PROGRAMME CODE : USMA

ACADEMIC YEAR : 2021 – 2022

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 2019 onwards

PROGRAMME CODE:

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

PART – I – TAMIL

Offered by The Research Centre of Tamil

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19TL1C1	Language-Modern Literature - nghJj;jkpo; - ,f;fhy ,yf;fpak;	5	3	40	60	100
2.	II	19TL2C2	Language - Bakthi Literature - nghJj;jkpo; - gf;jp ,yf;fpak;	5	3	40	60	100
3.	III	19TL3C3	Language- Epic Literature - nghJj;jkpo; - fhg;gpa ,yf;fpak;	5	3	40	60	100
4.	IV	19TL4C4	Language-Sangam Literature - nghJj;jkpo; - rq;f ,yf;fpak;	5	3	40	60	100
			TOTAL	20	12			

PART – I – FRENCH

Offered by The Department of French

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	**I**	19RL1C1	PART 1 LANGUAGE FRENCH - LE NIVEAU INTRODUCTIF	**5**	**3**	**40**	**60**	**100**
2.	**II**	19RL2C2	PART 1 LANGUAGE FRENCH - LE NIVEAU DÉCOUVERTE	**5**	**3**	**40**	**60**	**100**
3.	**III**	19RL3C3	PART 1 LANGUAGE FRENCH - LE NIVEAU INTERMEDIAIRE – LA CIVILISATION, LA LITTERATURE ET LA GRAMMAIRE	**5**	**3**	**40**	**60**	**100**
4.	**IV**	19RL4C4	PART 1 LANGUAGE FRENCH - LE NIVEAU DE SUIVRE – LA CIVILISATION, LA LITTERATURE ET LA GRAMMAIRE	**5**	**3**	**40**	**60**	**100**
			TOTAL	**20**	**12**			

PART – I – HINDI

Offered by The Department of Hindi

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19DL1C1	PART 1 LANGUAGE HINDI - बोलचाल की हिंदी	5	3	40	60	100
2.	II	19DL2C2	PART 1 LANGUAGE HINDI - कार्यालयीन हिंदी	5	3	40	60	100
3.	III	19DL3C3	PART 1 LANGUAGE HINDI - हिंदी साहित्य का आदिकाल और भक्तिकाल	5	3	40	60	100
4.	IV	19DL4C4	PART 1 LANGUAGE HINDI - हिंदी साहित्य का आधुनिक काल	5	3	40	60	100
			TOTAL	20	12			

PART – II -ENGLISH – 12 CREDITS

Offered by The Research Centre of English

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	19EL1LB/ 19EL1WB	BASIC COMMUNICATIVE ENGLISH	5	3	40	60	100
2.		19EL1LI/ 19EL1WI	INTERMEDIATE COMMUNICATIVE ENGLISH					

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
3.		19EL1LA/ 19EL1W A	ADVANCED COMMUNICATIVE ENGLISH					
4.	II	19EL2LB/ 19EL2WB	ENGLISH COMMUNICATION SKILLS	5	3	40	60	100
5.		19EL2LI/ 19EL2WI	ENGLISH FOR EMPOWERMENT					
6.		19EL2LA/ 19EL2WA	ENGLISH FOR CREATIVE WRITING					
7.	III	19EL2LA/ 19EL2WA	ENGLISH FOR DIGITAL ERA	5	3	40	60	100
8.	IV	19EL4LN/ 19EL4WN	ENGLISH FOR INTEGRATED DEVELOPMENT	5	3	40	60	100
			TOTAL	**20**	**12**			

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	19G1CC1	Calculus	6	4	40	60	100
2.		19G1CC2	Classical Algebra	6	4	40	60	100
3.	II	19G2CC3	Differential Equations	6	4	40	60	100
4.		21G2CC4	Statistics	6	4	40	60	100
5.	III	19G3CC5	Modern Algebra	6	4	40	60	100
6.		19G3CC6	Vector Calculus and Fourier Transforms	6	4	40	60	100
7.	IV	19G4CC7	Sequences and Series	6	4	40	60	100
8.		19G4CC8	Linear Algebra	6	4	40	60	100
9.	V	19G5CC9	Real Analysis	5	4	40	60	100
10.		19G5CC10	Statics	5	4	40	60	100
11.		19G5CC11	Linear Programming	5	4	40	60	100
12.		19G5CC12	Graph Theory	5	4	40	60	100
13.	VI	19G6CC13	Complex Analysis	5	4	40	60	100
14.		19G6CC14	Dynamics	5	4	40	60	100
15.		19G6CC15	Operations Research	5	4	40	60	100
			TOTAL	**83**	**60**			

ALLIED COURSES- 20 CREDITS

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. MKs
1.	I	21B1ACG1	Computer Programming in C	3	5	40	60	100
2.	I	21B1ACG2	C-Practicals	2		40	60	100
3.	II	21B2ACG3	Object Oriented Programming with C++	3	5	40	60	100
4.	II	21B2ACG4	C++ - Practicals	2		40	60	100
			TOTAL	**20**	**20**			

ELECTIVES-15 CREDITS

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	V	19G5ME1 & 19G5MEP1 / 19G5ME2	Computer Programming in C & C-Practicals / Fuzzy Mathematics	3+2/5	3+2/5	40+40/40	60+60/60	100+100/100
2.	VI	19G6ME3 & 19G6MEP2 / 19G6ME4	Object Oriented Programming with C++ & C++ - Practicals / Theory of Numbers	3+2/5	3+2/5	40+40/40	60+60/60	100+100/100
3.		19G6ME5 / 19G6ME6	Lattices and Boolean Algebra / Discrete Mathematics	5	5	40	60	100
			TOTAL	**15**	**15**			

ALLIED COURSES OFFERED FOR OTHER DEPARTMENTS

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1	I	19G1ACI1/ 19G1ACJ1	Discrete Mathematics (offered to BCA & IT)	5	5	40	60	100
2.	II	19G2ACI2/ 19G2ACJ2	Operations Research (offered to BCA & IT)	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	21G1VE1	Personal Values	1	1	40	60	100
2.		19G1NME	Quantitative Aptitude	2	2	40	60	100
3.	II	21G2VE2	Values for Life	1	1	40	60	100
4.		19G2NME	Quantitative Aptitude	2	2	40	60	100
5.	III	19G3EE1	Environmental Education	1	1	40	60	100
6.		19G3SB1	Applications of Calculus and Differential Equations	2	2	40	60	100
7.	IV	19G4EE2	Environmental Education	1	1	40	60	100
8.		19G4SB2	Foundations of Mathematics	2	2	40	60	100
9.	V	19G5SB3	Data Interpretation and Analytical Aptitude	2	2	40	60	100
10.		19G5SB4	Cryptography	2	2	40	60	100
11.	VI	19G6SB5	MATLAB	2	2	40	60	100
12.		19G6SB6	Combinatorial Mathematics	2	2	40	60	100

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
			TOTAL	**20**	**20**			

EXTRA CREDIT COURSES

COURSE CODE	COURSE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA MKS	ESE MKS	TOTAL MARKS
19UGSLG1	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

19UGVAG1 – Value Added Crash Course (Computational Mathematics)

PART – V – 1 CREDIT

OFF-CLASS PROGRAMMES - ALL PART-V

SHIFT - II

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	TOT. Mks
1.	I - IV	21S4PED	Physical Education	30/ SEM	1	100
2.		21S4YRC	Youth Red Cross			
3.		21S4NSS	NSS			
4.		21S4RTC	Rotaract			
5.		21S4WEC	Women Empowerment Cell			
6.		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	40	2	I & II	40	60	100

COURSE CODE	COURSE TITLE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA Mks	ESE Mks	TOTAL Mks
	department of PGDCA for Shift I)						
19UADFCA	**ONLINE SELF LEARNING COURSES**- Foundation Course for Arts	40	2	I	40	60	100
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	-	

COURSE CODE	COURSE TITLE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA Mks	ESE Mks	TOTAL Mks
							100
19UADRS	**OUTREACH PROGRAMME**- Reach Out to Society through Action **ROSA**	100	3	V & VI	100	-	100
19UADPR	**PROJECT**	30	4	VI	40	60	100
19UADRC	**READING CULTURE**	10/ Semester	1	II-VI	-	-	-
	TOTAL		**20**				

EXTRA CREDIT COURSES

COURSE CODE	COURSE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA MKS	ESE MKS	TOTAL MARKS
21UGSLEM1	Mathematics and Economics for Competitive Exams	-	2	II	40	60	100
19UGSLM1	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)

19UGVACM1 - Value Added Certificate Course (Speed Arithmetic)

19UGVAG1 – Value Added Crash Course (Computational Mathematics)

I B.Sc Mathematics

SEMESTER –I

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	19G1CC1	CALCULUS	Lecture	6	4

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.

UNITS

UNIT –I HIGHER DERIVATIVES AND CURVATURE (20 HRS.)

n^{th} Derivative of some standard functions- Leibnitz theorem- p-r equations – Curvature, centre and radius of curvature - Evolutes.

UNIT –II SINGULAR POINTS, ENVELOPES AND ASYMPTOTES (25 HRS.)

Envelopes - Multiple points – classification of double points – cusps – nodes – conjugate points- Asymptotes-Curve Tracing.

UNIT –III REDUCTION FORMULA (10 HRS.)

Reduction formula for $\sin^n x$, $\cos^n x$,$\tan^n x$, $\cot^n x$, $\operatorname{cosec}^n x$, $\sec^n x$, and $\sin^m x \cos^n x$. **(Self Study- $\cos^n x$, $\cot^n x$ and $\sec^n x$)**

UNIT –IV MULTIPLE INTEGRALS (20 HRS.)

Jacobian – Double and Triple integrals – Change of variables in double and triple integral.

UNIT –V FOURIER SERIES (15 HRS.)

Definiton – Sine Series - **Cosine Series (Self Study)**

TEXT BOOK:

Dr. S. Arumugam and A. ThangapandiIssac - Calculus (Differential and Integral Calculus) **-** New Gamma Publishing House, June 2014.

Unit I: PART I Sections – 2.12, 2.13, 3.3, 3.4, 3.5

Unit II: PART I Sections – 3.6, 3.10, 3.11(**excluding Asymptotes of polar curves**)**,**3.12.

Unit III: PART II Section 2.8

Unit IV: PARTI Section 3.9, PART II Sections 3.2, 3.3, 3.4

Unit V: PART II Chapter 5

REFERENCES:

1. Narayanan, Manickavasagam Pillai. *Calculus*.S.Viswanathan (Printers & Publishers) Pvt Ltd , 2008.
2. AnitM.Agarwal. *Differential Calculus*. MeerutArihantPrakashan -2008.
3. Shanthi Narayanan. *Differential Calculus*. ShyamLalCharitable Trust, 1994.
4. Shanthi Narayanan. *Integral Calculus*. S.Chand and Company Ltd, 1994

Digital Open Educational Resources

- **www.tutorialspoint.com**
- **https://mathworld.wolfram.com**
- **www.khanacademy.org**
- **www.britannica.com**
- **www.geeksforgeeks.org**

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**			

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 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	Explain higher derivatives and apply Leibnitz theorem to find the n^{th} derivative offunctions.	K1	PSO1
CO 2	Solve problems on curvature, envelopes, asymptotes and curve tracing.	K1 & K2	PSO3
CO 3	Construct reduction formula for trigonometric functions.	K1 & K3	PSO5
CO 4	Define Jacobian, double & triple integrals and apply the knowledge of change of variables to solve the problems in double and triple integrals.	K1, K2 & K3	PSO2
CO 5	Construct Fourier series by recalling integration.	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	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. E. Helena)

HOD's

Signature & Name

I B.Sc Mathematics

SEMESTER –I

For those who joined in 2019 onwards

Employbability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G1CC2	CLASSICAL ALGEBRA	Lecture	6	4

COURSE DESCRIPTION

This course is designed to understand the concepts of algebra which are useful for solving various real word problems.

COURSE OBJECTIVES

To enable the students to learn Set theory, Binomial, Exponential, Logarithmic series, Theory of equations and to apply them to solve problems.

UNIT –I THEORY OF SETS, RELATIONS AND FUNCTIONS (18 HRS.)

Set inclusion-Union of sets-Intersection of sets-difference of sets-complement of a set- Symmetric difference of sets-Cartesian product of sets-Relations- Equivalence relations- Partial order-Functions

UNIT –II BINOMIAL SERIES (18 HRS.)

Summation and approximation using Binomial Series.

UNIT –III EXPONENTIAL AND LOGARITHMIC SERIES (18 HRS.)

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

UNIT –IV THEORY OF EQUATIONS (18 HRS.)

An equation of n^{th} degree has exactly n roots, Relation between the roots and coefficients irrational roots – imaginary roots – Symmetric functions of the roots in terms of the coefficients. Sum of the powers of the roots (Newton's theorem)

UNIT –V TRANSFORMATION OF EQUATIONS (18 HRS.)

Transformation of equations –Reciprocal equations – To increase or decrease the roots of a given equation by a given quantity-Form of the quotient and

remainder when a polynomial is divided by a polynomial-Removal of terms-To form an equation whose roots are any power of the roots of a given equation – Descartes Rule of signs – multiple roots – Roll's theorem and applications– Descartes Rule of signs – Newton's method and Honer's method to solve algebraic equations.

TEXT BOOKS:

1. Arumugam and Isaac.*Modern Algebra.*New Gamma Publishing House 2002.

Unit I –Chapter 1(section 1.2 -1.8) & chapter 2(section 2.1-2.4)

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

Unit II - Chapter 3: Sections 10, 12& 14

Unit III - Chapter 4: Sections 1-9, 11-12

Unit IV - Chapter 6: Sections 1-14

Unit V - Chapter 6: Sections 15 - 26

REFERENCES:

1. P.R.Vittal and V.Malini - Algebra & Trigonometry, Margham Publications, 2008.
2. Sudhir K Pundirsingh- Algebra & Trigonometry, MeeratPragathi prakashan,2003

Digital Open Educational Resources

1.**https://www.britannica.com**

2.https://www.infoplease.com

3.https://www.wiley.com

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 THEORY OF SETS, RELATIONS AND FUNCTIONS				
1.1	Set inclusion	1	Chalk & Talk	Black Board
1.2	Union of sets	1	Chalk &Talk	LCD
1.3	Intersection of sets	4	Lecture	PPT & White board
1.4	Difference of sets	1	Chalk & Talk	Smart Board
1.5	complement of a set	2	Chalk & Talk	Smart Board
1.6	Symmetric difference of sets	2	Lecture	Smart Board
1.7	Cartesian product of sets	1	Lecture	Smart Board
1.8	Relations	1	Lecture	Smart Board
1.9	Equivalence relations	1	Lecture	Black Board
1.10	Partial order	1	Discussion	Google classroom
1.7	Functions	2	Specimen	Microscope

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT - 2 BINOMIAL SERIES				
2.1	Summation and approximation using Binomial Series.	8	Lecture	Green Board Charts
2.2	Summation and approximation using Binomial Series.	7	Chalk &Talk	Green Board
UNIT - 3 EXPONENTIAL AND LOGARITHMIC SERIES				
3.1	Exponential Series	3	Lecture	Green Board
3.2	Logarithmic series	3	Lecture	Green Board
3.3	Summation and approximation using Exponential series.	4	Lecture	Green Board
3.4	Summation and approximation using Logarithmic series.	5	Lecture	Green Board
UNIT - 4 THEORY OF EQUATIONS				
4.1	An equation of n^{th} degree has exactly n roots	3	Chalk &Talk	Green Board
4.2	Relation between the roots and coefficients irrational roots – imaginary roots	4	Chalk &Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.3	Symmetric functions of the roots in terms of the coefficients	4	Chalk &Talk	Green Board
4.4	Sum of the powers of the roots (Newton's theorem)	4	Chalk &Talk	Green Board
UNIT - 5 TRANSFORMATION OF EQUATIONS				
5.1	Transformation of equations	1	Lecture	Ppt
5.2	Reciprocal equations	1	Lecture	Ppt
5.3	To increase or decrease the roots of a given equation by a given quantity	2	Lecture	Ppt
5.4	Form of the quotient and remainder when a polynomial is divided by a polynomial	1	Chalk &Talk	Green Board
5.5	Removal of terms-To form an equation whose roots are any power of the roots of a given equation	2	Chalk &Talk	Green Board
5.6	Descartes Rule of signs	1	Chalk &Talk	Green Board
5.7	multiple roots	2	Chalk &Talk	Green Board
5.8	Roll's theorem and applications	2	Chalk &Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.9	Newton's method to solve algebraic equations.	1	Chalk &Talk	Green Board
5.10	Horner's method to solve algebraic equations.	2	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	Explain sets, relations and functions	K1	PSO1&PSO2
CO 2	Define binomial series, logarithmic and exponential series and solve problems.	K1 & K2	PSO3
CO 3	Identify Relations between the roots and coefficients of equations.	K1 & K3	PSO5
CO 4	Explain the transformations of equations.	K1, K2 & K3	PSO4
CO 5	Recognize the important Methods in finding roots.	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**	**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:

1. Dr.E.Helena

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name

I B.Sc. MATHEMATICS
SEMESTER –I

For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	21B1ACG1	COMPUTER PROGRAMMING IN C	Lecture	3	3

COURSE DESCRIPTION

This course provides skills in designing and writing simple programs in C.

COURSE OBJECTIVES

To enable the students to learn the basic concepts of data input, output, operators, expressions, control statements , arrays, handling of strings and user – defined functions. to write C programs.

UNIT –I C FUNDAMENTALS, OPERATORS AND EXPRESSIONS (9 HRS.)

Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data types – Declaration of Variables – Assigning Values to Variables – Defining Symbolic Constants – **Operators & Expressions : Introduction – Arithmetic of operators – Relational operators – Logical operators – Assignment operators – Increment and decrement operators** – Conditional operator – Bitwise operators – Special operators – Arithmetic expressions – Evaluation of expressions – Precedence of arithmetic operators – Some computational problems – Type conversions in expressions – Operator precedence and associativity – Mathematical functions.

UNIT –II DATA INPUT, OUTPUT & CONTROL STATEMENTS (9 HRS.)

Reading a character – Writing a character – Formatted input – Formatted output - Decision Making and Branching : IF Statement – the IF ELSE

statement – Nesting of IF..ELSE statements – The ELSE IF ladder – The switch statement - The ?: Operator – the GOTO statement – Decision Making and Looping : The WHILE statement – the DO statement – the FOR statement – Jumps in loops.

UNIT –III ARRAYS (9 HRS.)

One Dimensional Array – Two Dimensional Arrays – Initializing Two Dimensional Arrays

UNIT –IV HANDLING OF STRINGS (9 HRS.)

Handling of Character Strings : Declaring and Initializing String Variables – Reading String from Terminal – Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings together – Comparison of two Strings – String Handling Functions – Table of Strings

UNIT –V USER – DEFINED FUNCTIONS (9 HRS.)

Need for User-Defined Functions – A Multi-function Program – Form of C Functions – Return Values and their Types – Calling a Function – Category of Functions – No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – Handling of Non-Integer Functions – Nesting of Functions – Recursion – Functions with Arrays - the scope and lifetime of variables in functions.

TEXT BOOK:

1. E. Balagurusamy - *Programming in ANSI C* - Tata McGraw-Hill Publishing Company Ltd. – Sixth Edition - 2014 **(NO CASE STUDY)**

   UNIT I : Chapters: 2, 3
   UNIT II : Chapters: 4, 5, 6
   UNIT III : Chapter: 7: Section 7.1 – 7.6
   UNIT IV : Chapter 8
   UNIT V : Chapter: 9

REFERENCES:

1. Byron S. Gotfried - *Theory and problems of programming with C* (Schaums Series) Tata – McGraw Hills Edition - 1991.

2. Kernighan & Brian.W - *The C programming language*, Prentice – Hall of India, Private Limited, New Delhi - 1999.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**C FUNDAMENTALS, OPERATORS AND EXPRESSIONS**			
1.1	Character Set ,C Tokens , Keywords and Identifiers , Constants, Variables, Data types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants and Example programs.	3	Chalk & Talk	Black Board
1.2	Operators & Expressions, Arithmetic of operators Relational operators, Logical operators , Assignment operators , Increment and decrement operators.(self study)	4	Discussion	Black Board
1.3	Conditional operator , Bitwise operators ,Special operators , Arithmetic expressions , Evaluation of expressions , Precedence of arithmetic operators , Some computational problems , Type conversions in expressions , Operator precedence and associativity, Mathematical functions and Example program ms.	2	Chalk & Talk	Black Board
UNIT -2	**DATA INPUT, OUTPUT & CONTROL STATEMENT**			
2.1	Reading a character , Writing a character , Formatted input , Formatted output,- Decision	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Making and Branching : IF Statement , the IF ELSE statement, Nesting of IF..ELSE statements , The ELSE IF ladder , The switch statement and Example programs.			
2.2	The ?: Operator , the GOTO statement , Decision Making and Looping : The WHILE statement , the DO statement , the FOR statement , Jumps in loops and Example programs.	4	Chalk & Talk	Black Board
UNIT -3 ARRAY				
3.1	One Dimensional Array and Example programs.	5	Chalk & Talk	Black Board
3.2	Two Dimensional Array, Initializing Two Dimensional Array and Example programs.	4	Chalk & Talk	Black Board
UNIT -4 HANDLING OF STRING				
4.1	Handling of Character Strings : Declaring and Initializing String Variables , Reading String from Terminal , Writing Strings to Screen and Example programs.	4	Chalk & Talk	Black Board
4.2	Arithmetic Operations on Characters , Putting Strings together , Comparison of two String and Example programs..	3	Chalk & Talk	Black Board
4.3	String Handling Functions , Table of String and Example programs.	2	Chalk & Talk	Black Board
UNIT -5 USER – DEFINED FUNCTION				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	Need for User-Defined Functions , A Multi-function Program , Form of C Functions , Return Values and their Types , Calling a Function and Example programs.	2	Chalk & Talk	Black Board
5.2	Category of Functions , No Arguments and No Return Values , Arguments but No Return Values , Arguments with Return Values , Handling of Non-Integer Function and Example programs	4	Chalk & Talk	Black Board
5.3	Nesting of Functions – Recursion – Functions with Arrays and Example programs.	2	Chalk & Talk	Black Board
5.4	The scope and lifetime of variables in functions and Example programs.	1	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 various data types and operators in C	K1	PSO1
CO 2	Summarize Decision Making Branching, looping statements and arrays	K1 & K2	PSO3
CO 3	Categorize function, pointers and structures.	K1 & K3	PSO5
CO 4	Describe Strings and String Handling Functions.	K1, K2 & K3	PSO2
CO 5	Create C program for real life problems	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	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	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	3	2
CO5	2	3	2	2

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

COURSE DESIGNER:

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

Forwarded By

(Dr. E. Helena)
HOD's
Signature & Name

I B.Sc. MATHEMATICS
SEMESTER –I

For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	21B1ACG2	C PRACTICALS	Practical	2	2

LIST OF PROGRAMS

1) To find the area of a square
2) To find the area of a circle
3) To find the area of a triangle
4) To find Simple interest
5) Solving Quadratic equations
6) Checking primes
7) Arranging numbers in ascending order
8) Reversing digits of a number
9) Finding the values of ncr, npr.
10) Palindrome
11) Matrix addition
12) Matrix multiplication
13) Transpose of a matrix
14) Trace of a matrix
15) Alphabetizing names
16) Mean and Standard deviation
17) To find Correlation Coefficient
18) Straight line fitting by the method of least squares
19) To print n th Fibonacci number
20) To read a series of words form a terminal

COURSE DESIGNER:

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

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

I B.Sc. IT/BCA

SEMESTER -I

For those who joined in 2019 onwards

EMPLOYABILITY-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	19G1ACI1/ 19G1ACJ1	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 basics of Boolean Algebra.

UNIT I: SETS, RELATIONS **[15 HRS]**

Sets – Definition- Venn Diagram- Operations on sets Properties of Relations- Inverse relation- Equivalence classes- Partition of a set- Fundamental theorem on equivalence relations- Graphs of relations and Hasse Diagram.

UNIT II: LOGIC **[15 HRS]**

Connectives- Equivalence Formulas- Tautological Implication- Normal Forms- Inference Theory- Predicate Calculus-Inference theory for Predicate Calculus.

UNIT III: THEORY OF MATRICES **[15 HRS]**

Matrix Inversion- System of equations- Consistency of systems of linear equations- Eigen Values- Eigen Vectors- Digitalization Process- Induction Principle- Peano's Postulates.

UNIT IV: RECURRENCE RELATIONS AND GENERATING FUNCTIONS

[15 HRS]

Polynomial expression- Sequences- Recurrence relations- Generating Functions- Properties of Generating Functions- Ssolution of Recurrence Relations using Generating Functions.

UNIT V: BOOLEAN ALGEBRA [15 HRS]

Boolean Algebra- Simplification of Boolean Functions by the map method - Introduction to the Applications of Boolean Algebra to Switching Theory- Turing Machine Problem.

TEXT :

Discrete Mathematics - Prof. V. Sunderesan, K.S. Ganapathy Subramanian,K. Ganesan, A.R. Publications, 2002. Chapters : 1(excluding Functions),2,3,6(excluding 6.1,6.2).

REFERENCES:

1) Applied Discrete Structures for Computer Science - Alan Doerr & Kenneth Levasseur, Galgotia Publications, New Delhi.

2) J P Tremblay and R Manohar, Discrete Mathematical Structures with Applications to Computer Science, Publication : Tata McGraw-Hill Publishing Company Limited.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 SETS, RELATIONS				
1.1	Sets, Definition, Venn Diagram	3	Chalk & Talk	Black Board
1.2	Operations on sets Properties of Relations, Inverse relation	3	Chalk & Talk	Black Board
1.3	Equivalence classes, Partition of a set	6	Chalk & Talk	Black Board
1.4	Fundamental theorem on equivalence relations, Graphs of relations and Hasse Diagram	6	Chalk & Talk	Black Board
UNIT -2 LOGIC				
2.1	Connectives, Equivalence Formulas	3	Chalk & Talk	Black Board
2.2	Tautological Implication, Normal Forms.	4	Chalk & Talk	Black Board
2.3	Inference Theory	3	Chalk & Talk	Black Board
2.4	Predicate Calculus	4	Discussion	Black Board
2.5	Inference theory for Predicate Calculus	4	Discussion	Black Board
UNIT -3 : THEORY OF MATRICES				
3.1	Matrix Inversion, System of Equations Coefficient of Determination	5	Chalk & Talk	Black Board
3.2	Eigen Values, Eigen Vectors	5	Chalk & Talk	Black Board
3.3	Digitalization Process	8	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.4	Induction Principle, Peano's Postulates.	6	Chalk & Talk	Black Board
UNIT -4 RECURRENCE RELATIONS AND GENERATING FUNCTIONS				
4.1	Polynomial expression, Sequences.	5	Chalk & Talk	Black Board
4.2	Recurrence relations	5	Chalk & Talk	Black Board
4.3	Generating Functions, Properties of Generating Functions	4	Chalk & Talk	Black Board
4.4	Solution of Recurrence Relations using Generating Functions.	4	Chalk & Talk	Black Board
UNIT -5 BOOLEAN ALGEBRA				
5.1	Boolean Algebra, Simplification of Boolean Functions by the map method	5	Chalk & Talk	Black Board
5.2	Introduction to the Applications of Boolean Algebra to Switching Theory	5	Chalk & Talk	Black Board
5.3	Turing Machine Problem.	4	Chalk & Talk	Black Board
5.4	Difference between Correlation and Association	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 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	Understand the basic principles of sets and operations in sets..	K2 & K4	PSO2
CO 2	Describe any statement formula in normal forms.	K3	PSO1
CO 3	Understand the basics of matrices and able to solve system of equation using matrix.	K2 & K4	PSO3
CO 4	Demonstrate an understanding of relations and functions and be able to determine their properties	K1, K2 & K3	PSO4
CO 5	Understand Boolean algebra and basic properties of Boolean algebra; able to simplify simple Boolean functions by using the basic Boolean properties.	K2 & K4	PSO5

Mapping of COs with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5

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

Mapping of COs with POs

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

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

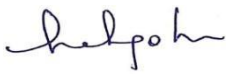
□ Weakly Correlated -**1**

COURSE DESIGNER:

1. C. Jeslyn Sathya

2. J. Annaal Mercy

Forwarded By



(Dr. E. Helena)

HOD's

Signature & Name

I B.Sc Mathematics

SEMESTER –II

For those who joined in 2019 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G2CC3	DIFFERENTIAL EQUATIONS	Lecture	6	4

COURSE DESCRIPTION

This course will provide the knowledge for solving ordinary and partial differential equations

COURSE OBJECTIVES

To enable the students to get thorough knowledge of solving Differential Equations of first order, second order, Laplace transforms Partial differential equations.

UNIT I: DIFFERENTIAL EQUATIONS OF FIRST ORDER (20 HRS.)

Homogeneous equations – Non homogeneous equations of the first degree in x and y – Linear equations (Self Study) – Bernoulli's equation – Exact differential equation – Equations solvable for p – solvable for x – solvable for y – Clairaut's equation.

UNIT II: DIFFERENTIAL EQUATIONS OF SECOND ORDER (20 HRS.)

Linear equations with constant coefficients with terms of the form e^{ax} V on RHS – Linear equations with variable coefficients – Equations reducible to the linear homogeneous equations – methods of variation of parameters – Simultaneous linear differential equations.

UNIT III: LAPLACE TRANSFORMS (20 HRS.)

Laplace transforms – Laplace transforms of periodic functions – Some general theorems – The Inverse Laplace transforms – Solution of Differential equations using Laplace transform.

UNIT IV: PARTIAL DIFFERENTIAL EQUATIONS (20 HRS.)

Formation of Partial Differential equations – First order Partial Differential Equations – Some standard forms – Lagrange's method – Charpit's method.

UNIT V: APPLICATIONS (10 HRS.)

Applications of first order equations: Growth, decay and chemical reactions.

TEXT BOOKS:

1. S. Narayanan, T.K. Manickavachagam Pillay - Differential Equation and its Applications – S. Viswanathan (Printers and Publishers) Pvt. Ltd.2006.

   UNIT I : Chapter : 2- Sections : 1 – 6.4 & Chapter : 4 - Sections 1 – 4.

   UNIT II : Chapter : 5 - Sections : 1 – 6, Chapter : 6 - Sections : 1 – 6.

   UNIT III : Chapter :9 -Sections : 1 – 10.

   UNIT V : Chapter: 3 - Section: 1.

2. Dr. S. Arumugam and Issac - Differential Equation and Applications – New Gamma Publishing House Nov- 2011.

   UNIT II : Chapter : 2 - Sections : 2.5 Type D

   UNIT IV : Chapter : 4 - Sections : 4.0 – 4.5.

REFERENCES :

1. N.Ch.S.N.Iyengar – Differential Equations – Anmol publications pvt.ltd – 2000
2. Rasinghania - Differential Equations – S.Chand& Company limited – 1997.

Digital Open Educational Resources

1.https://www.khanacademy.org/math/differential-equations

2.www.geeksforgeeks.org

3.www.khanacademy.org

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**DIFFERENTIAL EQUATIONS OF FIRST ORDER**			
1.1	Homogeneous equations	2	Discussion	Green Board
1.2	Non homogeneous equations of the first degree in x and y	3	Discussion	Green Board
1.3	Linear equations	2	Discussion	Green Board
1.4	Bernoulli's equation	2	Lecture	Green Board
1.5	Exact differential equation	3	Lecture	Green Board
1.6	Equations solvable for p	2	Lecture	Green Board
1.7	solvable for x- solvable for y	3	Discussion	Black Board
1.8	Clairauts equation	3	Discussion	Black Board
UNIT -2	**DIFFERENTIAL EQUATIONS OF SECOND ORDER**			
2.1	Linear equations with constant coefficients with terms of the form e^{ax} V on RHS	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.2	Linear equations with variable coefficients	4	Chalk & Talk	Green Board
2.3	Equations reducible to the linear homogeneous equations	4	Chalk & Talk	Green Board
2.4	Methods of variation of parameters	4	Chalk & Talk	Green Board
2.5	Simultaneous linear differential equations.	4	Chalk & Talk	Green Board
UNIT -3LAPLACE TRANSFORMS				
3.1	Laplace transforms	4	Chalk & Talk	Green Board
3.2	Laplace transforms of periodic functions	**2**	Chalk & Talk	Green Board
3.3	Some general theorems	**4**	Chalk & Talk	Green Board
3.4	The Inverse Laplace transforms	**5**	Chalk & Talk	Green Board
3.5	Solution of Differential equations using Laplace transforms.	**5**	Chalk & Talk	Green Board
UNIT -4 PARTIAL DIFFERENTIAL EQUATIONS				
4.1	Formation of Partial Differential equations	4	Chalk & Talk	Green Board
4.2	First order Partial Differential Equations	4	Chalk & Talk	Green Board
4.3	Some standard forms	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.4	Lagrange's method	4	Chalk & Talk	Green Board
4.5	Charpit's method.	4	Chalk & Talk	Green Board
UNIT -5 APPLICATIONS				
5.1	Applications of first order equations: Growth.	4	Discussion	PPT
5.2	Applications of first order equations: decay	3	Discussion	PPT
5.3	Applications of first order equations: chemical reactions.	3	Discussion	PPT

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 in differential equations of first order.	K1	PSO1& PSO2
CO 2	Classify homogeneous and Non homogeneous differential equations of second order and solve problems.	K1 & K2	PSO3
CO 3	Solve differential equation problems using Laplace transform.	K1 & K3	PSO5
CO 4	Define Partial differential equations and solve problems.	K1, K2 & K3	PSO4
CO 5	Solve problems on Growth, decay and chemical reactions	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**	**3**	**2**	**2**
CO2	**2**	**3**	**2**	**3**
CO3	**3**	**3**	**2**	**2**
CO4	**2**	**3**	**2**	**3**
CO5	**2**	**3**	**2**	**3**

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

□ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs.A.Paulin Mary**

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name

I B.Sc Mathematics

SEMESTER –II

For those who joined in 2021 onwards

Skill Development-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	21G2CC4	STATISTICS	Lecture	6	4

COURSE DESCRIPTION

This course is designed to make the students understand the importance of statistical literacy in today's data rich world.

COURSE OBJECTIVES

To enable the students learn moments, correlation, regression, curve fitting, random variables, analysis of time series and index numbers which will be used in various social sciences, business management, public administration, etc.

UNIT –I MOMENTS AND CORRELATION (15 HRS.)

Moments – Measures of skewness, Kurtosis, Correlation- rank correlation and product moment correlation coefficient.

UNIT –II REGRESSION AND CURVE FITTING (15 HRS.)

Regression- Regression lines - curve fitting.

UNIT –III RANDOM VARIABLES AND DENSITY FUNCTIONS (15 HRS.)

Random variables- distribution functions- probability density functions – Various measure of central tendency – dispersion - skewness and kurtosis for continuous probability distribution- Joint probability mass function and properties –Transformation of one dimensional and two dimensional random variables.

UNIT –IV MATHEMATICAL EXPECTATION (15 HRS.)

Mathematical expectation – Addition theorem of expectation, multiplication theorem of expectation- Expectation of a linear combination random variables – covariance- Correlation coefficient –linear combination of random variables – conditional expectation and conditional variance – Moment generating function – cumulants – Characteristic function.

UNIT –V ANALYSIS OF TIME SERIES AND INDEX NUMBERS (15 HRS.)

Components of a time series- measurements of trends. **Index numbers (Self study)**

TEXT BOOKS:

1. S.Arumugam and Thangapandi Isaac, Statistics–New Gamma publishing house, January 2006 for Unit I, II and V.
   UNIT I : Chapter : 4- Sections : 4.0 to 4.2.

   Chapter : 6- Sections : 6.0 to 6.2,

   UNIT II : Chapter : 6- Sections : 6.3.

   Chapter : 5

   UNIT V: Chapter: 9 and 10
2. S.C.Gupta and V.K.Kapoor ,Fundamentals of Mathematical statistics- Sultan Chand & Sons, Revised edition - June 2002 for Unit III and IV.
   UNIT III : Chapter : 5- Sections : 5.1 to 5.7

   UNIT IV : Chapter : 6- Sections : 6.1 to 6.6, 6.8

REFERENCES

1. Kapoor, Mathematical statistics, second edition, Delhi PusthkSadan, 1961.
2. H.C.Saxena,Elementary statistics, AbhirorPrakashan, New Delhi, 2008. .
3. S.C. Gupta and V.K Kapoor, Fundamental of Applied Statistics, third edition, Sultan Chand & Sons, New Delhi.
4. T. Veerarajan, Fundamentals of Mathematical Statistics, Yesdee Publishing Private Limited, Chennai, 2017.

Digital Open Educational Resources

- **Statistics & Probability Calculators & Workouts (getcalc.com)**
- **Welcome! | STAT 414 (psu.edu)**
- **Correlation | Introduction to Statistics | JMP**
- **Microsoft Word - Unit 4 (igntu.ac.in)**
- **Mathematical Expectation: Properties of Expectation, Questions (toppr.com)**

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT – I MOMENTS AND CORRELATION				
1.1	Moments	4	Lecture	PPT
1.2	Measures of skewness	2	Lecture	PPT
1.3	Measures of Kurtosis	1	Lecture	PPT
1.4	Rank correlation	4	Lecture	PPT
1.5	Product moment correlation coefficient.	4	Lecture	PPT
UNIT -2 REGRESSION AND CURVE FITTING				
2.1	Regression and Regression lines	8	Lecture	Green Board
2.2	curve fitting	7	Chalk & Talk	Green Board
UNIT -3 RANDOM VARIABLES AND DENSITY FUNCTIONS				
3.1	Random variables	2	Lecture	Green Board
3.2	Distribution functions	1	Lecture	Green Board
3.3	Probability density functions	1	Chalk & Talk	Green Board
3.4	Various measure of central tendency	3	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.5	Dispersion	1	Chalk & Talk	Green Board
3.6	Skewness and kurtosis for continuous probability distribution	2	Chalk & Talk	Green Board
3.7	Joint probability mass function and properties	2	Chalk & Talk	Green Board
3.8	Transformation of one dimensional and two dimensional random variables	3	Chalk & Talk	Green Board
UNIT -4 MATHEMATICAL EXPECTATION				
4.1	Mathematical expectation	1	Lecture	Green Board
4.2	Addition theorem of expectation, multiplication theorem of expectation	2	Lecture	Green Board
4.3	Expectation of a linear combination random variables	1	Chalk & Talk	Green Board
4.4	Covariance	1	Chalk & Talk	Green Board
4.5	Correlation coefficient	1	Chalk & Talk	Green Board
4.6	Linear combination of random variables	1	Lecture	PPT
4.7	Conditional expectation and conditional variance	4	Lecture	PPT
4.8	Moment generating function	2	Chalk & Talk	Green Board
4.9	Cumulants	1	Chalk & Talk	Green Board
4.10	Characteristic function	1	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -5 ANALYSIS OF TIME SERIES AND INDEX NUMBERS				
5.1	Components of a time series	1	Chalk & Talk	Green Board
5.2	Measurements of trends	7	Chalk & Talk	Green Board
5.3	Index numbers	7	Discussion	PPT

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 moments, skewness, kurtosis and correlation.	K1 ,K2 & K3	PSO1&PSO2
CO 2	Construct regression lines and curve equation	K1, K2 & K3	PSO3
CO 3	Explain random variables and probability density function	K1 & K3	PSO5
CO 4	Solve problems on expectation.	K1, K2 & K3	PSO4
CO 5	Define and explain analysis of time series and index numbers.	K1, 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	3	2	2
CO2	2	2	2	3
CO3	2	2	2	3
CO4	3	3	2	2
CO5	2	2	2	3

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

□ Weakly Correlated -**1**

COURSE DESIGNER:

1. Mrs.A.Paulin Mary.
2. Mrs.R.Jenovi Rosary Deepa

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name

I B.Sc. MATHEMATICS
SEMESTER –II

For those who joined in 2021 onwards

EMPLOYABILITY-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	21B2ACG3	OBJECT ORIENTED PROGRAMMING WITH C++	Lecture	3	3

COURSE DESCRIPTION

This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development.

COURSE OBJECTIVES

In the expanding field of computer education, one of the fastest growing, versatile and much sought after languages is C++. This course enables the students to understand the fundamentals of the language, the concepts related to the syntax of the language.

UNIT –I BEGINNING WITH C++, TOKENS, EXPRESSIONS AND CONTROL STRUCTURES, FUNCTIONS IN C++ (9 HRS.)

What is C++ - Applications of C++ - A simple C++ program – More C++ statements – Structure of C++ program – **Tokens – Keywords – Identifiers – Variables** – Operators – Manipulators – Expressions – **Control structures.** Introduction – The main function – **Function prototyping** – Call by reference – Return by reference – Return by reference – Inline function – Default arguments – Const arguments – Function overloading – Friend and virtual functions – Math library functions.

UNIT –II CLASSES AND OBJECTS (9 HRS.)

Introduction – C structures revisited – Specifying a class – Defining member functions – A C++ program with class – Making an outside function inline –

Nesting of member functions – Private member functions – Arrays within a class – Memory allocation for objects – Static data members – Static member functions – Arrays of objects – Objects as function arguments – Friendly functions – Returning objects – Const member functions – Pointers to members – Local classes.

UNIT – III CONSTRUCTORS, DESTRUCTORS AND OPERATOR OVERLOADING (9 HRS.)

Introduction – Constructors and destructors - Defining operator overloading – Overloading unary operators - Overloading binary operators - Overloading binary operators using friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions.

UNIT – IV INHERITANCE (9 HRS.)

Introduction – Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Virtual base classes – Abstract classes – Constructors in derived classes – Member classes: Nesting of classes.

UNIT –V POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM

(9 HRS.)

Introduction – Pointers – Pointers to objects –this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – Polymorphism.

TEXT BOOK:

1. E. Balagurusamy - *Object Oriented Programming with C++*, Tata McGraw-Hill Publishing Company Limited – Fourth Edition - 2007.

   UNIT I : Chapter 2- 2.1 to 2.4, 2.6, Chapter 3- 3.2 to 3.24
   Chapters 4- 4.1 to 4.11

   UNIT II : Chapter 5- 5.1 to 5.19,

   UNIT III: Chapter 6-6.1 to 6.11 Chapter 7- 7.1 to 7.8,

   UNIT IV: Chapter 8-8.1 to 8.12

   UNIT V : Chapter 9- 9.1 to 9.7

REFERENCES:

1. Robert Lafore – Object-Oriented Programming in Microsoft C++ - Galgotia publication – Third Edition – 2004.
2. Stephen Prata - *C++* primer plus - Galgotia publication pvt. Ltd. – 1997.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BEGINNING WITH C++, TOKENS, EXPRESSIONS AND CONTROL STRUCTURES, FUNCTIONS IN C++				
1.1	What is C++, Applications of C++, A simple C++ program, More C++ statements, Structure of C++ program and example programs.	2	Chalk & Talk	Black Board
1.2	Tokens, Keywords, Identifiers, Variables, Operators, Manipulators Expressions, Control structures. (self study)	1	Discussion	Black Board
1.3	Introduction, The main function, Function prototyping (self study) Call by reference, Return by reference	4	Chalk & Talk	Black Board
1.4	Inline function, Default arguments, Const arguments and example programs.	1	Chalk & Talk	Black Board
1.5	Function overloading, Friend and virtual functions, library functions and example programs.	1	Chalk & Talk	Black Board
UNIT -2 CLASSES AND OBJECTS				
2.1	Introduction, C structures revisited , Specifying a class, Defining member	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	functions			
2.2	A C++ program with class , Making an outside function inline ,Nesting of member functions , Private member functions, programs	1	Chalk & Talk	Black Board
2.3	Arrays within a class, Memory allocation for objects, Static data members, Static member functions, programs.	3	Chalk & Talk	Black Board
2.4	Arrays of objects, Objects as function arguments, Friendly functions , Returning objects, programs.	2	Chalk & Talk	Black Board
2.4	Const member functions , Pointers to members , Local classes, programs.	2	Chalk & Talk	Black Board
UNIT -3 CONSTRUCTORS, DESTRUCTORS AND OPERATOR OVERLOADING				
3.1	Introduction, Constructors and destructors, programs.	1	Chalk & Talk	Black Board
3.2	Defining operator overloading , Overloading unary operators , Overloading binary operators , Overloading binary operators using friends, programs	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Manipulation of strings using operators , Rules for overloading operators, programs	4	Chalk & Talk	Black Board
3.4	Type conversions, programs	2	Chalk & Talk	Black Board
UNIT -4 INHERITANCE				
4.1	Introduction , Defining derived classes and programs.	1	Chalk & Talk	Black Board
4.2	Single inheritance , Making a private member inheritable , Multilevel inheritance and programs	4	Chalk & Talk	Black Board
4.3	Multiple inheritance , Hierarchical inheritance , Hybrid inheritance and programs	2	Chalk & Talk	Black Board
4.4	Virtual base classes , Abstract classes, Constructors in derived classes, Member classes: Nesting of classes and programs.	2	Chalk & Talk	Black Board
UNIT -5 POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM				
5.1	Introduction , Pointers , Pointers to objects and programs.	2	Chalk & Talk	Black Board
5.2	this pointer , Pointers to derived classes and programs.	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.3	Virtual functions , Pure virtual functions and programs.	2	Chalk & Talk	Black Board
5.4	Polymorphism and programs.	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 %

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 the features of C++ supporting object oriented programming	K1	PSO1
CO 2	Describe classes and objects	K1 & K2	PSO2
CO 3	Distinguish Constructors and Destructors and Explain overloading concepts	K1 & K3	PSO4
CO 4	Classify Inheritance in C++	K1, K2 & K3	PSO4
CO 5	Design C++ programs for real life situations	K2 & K4	PSO5

apping 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**	**2**	**2**	**3**	**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**	**2**	**2**	**2**
CO2	**2**	**2**	**3**	**2**
CO3	**2**	**2**	**2**	**3**
CO4	**2**	**2**	**3**	**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. E. Helena)

HOD's

Signature & Name

I B.Sc. MATHEMATICS
SEMESTER –II

For those who joined in 2021 onwards

Employability-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	21B2ACG4	C++ PRACTICALS	Practical	2	2

List of Programs

1. To add two integers
2. Multiply two integers.
3. Divide one integer by the other.
4. To find if the number is odd or even.
5. To find if the given number is negative or non-negative
6. To find the area of the square
7. To find the greatest between two integers
8. To find the area of rectangle
9. To find the area of triangle
10. To find Simple Interest
11. To illustrate the use of dereference operator
12. To illustrate the use of default arguments.
13. Using Function overloading to find the areas of square, rectangle, Triangle and circle.
14. To illustrate the use of object arrays.
15. To swap private data of classes
16. To illustrate returning objects
17. To show the use of overloaded constructors
18. To overload binary operators
19. To illustrate single inheritance
20. To illustrate multiple inheritance

COURSE DESIGNER:

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

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name

I B.Sc. IT/BCA

SEMESTER- II

For those who joined in 2019 onwards

SKILL DEVELOPMENT-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	19G2ACI2/ 19G2ACJ2	Operations Research	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 Also to solve problems in transportation, assignment and game theory.

UNIT I: LINEAR PROGRAMMING PROBLEM [15 HRS]

Linear Programming Problem- Mathematical Foundation: Introduction - Linear Programming Problem - Mathematical Formulation of the Problem - Illustration on Mathematical Formulation of LPPs.

Linear Programming Problem- Graphical Solution: Introduction - Graphical Solution Method - General Linear Programming problem.

UNIT II : SIMPLEX METHOD [15 HRS]

Linear Programming - Simplex Method: Introduction - Fundamental Properties of Solutions - The Computational Procedure - Use of Artificial Variables - Degeneracy in Linear Programming - Solution of Simultaneous Linear Equations - Inverting a Matrix Using Simplex Method - Application of Simplex Method.

UNIT III: DUAL PROBLEM [15 HRS]

Primal-Dual Pair in Matrix Form - Duality Theorems - Complementary Slackness Theorem - Duality and Simplex Method - Economic Interpretation of Duality - Dual Simplex Method.

UNIT IV TRANSPORTATION PROBLEM [15 HRS]

Introduction - LP Formulation of the Transportation Problem - Existence of Solution in T.P. - Duality in Transportation Problem - The Transportation Table - Loops in Transportation Tables - Triangular Basis in a T.P. - Solution of a Transportation Problem - Finding an Initial Basic Feasible Solution - Test for Optimality

UNIT V: ASSIGNMENT PROBLEM [15 HRS]

Introduction - Mathematical Formulation of the Problem - Solution Methods of Assignment Problem - Special Cases in Assignment Problem - Dual of the Assignment Method – The Travelling Salesman Problem.

TEXT BOOK:

Operations research, Eighth edition, Kanti Swarup, Gupta P.K. and Manmohan,1997, sultan Chand and sons.

Unit I: Chapter: 2, 3 Unit II: Chapter: 4Unit III: Chapter: 5 Unit IV: Chapter: 10

Unit V: Chapter: 11

REFERENCES:

1. V. Sunderesan, K.S. Subramanian, K. Ganesan, Operations Research, New revised edition, A.R. Publications, sirkali.
2. Hamdy A. Taha, Operations Research, Fifth edition, Prentice Hall of India, New Delhi, 1995.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 LINEAR PROGRAMMING PROBLEM				
1.1	Linear Programming Problem, Mathematical Formulation of the Problem	3	Chalk & Talk	Black Board
1.2	Illustration on Mathematical Formulation of LPPs.	3	Chalk & Talk	Black Board
1.3	Linear Programming Problem Graphical Solution: Introduction	6	Chalk & Talk	Black Board
1.4	General Linear Programming problem.	6	Chalk & Talk	Black Board
UNIT -2 SIMPLEX METHOD				
2.1	Linear Programming - Simplex Method	3	Chalk & Talk	Black Board
2.2	Use of Artificial Variables.	4	Chalk & Talk	Black Board
2.3	Solution of Simultaneous Linear Equations	3	Chalk & Talk	Black Board
2.4	Inverting a Matrix Using Simplex Method	4	Discussion	Black Board
2.5	Application of Simplex Method.	4	Discussion	Black Board
UNIT -3 : DUAL PROBLEM				
3.1	Primal-Dual Pair in Matrix Form	5	Chalk & Talk	Black Board
3.2	Duality Theorems	5	Chalk & Talk	Black Board
3.3	Complementary Slackness Theorem, Duality and Simplex Method	8	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.4	Economic Interpretation of Duality , Dual Simplex Method.	6	Chalk & Talk	Black Board
UNIT -4 RECURRENCE RELATIONS AND GENERATING FUNCTIONS				
4.1	Formulation Of The Transportation Problem, Solution Of A Transportation Problem, Finding An Initial Basic Feasible Solution	5	Chalk & Talk	Black Board
4.2	Duality in Transportation Problem, The Transportation Table	5	Chalk & Talk	Black Board
4.3	Loops in Transportation Tables, Triangular Basis in a T.P. Generating Functions, Properties of Generating Functions	4	Chalk & Talk	Black Board
4.4	Test for Optimality, Polynomial expression, Sequences	4	Chalk & Talk	Black Board
UNIT -5 BOOLEAN ALGEBRA				
5.1	Mathematical Formulation of the Problem, Solution Methods of Assignment Problem	5	Chalk & Talk	Black Board
5.2	Special Cases in Assignment Problem	5	Chalk & Talk	Black Board
5.3	Dual of the Assignment Method	4	Chalk & Talk	Black Board
5.4	The Traveling Salesman Problem	4	Chalk & Talk	Black Board

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

	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	% of Assessment
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	Formulate linear programming problems and solve by graphical method	K2 & K4	PSO2
CO 2	Classify simplex, two phase and Big - M method to solve linear programming problems	K3	PSO1
CO 3	Illustrate Duality in Linear programming	K2 & K4	PSO3
CO 4	Recognize and formulate transportation, assignment problems and find the optimal solution	K1, K2 & K3	PSO4
CO 5	Recognize and formulate the travelling salesman problem	K2 & K4	PSO5

Mapping of COs with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	2	2	2
CO2	3	2	2	2	2
CO3	2	2	3	2	2
CO4	2	2	2	3	2
CO5	2	3	2	2	2

Mapping of COs with POs

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

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

□ Weakly Correlated -**1**

COURSE DESIGNER:

1. **B.Vethamary Jacquline**
2. **R. Jenovi Rosary Deepa**

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name

I B.Sc Mathematics

SEMESTER –I & II

For those who joined in 2019 onwards

EMPLOYABIILITY-40%

SKILL DEVEOPMENT-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G1NME / 19G2NME	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 – 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 (self study)** – 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 speed, time and distance – Problems

TEXT BOOK:

R.S. Aggarwal , Quantitative Aptitude for Competitive Examinations, S. Chand & Company Ltd, Revised Edition 2008.

UNIT I : Chapter 17

UNIT II : Chapter 11

UNIT III : Chapter 13

UNIT IV : Chapter 15

UNIT V : Chapter 17

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 PROBLEMS ON AGES				
1.1	Problems related with ages	6	Chalk & Talk	Black Board
UNIT -2 PROFIT AND LOSS				
2.1	Cost Price – Selling Price – Profit	3	Group discussion	Green Board Charts
	Gain – Loss	1	Chalk & Talk	Black Board
2.2	Gain percentage - Loss percentage	2	Chalk & Talk	Green Board
UNIT -3 PARTNERSHIP				
	Ratio of Division of Gains	3	Chalk & Talk	Black Board
	Working and Sleeping Partners.	3	Chalk & Talk	Black Board
UNIT -4 TIME & WORK				
	Important facts and formulae on time and work -Problems.	6	Chalk & Talk	Black Board
UNIT -5 TIME & DISTANCE				
	Important facts and formulae on speed, time and distance – Problems	6	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	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 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	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	3	2
CO3	2	3	3	2
CO4	2	3	3	2
CO5	2	3	3	2

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

 Weakly Correlated -**1**

COURSE DESIGNER:

1. **A. Sheela Roselin**

Forwarded By

(Dr. E. Helena)

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
USMA	19G3CC5	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.4	Quotient Groups	3	Chalk & Talk	Black Board
2.5	Isomorphism	3	Chalk & Talk	Black Board
2.6	Homomorphisms	3	Discussions	PPT
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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.7	Unique Factorization domain	2	Chalk & Talk	Black Board
UNIT -5 POLYNOMIAL RINGS				
5.1	Euclidean domain	4	Chalk & Talk	Black Board
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 %

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	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. E. Helena)

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
USMA	19G3CC6	VECTOR CALCULUS AND FOURIER TRANSFORMS	UG	6	4

COURSE DESCRIPTION

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

COURSE OBJECTIVES

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.

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 (20 HRS.)

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

UNIT -IV FOURIER TRANSFORMS (20 HRS.)

Introduction - Fourier transforms - Fourier cosine transform - Fourier sine transform -Alternative form of Fourier complex integral formula -

Relationship between Fourier transform and Laplace transform, Finite Fourier transforms - Inversion formulae(self study).

UNIT V: PROPERTIES OF FOURIER TRANSFORM (20 HRS.)

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

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 - PragatiPrakashan, Meerut, 1987.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT –1 DIFFERENTIATION OF VECTORS				
1.1	Differentiation of vectors	4	Chalk & Talk	Green Board
1.2	Gradient	4	Chalk & Talk	Green Board
1.3	Geometrical interpretation of gradient	4	Chalk & Talk	Green Board
1.4	Directional derivative	3	Chalk & Talk	Green Board
UNIT -2 DIVERGENCE AND CURL				
2.1	Divergence and Curl	5	Chalk & Talk	Green Board
2.2	Solenoidal vectors	5	Chalk & Talk	Green Board
2.3	Irrotational vectors	5	Chalk & Talk	Green Board
UNIT -3 LINE AND SURFACE INTEGRALS				
3.1	Line integrals	6	Chalk & Talk	Green Board
3.2	Surface integrals	6	Chalk & Talk	Green Board
3.3	Theorems of Green, Gauss and Stokes.(only problems)	8	Chalk & Talk	Green Board
UNIT -4 FOURIER TRANSFORMS				
4.1	Fourier transforms	4	Chalk & Talk	Green Board
4.2	Fourier cosine transform	3	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.3	Fourier sine transform	3	Chalk & Talk	Green Board
4.4	Alternative form of Fourier complex integral formula	1	Chalk & Talk	Green Board
4.5	Relationship between Fourier transform and Laplace transform	3	Discussion	Green Board
4.6	Finite Fourier transforms	3	Discussion	Green Board
4.7	Inversion formulas	3	Discussion	Green Board
UNIT -5 PROPERTIES OF FOURIER TRANSFORM				
5.1	Linear property	2	Chalk & Talk	Green Board
5.2	Shifting property	2	Chalk & Talk	Green Board
5.3	Modulation theorem	2	Chalk & Talk	Green Board
5.4	Conjugate symmetry property	2	Chalk & Talk	Green Board
5.5	Transform of derivatives	3	Chalk & Talk	Green Board
5.6	Derivatives of the transform	2	Chalk & Talk	Green Board
5.7	Convolution theorem	2	Chalk & Talk	Green Board
5.8	Parsevel's identity (without proof)	2	Chalk & Talk	Green Board
5.9	Finite Fourier transforms of derivatives.	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:

At the end of the course, the 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	K1	PSO1&
CO 2	Compute divergence and curl of vectors	K1 & K2	PSO3
CO 3	Solve problems on line and surface integrals	K1 & K3	PSO5
CO 4	Compute Fourier sine and cosine transforms	K1, K2 & K3	PSO4
CO 5	Describe the properties of Fourier transforms	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	**3**	**2**	**2**	**2**
CO3	**2**	**3**	**2**	**2**
CO4	**3**	**2**	**2**	**2**
CO5	**2**	**2**	**2**	**3**

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

□ Weakly Correlated -**1**

COURSE DESIGNER:

1. Dr.V.Vanitha
2. Mrs. R. Jenovi Rosary Deepa

Forwarded By

(Dr. E. Helena)

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
USMA	19G3SB1	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -4 THE BRACHISTOCHRONE PROBLEM				
4.1	The Brachistochrone Problem	2	Chalk & Talk	Black Board
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	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 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. E. Helena)

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
USMA	19G4CC7	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3 SERIES OF POSITIVE TERMS				
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	

	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	% of Assessment
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 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. E. Helena)

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
USMA	19G4CC8	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -4 THEORY OF MATRICES				
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. E. Helena)

HOD's

Signature & Name

II B.Sc Mathematics

SEMESTER –IV

For those who joined in 2019 onwards

SKILL DEVELOPMENT-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G4SB2	FOUNDATIONS OF MATHEMATICS	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, Number Theory and Algebra and to solve problems.

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

Hyperbolic functions , Inverse Hyperbolic functions.

UNIT II : COMPLEX QUANTITIES **(6 HRS.)**

Logarithms of complex quantities

UNIT III: PROPERTIES OF INTEGERS **(6 HRS.)**

Euclid's First Theorem, Euclid's Second Theorem, Law of Trichotomy, Fundamental Theorem of Arithmetic, Division Algorithm, **Calculation of LCM and GCD (Self – Study).**

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

Congurences and Chinese Remainder theorem (Only Statements & Problems).

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

Triangular inequalities, Relation between arithmetic, harmonic and geometric means, Cauchy-Schwartz inequality **(Self – Study)**.

TEXT BOOKS:

1. S. Narayanan and T. K. Manicavachagam Pillai - Trigonometry , S. Viswanathan (Printers and Publishers), Pvt. Ltd, 2008.
   UNIT I Chapter 4 – Section 2.1, 2.2, 2.3
   UNIT II Chapter 5 - Section 5

2. Dr. N. Vijayarangan **-** *Foundations of Mathematics* – Scitech Publications (India) Pvt. Ltd
   UNIT III Chapter 3 (Relevant topics)
   UNIT IV Chapter 3 (Relevant topics)

3. Dr. S Arumugam and A Thangapandi Issac – *Sequences and series*-New Gamma Publishing House-July 2010.
   UNIT V Chapter 2 (Section 2.1 - 2.4)

REFERENCE BOOKS:

1. P.R.Vittal & V.Malini - Algebra & Trigonometry, Margham Publications, 2008.
2. Sudhir K Pundir singh- Algebra & Trigonometry, Meerat Pragathi prakashan,2003
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 TRIGONOMETRY				
1.1	Hyperbolic functions	3	Chalk & Talk	Black Board
1.2	Inverse Hyperbolic functions	3	Chalk & Talk	Black Board
UNIT -2 COMPLEX QUANTITIES				
2.1	Logarithms of complex quantities	6	Chalk & Talk	Black Board
UNIT -3 PROPERTIES OF INTEGERS				
3.1	Euclid's First Theorem, Euclid's Second Theorem, Law of Trichotomy, Fundamental Theorem of Arithmetic, Division Algorithm	4	Chalk & Talk	Black Board
3.2	Calculation of LCM and GCD	**2**	Discussion, Seminar	Black Board
UNIT -4 CONGRUENCES				
4.1	Congurences	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	Chinese Remainder theorem (Only Statements & Problems).	3	Chalk & Talk	Black Board
UNIT -5 INEQUALITIES				
5.1	Triangular inequalities	3	Chalk & Talk	Black Board
5.2	Relation between arithmetic, harmonic and geometric means.	2	Chalk & Talk	Black Board
5.3	Cauchy-Schwartz inequality	**1**	Discussion, Seminar	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 some expansions of Trigonometric functions.	K1	PSO 1
CO 2	Explain Logarithms of Complex Quantities.	K2	PSO 5
CO 3	Describe properties of integers.	K2	PSO 4
CO 4	Solve puzzles using Chinese Remainder Theorem.	K3	PSO 2
CO 5	Analyse inequalities.	K3	PSO 3

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

Mapping COs Consistency with POs

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

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

□ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Mrs NIGILA RAGAVAN**

Forwarded By

(Dr. E. Helena)

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
USMA	19G5CC9	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.4	Dense sets and Completeness	4	Chalk & Talk	Black 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. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS

SEMESTER –V

For those who joined in 2019 onwards

SKILL DEVEOPMENT-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G5CC10	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**			
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	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	point: Analytical method and related problems			
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	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	of a force about an axis and related problems.			
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	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	body on a rough inclined plane under a force parallel to the 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 TAXONOMY)	PSOs ADDRESSED
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. E. Helena)

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
USMA	19G5CC11	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	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Feasible Solution in terms of net Evaluations.			
2.3	Pivotal element, Computational procedure of the simplex method, Tie for entering basis vector and leaving basis vector, problems.	3	Chalk & Talk	Black 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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Duality and Simplex method, related problems	5	Chalk & Talk	Black Board
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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -5	**GAMES AND STRATEGIES**			
5.1	Introduction, Two person zero sum games, Some basic terms, The maximin-minimax principle, problems.(Self Study)	3	Chalk & Talk Discussion	Black Board
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 (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
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. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

EMPLOYABILITY-40%

SKILL DEVLOPMENT-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G5CC12	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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
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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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 %

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 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. E. Helena)

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
USMA	19G5ME1	COMPUTER PROGRAMMING IN C	Lecture	3	3

COURSE DESCRIPTION

This course provides skills in designing and writing simple programs in C.

COURSE OBJECTIVES

To enable the students to learn the basic concepts of data input, output, operators, expressions, control statements , arrays, handling of strings and user – defined functions. to write C programs.

UNIT –I C FUNDAMENTALS, OPERATORS AND EXPRESSIONS (9 HRS.)

Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data types – Declaration of Variables – Assigning Values to Variables – Defining Symbolic Constants – **Operators & Expressions : Introduction – Arithmetic of operators – Relational operators – Logical operators – Assignment operators – Increment and decrement operators** – Conditional operator – Bitwise operators – Special operators – Arithmetic expressions – Evaluation of expressions – Precedence of arithmetic operators – Some computational problems – Type conversions in expressions – Operator precedence and associativity – Mathematical functions.

UNIT –II DATA INPUT, OUTPUT & CONTROL STATEMENTS (9 HRS.)

Reading a character – Writing a character – Formatted input – Formatted output - Decision Making and Branching : IF Statement – the IF ELSE statement – Nesting of IF..ELSE statements – The ELSE IF ladder – The switch

statement - The ?: Operator – the GOTO statement – Decision Making and Looping : The WHILE statement – the DO statement – the FOR statement – Jumps in loops.

UNIT –III ARRAYS (9 HRS.)

One Dimensional Array – Two Dimensional Arrays – Initializing Two Dimensional Arrays

UNIT –IV HANDLING OF STRINGS (9 HRS.)

Handling of Character Strings : Declaring and Initializing String Variables – Reading String from Terminal – Writing Strings to Screen – Arithmetic Operations on Characters – Putting Strings together – Comparison of two Strings – String Handling Functions – Table of Strings

UNIT –V USER – DEFINED FUNCTIONS (9 HRS.)

Need for User-Defined Functions – A Multi-function Program – Form of C Functions – Return Values and their Types – Calling a Function – Category of Functions – No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – Handling of Non-Integer Functions – Nesting of Functions – Recursion – Functions with Arrays - the scope and lifetime of variables in functions.

TEXT BOOK:

2. E. Balagurusamy - *Programming in ANSI C* - Tata McGraw-Hill Publishing Company Ltd. – Sixth Edition - 2014 **(NO CASE STUDY)**

   UNIT I : Chapters: 2, 3
   UNIT II : Chapters: 4, 5, 6
   UNIT III : Chapter: 7: Section 7.1 – 7.6
   UNIT IV : Chapter 8
   UNIT V : Chapter: 9

REFERENCES:

3. Byron S. Gotfried - *Theory and problems of programming with C* (Schaums Series) Tata – McGraw Hills Edition - 1991.
4. Kernighan & Brian.W - *The C programming language*, Prentice – Hall of

India, Private Limited, New Delhi - 1999.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**C FUNDAMENTALS, OPERATORS AND EXPRESSIONS**			
1.1	Character Set ,C Tokens , Keywords and Identifiers , Constants, Variables, Data types, Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants and Example programs.	3	Chalk & Talk	Black Board
1.2	Operators & Expressions, Arithmetic of operators Relational operators, Logical operators , Assignment operators , Increment and decrement operators.(self study)	4	Discussion	Black Board
1.3	Conditional operator , Bitwise operators ,Special operators , Arithmetic expressions , Evaluation of expressions , Precedence of arithmetic operators , Some computational problems , Type conversions in expressions , Operator precedence and associativity, Mathematical functions and Example programs.	2	Chalk & Talk	Black Board
UNIT -2	**DATA INPUT, OUTPUT & CONTROL STATEMENT**			
2.1	Reading a character , Writing a character , Formatted input , Formatted output,- Decision Making and Branching : IF Statement , the IF ELSE	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	statement, Nesting of IF..ELSE statements , The ELSE IF ladder , The switch statement and Example programs.			
2.2	The ?: Operator , the GOTO statement , Decision Making and Looping : The WHILE statement , the DO statement , the FOR statement , Jumps in loops and Example programs.	4	Chalk & Talk	Black Board
UNIT -3 ARRAY				
3.1	One Dimensional Array and Example programs.	5	Chalk & Talk	Black Board
3.2	Two Dimensional Array, Initializing Two Dimensional Array and Example programs.	4	Chalk & Talk	Black Board
UNIT -4 HANDLING OF STRING				
4.1	Handling of Character Strings : Declaring and Initializing String Variables , Reading String from Terminal , Writing Strings to Screen and Example programs.	4	Chalk & Talk	Black Board
4.2	Arithmetic Operations on Characters , Putting Strings together , Comparison of two String and Example programs..	3	Chalk & Talk	Black Board
4.3	String Handling Functions , Table of String and Example programs.	2	Chalk & Talk	Black Board
UNIT -5 USER – DEFINED FUNCTION				
5.1	Need for User-Defined Functions , A Multi-function Program , Form of C	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Functions , Return Values and their Types , Calling a Function and Example programs.			
5.2	Category of Functions , No Arguments and No Return Values , Arguments but No Return Values , Arguments with Return Values , Handling of Non-Integer Function and Example programs	4	Chalk & Talk	Black Board
5.3	Nesting of Functions – Recursion – Functions with Arrays and Example programs.	2	Chalk & Talk	Black Board
5.4	The scope and lifetime of variables in functions and Example programs.	1	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 various data types and operators in C	K1	PSO1
CO 2	Summarize Decision Making Branching, looping statements and arrays	K1, K2	PSO3
CO 3	Categorize function, pointers and structures.	K1 & K3	PSO5
CO 4	Describe Strings and String Handling Functions.	K1, K2, K3	PSO2
CO 5	Create C program for real life problems	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	2	3	2	2
CO3	2	2	2	2	3
CO4	2	3	2	2	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	2	3	2
CO3	2	3	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. E. Helena)

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
USMA	19G5MEP1	C PRACTICALS	Practical	2	2

LIST OF PROGRAMS

1) To find the area of a square
2) To find the area of a circle
3) To find the area of a triangle
4) To find Simple interest
5) Solving Quadratic equations
6) Checking primes
7) Arranging numbers in ascending order
8) Reversing digits of a number
9) Finding the values of ncr, npr.
10) Palindrome
11) Matrix addition
12) Matrix multiplication
13) Transpose of a matrix
14) Trace of a matrix
15) Alphabetizing names
16) Mean and Standard deviation
17) To find Correlation Coefficient
18) Straight line fitting by the method of least squares
19) To print n th Fibonacci number
20) To read a series of words form a terminal

COURSE DESIGNER:

1.Mrs. A. Sheela Roselin

2.Dr. E. Helena

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

SKILL DEVLOPMENT-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G5ME2	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 $\alpha-$ CUT PROPERTIES AND FUZZY NUMBERS (15 HRS.)

Additional properties of $\alpha-$ 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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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				
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**	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	(Self Study)			

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 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. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –V

For those who joined in 2019 onwards

EMPLOYABILITY-40%

SKILL DEVELOPMENT-30%

ENTREPRENEURSHIP-30%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G5SB3	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:

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 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 -	2	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	problems.		Talk	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
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. E. Helena)

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
USMA	19G5SB4	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	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Cipher.			
UNIT -5 DATA ENCRYPTION STANDARD				
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 %

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 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. E. Helena)

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
USMA	19G6CC13	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:

2. T. K. Manicavachagam Pillay,Dr. S. P.Rajagopalan and Dr .S. Sattanathan- S.Viswanathan (Printers & Publishers),*Complex Analysis,*Pvt.Ltd., 2007.
3. 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	2	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	problems and theorems.			
UNIT -2	**BILINEAR TRANSFORMATIONS**			
2.1	Introduction, Elementary transformations, definitions and theorems.	5	Chalk & Talk	Green 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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	Laurent's series, theorems and problems	5	Discussion	Green Board
4.3	Zeros of an analytic function, singularities, definitions, theorems and problems	4	Chalk & Talk	Green Board
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 %

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 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. E. Helena)

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
USMA	19G6CC14	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 SIMPLE HARMONIC MOTION (15 HRS.)

Introduction-Simple harmonic motion in a straight line-General solution of the S.H.M. equation-Geometrical representation of a S.H.M.-Change of origin-**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)**-Simple pendulum-Period of oscillation of a simple pendulum-Equivalent simple pendulum-The seconds pendulum.

UNIT –V 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)**.

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 10 (10.1-10.7 & 10.12-10.15)

   UNIT V: Chapter 11

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	4	Chalk &Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Fixed Smooth Plane and problems.			
3.2	Direct Impact of Two Smooth Spheres, Loss of kinetic energy due to direct impact of smooth spheres, derivations and problems.	4	Chalk & Talk	Black 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	2	Discussion	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	period in two perpendicular directions (self study)			
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.	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 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. E. Helena)

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
USMA	19G6CC15	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 of sequencing, Basic terms used in sequencing, Processing n jobs through two machines and related problems.	5	Chalk & Talk	Green 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	3	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	for carrying inventories, The Inventory decisions.			
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	5	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	problems.			
UNIT -5	**NETWORK SCHEDULING BY PERT/CPM**			
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	

	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	% of Assessment
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 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. E. Helena)

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
USMA	19G6ME3	OBJECT ORIENTED PROGRAMMING WITH C++	Lecture	3	3

COURSE DESCRIPTION

This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development.

COURSE OBJECTIVES

In the expanding field of computer education, one of the fastest growing, versatile and much sought after languages is C++. This course enables the students to understand the fundamentals of the language, the concepts related to the syntax of the language.

UNIT –I BEGINNING WITH C++, TOKENS, EXPRESSIONS AND CONTROL STRUCTURES, FUNCTIONS IN C++ (9 HRS.)

What is C++ - Applications of C++ - A simple C++ program – More C++ statements – Structure of C++ program – **Tokens – Keywords – Identifiers – Variables** – Operators – Manipulators – Expressions – **Control structures.** Introduction – The main function – **Function prototyping** – Call by reference – Return by reference – Return by reference – Inline function – Default arguments – Const arguments – Function overloading – Friend and virtual functions – Math library functions.

UNIT –II CLASSES AND OBJECTS (9 HRS.)

Introduction – C structures revisited – Specifying a class – Defining member functions – A C++ program with class – Making an outside function inline – Nesting of member functions – Private member functions – Arrays within a

class – Memory allocation for objects – Static data members – Static member functions – Arrays of objects – Objects as function arguments – Friendly functions – Returning objects – Const member functions – Pointers to members – Local classes.

UNIT – III CONSTRUCTORS, DESTRUCTORS AND OPERATOR OVERLOADING (9 HRS.)

Introduction – Constructors and destructors - Defining operator overloading – Overloading unary operators - Overloading binary operators - Overloading binary operators using friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions.

UNIT – IV INHERITANCE (9 HRS.)

Introduction – Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Virtual base classes – Abstract classes – Constructors in derived classes – Member classes: Nesting of classes.

UNIT –V POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM

(9 HRS.)

Introduction – Pointers – Pointers to objects –this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – Polymorphism.

TEXT BOOK:

2. E. Balagurusamy - *Object Oriented Programming with C++*, Tata McGraw-Hill Publishing Company Limited – Fourth Edition - 2007.

   UNIT I : Chapter 2- 2.1 to 2.4, 2.6, Chapter 3- 3.2 to 3.24
   Chapters 4- 4.1 to 4.11

   UNIT II : Chapter 5- 5.1 to 5.19,

   UNIT III: Chapter 6-6.1 to 6.11 Chapter 7- 7.1 to 7.8,

   UNIT IV: Chapter 8-8.1 to 8.12

   UNIT V : Chapter 9- 9.1 to 9.7

REFERENCES:

3. Robert Lafore – Object-Oriented Programming in Microsoft C++ - Galgotia publication – Third Edition – 2004.
4. Stephen Prata - *C++* primer plus - Galgotia publication pvt. Ltd. – 1997.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 BEGINNING WITH C++, TOKENS, EXPRESSIONS AND CONTROL STRUCTURES, FUNCTIONS IN C++				
1.1	What is C++, Applications of C++, A simple C++ program, More C++ statements, Structure of C++ program and example programs.	2	Chalk & Talk	Black Board
1.2	Tokens, Keywords, Identifiers, Variables, Operators, Manipulators Expressions, Control structures. (self study)	1	Discussion	Black Board
1.3	Introduction, The main function, Function prototyping (self study) Call by reference, Return by reference	4	Chalk & Talk	Black Board
1.4	Inline function, Default arguments, Const arguments and example programs.	1	Chalk & Talk	Black Board
1.5	Function overloading, Friend and virtual functions, library functions and example programs.	1	Chalk & Talk	Black Board
UNIT -2 CLASSES AND OBJECTS				
2.1	Introduction, C structures revisited , Specifying a class, Defining member functions	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.2	A C++ program with class , Making an outside function inline ,Nesting of member functions , Private member functions, programs	1	Chalk & Talk	Black Board
2.3	Arrays within a class, Memory allocation for objects, Static data members, Static member functions, programs.	3	Chalk & Talk	Black Board
2.4	Arrays of objects, Objects as function arguments, Friendly functions , Returning objects, programs.	2	Chalk & Talk	Black Board
2.4	Const member functions , Pointers to members , Local classes, programs.	2	Chalk & Talk	Black Board
UNIT -3 CONSTRUCTORS, DESTRUCTORS AND OPERATOR OVERLOADING				
3.1	Introduction, Constructors and destructors, programs.	1	Chalk & Talk	Black Board
3.2	Defining operator overloading , Overloading unary operators , Overloading binary operators , Overloading binary operators using friends, programs	2	Chalk & Talk	Black Board
3.3	Manipulation of strings using	4	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	operators , Rules for overloading operators, programs		Talk	Board
3.4	Type conversions, programs	2	Chalk & Talk	Black Board
UNIT -4 INHERITANCE				
4.1	Introduction , Defining derived classes and programs.	1	Chalk & Talk	Black Board
4.2	Single inheritance , Making a private member inheritable , Multilevel inheritance and programs	4	Chalk & Talk	Black Board
4.3	Multiple inheritance , Hierarchical inheritance , Hybrid inheritance and programs	2	Chalk & Talk	Black Board
4.4	Virtual base classes , Abstract classes, Constructors in derived classes, Member classes: Nesting of classes and programs.	2	Chalk & Talk	Black Board
UNIT -5 POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM				
5.1	Introduction , Pointers , Pointers to objects and programs.	2	Chalk & Talk	Black Board
5.2	this pointer , Pointers to derived classes and programs.	3	Chalk & Talk	Black Board
5.3	Virtual functions , Pure virtual functions	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	and programs.			
5.4	Polymorphism and programs.	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 %

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 the features of C++ supporting object oriented programming	K1	PSO1
CO 2	Describe classes and objects	K1, K2	PSO2
CO 3	Distinguish Constructors and Destructors and Explain overloading concepts	K1 & K3	PSO4
CO 4	Classify Inheritance in C++	K1, K2, K3	PSO4
CO 5	Design C++ programs for real life situations	K2 & K4	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**	**2**	**2**	**2**
CO3	**2**	**2**	**2**	**3**	**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**	**2**	**2**	**2**
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. E. Helena)

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
USMA	19G6MEP2	C++ PRACTICALS	Practicals	2	2

List of Programs

1. To add two integers
2. Multiply two integers.
3. Divide one integer by the other.
4. To find if the number is odd or even.
5. To find if the given number is negative or non-negative
6. To find the area of the square
7. To find the greatest between two integers
8. To find the area of rectangle
9. To find the area of triangle
10. To find Simple Interest
11. To illustrate the use of dereference operator
12. To illustrate the use of default arguments.
13. Using Function overloading to find the areas of square, rectangle, triangle and circle.
14. To illustrate the use of object arrays.
15. To swap private data of classes
16. To illustrate returning objects
17. To show the use of overloaded constructors
18. To overload binary operators
19. To illustrate single inheritance
20. To illustrate multiple inheritance

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

SKILL DEVELOPMENT-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G6ME4	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. E. Helena)

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
USMA	19G6ME5	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 &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	Board
3.4	**Distributive Lattices (self study)**	2	Discussion	Black Board
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. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS

SEMESTER –VI

For those who joined in 2019 onwards

SKILL DEVELOPMENT - 60%

EMPLOYABILITY-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G6ME6	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	5	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Variables, Universe of Discourse, Inference Theory forPredicate Calculus.			
UNIT -3 RECURSION				
3.1	Characteristic function	**1**	Discussion, Seminar	Black Board
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.	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 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. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G6SB5	MATLAB	Lecture	2	2

For those who joined in 2019 onwards

SKILL DEVELOPMENT-100%

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. E. Helena)

HOD's

Signature & Name

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

EMPLOYABILITY-50%

SKILL DEVLOPMENT-50%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	19G6SB6	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.3	Problem of Fibonacci.	2	Chalk & Talk	Black Board
UNIT -5 NECKLACE PROBLEM AND BURNSIDE'S LEMMA				
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. E. Helena)

HOD's

Signature & Name

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
USMA	19UGSLG1	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 will 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 BLOOM'S TAXONOMY)	PSOs ADDRESSED
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

Forwarded By

(Dr. E. Helena)

HOD's

Signature & Name