FATIMA COLLEGE (AUTONOMOUS)

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

NAME OF THE DEPARTMENT: MATHEMATICS

NAME OF THE PROGRAMME : B. Sc

PROGRAMME CODE : USMA

ACADEMIC YEAR : 2023 – 2024

Minutes of the Board of Studies meeting in the Department of Mathematics to be implemented from 2023-2024 onwards.

Venue : B5
Convened on : 5.4.2023 Convened at : 2pm.

Members Present : Name with Initial and Designation)

1.	Dr. S. Muralisankar Professor School of Mathematics Madurai Kamaraj University Madurai - 625021	University Nominee
2.	Dr. M. Navaneethakrishnan Associate Professor & Head Department of Mathematics Kamaraj College, Thoothukudi - 628003	Subject Expert.
3.	Dr. D. Muthuramakrishnan Dean of Sciences, Head of the Department Department of Mathematics National College, Trichy - 620001	Subject Expert.
4.	Dr. K. P. V. Preethi. Assistant Professor Department of Mathematics	Alumna.

	Saiv Bhanu Kshatriya College; Aruppukottai - 626101	
5.	Ms. S. Sindhuja, Senior Statistical Officer NSSO(FOD)TN(N) Chennai. R.O. Ministry of Statistics & P.I Government of India. Chennai.	Industrialist
6.	Dr. A. Paulin Mary Associate Professor.	Head of the Dept.
7.	Dr. A. Rajeswari Assistant Professor	Dean of Academic Affairs
8.	Mrs. A. Sheela Roselin	Staff Member
9.	Dr. Sr. M. Fatima Mary	"
10.	Dr. C. Prasanna Devi	"
11.	Dr. F. Helena	"
12.	Mrs. Nigila Ragavan	"
13.	Mrs. M. Teresa Nirmala.	"
14.	Dr. V. Vanitha	"
15.	Dr. M. V. Selvi Meenakshi	"
16.	Dr. A. Jose Little Flower	"
17.	Mrs. R. Rajeswari	"
18.	Mrs. R. Jenovi Rosary Deepa	"
19.	Mrs. B. Velthamary Jacqueline.	"
20	Mrs. J. Annal Mercy	"
21.	Dr. K. Amutha	"
22.	Dr. M. Subha	"
23	Dr. J. Joseline Charishma	

Minutes of the Board of Studies:

1. PRESENTATION OF THE ACTION TAKEN REPORT

Action Taken Report for 2022-2023 UG

S.No	Common Suggestions offered in the Previous Board.	Action Taken for the Academic year 2022-23
1.	The Board recommended to introduce Variable Separable method in Unit I, "Differential Equations of First order' of 19M2CC3/19G2CC3, "Differential Equations".	Introduced Variable Separable method in Unit-I, 'Differential Equations of First order' of the Core paper 19M2CC3/19G2CC3 - "Differential Equations"
2.	The Board recommended to introduce variable Separable method in Unit-I, "Differential Equations of First order' of 21M2ACP2, "Allied Mathematics -II"	Introduced Variable Separable method in Unit-I, 'Differential Equations of First order' of the Allied paper 21M2ACP2, "Allied Mathematics -II"
3.	The Board recommended to introduce Linear Equations in Unit-III, Exact 'Differential Equations and Higher orders of 21M4ACC2, "Allied Mathematics -I"	Introduced Linear Equations in Unit-III, Exact "Differential Equations and Higher orders of the Allied paper, 21M4ACC2, - "Allied Mathematics -I"
4.	The Board recommended to remove Unit IV, "Simple	Removed Unit IV, "Simple Harmonic

Harmonic Motion' and to include 'Moment of Inertia' and to rearrange the units according to the chapters given in the text-book of 22M6CC14 - Dynamics.	Motion' and included "Moment of Inertia' and rearranged the units according to the chapters given in the text book of 22M6CC14 - Dynamics.

Action Taken Report for 2022-2023 - PG.

1.	The Board recommended to remove 'Bertrand's Theorem' from Unit-V, Classification of orbits' of 19PG1M4, "Classical Mechanics"	Removed 'Bertrand's theorem' from Unit V, Classification of orbits of 19PG1M4 - Classical Mechanics.
2.	The Board recommended to remove Appendix from Unit-I - 'The Real and Complex number Systems' of 19PG1M2 - Real Analysis	Removed Appendix from Unit I - 'The Real and Complex number Systems' of 19PG1M2 - Real Analysis
3.	The Board recommended to include Justification of the power Series Method in Unit-II - "Linear Equations with Variable Coefficients" of 19PG2M7 - Differential Equations	Introduced Justification of the power Series Method' in unit - II - Linear Equations with Variable Coefficients' of 19PG2M7 - Differential Equations.
4.	The Board recommended to remove Unit V; Functions of Several Variables' and to divide 'Unit III' into two Units in 22PG2M6 - Advanced	Removed 'Functions of Several Variables - Unit V' and divided Unit III into two Units in 22PG2M6 - Advanced

	Real Analysis	Real Analysis.
5.	The Board recommended to remove Unit V, "Measure and integration in a Product Space' and to divide the first Unit into two Units of 22PC2M9 - Measure and Integration.	Removed Unit V 'Measure and integration in a Product Space' and divided the first Unit into two Units of 22PC2M9, Measure and integration:
6.	The Board recommended to introduce 'The Tychonoff theorem in Unit V - Countability and Separation axioms' of 19PC3M12 - Topology.	Introduced 'The Tychonoff's theorem in Unit V - Countability and Separation axioms of 19PC3M12, - Topology

New Courses Introduced in 2022-23.

1.	The Board passed the Syllabi for new Skill based paper - 22M4SB2 - Trigonometry	The Syllabi passed by the board for new Skill based paper - 22M4SB2 - Trigonometry was implemented
2.	The Board passed the Syllabi for new Self Learning Course - 22UG&M4SL - Financial Mathematics	The Syllabi passed by the Board for new Self Learning Course - 22UG&MSL - Financial Mathematics was implemented.
3.	The Board passed the Syllabi for new Value	The Syllabi passed by the Board for

	added Certificate Course 22UCVACM1 - Quantitative and Qualitative methods for Competitive Examinations.	new Value added Certificate Course. 22UCVACM1 - Quantitative and Qualitative Methods for Competitive Examinations. was implemented.
4.	The Board passed the Syllabi for new value added Certificate Course 22UCVACC1 - 'Concrete Mathematics'	The Syllabi passed by the Board for new Value added Certificate Course. 22UCVACC1 'Concrete Mathematics was implemented

Core Courses Introduced - UG.

S.No	Course Code	Course Title	Relevance to L	R	N	H	Scope for EMP	ENTRE	SD	Need for Introduction
1.	23MCC1	Algebra and Trigonometry				✓	✓			As per TANSCHE Guide Lines.
2.	23MCC2	Differential Calculus				✓	✓			
3.	23MCC3	Analytical Geometry				✓	✓			
4.	23MCC4	Integral Calculus.				✓	✓			

Elective Courses Introduced

S.No	Generic/ Discipline Specific with Sem.	Course Code	Course Title	Relevance to L R N G	Scope for Emp Entre SD	Need for Introduction
1.	Discipline Specific	EC1	Mathematics -I&II for Physics	✓ ✓		As per TANSCHE Guide Lines
2.	Discipline Specific	EC2	Mathematics -II for Physics Chemistry	✓ ✓		

Skill Enhancement / Foundation / Ability Enhancement Course.

S.No.	SEC/FC/ AEC	Course Code	Course Title	Relevance to L R N G	Scope for Emp Entre SD	Need for Introduction.
1.	SEC 1	23M1SE1/ 23G1SE1	Quantitative Aptitude	✓	✓	As per TANSCHE Guide Lines
2.	FC	23M1FC/ 23G1FC	Foundation Course.	✓	✓	
3.	SEC 2	23M2SE3/ 23G2SE3	Mathematics for Competitive Examinations	✓	✓	
4.	SEC 3	23M2SE2/ 23G2SE2	Data Interpretation	✓	✓	

I PG - Core Courses Introduced:

S.No	Course Code	Course Title	Relevance to				Scope for			Need for Introduction
			L	R	N	C	Emp	Entre	SD	
1.	23PG1M1	Algebraic Structures				✓			✓	As per TANSCHE Guidelines
2.	23PG1M2	Real Analysis-I				✓			✓	
3.	23PG1M3	Differential Equations				✓			✓	As per TANSCHE Guidelines
4.	23PG2M4	Advanced Algebra				✓			✓	As per TANSCHE Guidelines
5.	23PG2M5	Real Analysis-II				✓			✓	
6.	23PG2M6	Mechanics				✓				

Elective Courses Introduced.

S.No	Generic/ Discipline Specific	Course Code	Course Title	Relevance to				Scope for			Need for Introduction
				L	R	N	C	Emp	Entre	SD	
1.	Discipline Specific	23PG1ME3	Number Theory				✓				As per TANSCHE Guidelines
2.	D.S.	23PG1ME4	Fuzzy Sets and its applications				✓				
3	D.S.		Mathematical Statistics				✓				
4.	D.S.		Graph Theory				✓				

Skill Enhancement / Ability Enhancement Course

S.No.	SEC / AECC	Course Code	Course Title	Relevance to				Scope for			Need for Introduction
				L	R	N	A	Emp	Entre	SD	
1.	SEC 1	23PA1SE1	Optimization Method - I			✓					As per TANSCHE Guidelines
2.	SEC 2	23PA2SE1	Optimization Method - II			✓					

1. Introduction of Value-added Course - Certificate / Diploma / Advanced Diploma - Nil.

2. Introduction of Purely Skill-Embedded Certificate / Diploma / Advanced Diploma Course - Nil.

The Board Scrutinized II & III UG Syllabus and II PG Syllabus. The Board approved the Syllabus for new elective papers:

23M5ME1 / 23G5ME1 - Numerical Methods and
23M5MG2 / 23G5ME2 - Vector Calculus and Fourier Transforms.

The Board also approved the following Allied / Elective Courses offered by the Mathematics Department (BF) for B.Sc. I:

19G1AL11 - Discrete mathematics, 19G2AL12 - Operations Research

The Board approved the following papers for III and IV Semesters of M.Sc Mathematics

III Semester

CC7 - Complex Analysis
CC8 - Measure theory
CC9 - Topology
EC5 - Algebraic Number Theory
Core Industry Module - Industrial Statistics.
SE3 - By the Dept - Research Methodology

IV Semester

Functional Analysis
Differential Geometry
Combinatorics
EC6 - Formal Languages
Professional Competency Skill Enhancement Course - NET / UGC-CSIR / SET / TRB Competitive Examinations - By the Dept.

The Board approved the following papers for III, IV, V & VI Semesters of B.Sc Mathematics.

III Semester

CC5 - Vector Calculus and its Applications.
CC6 - Differential Equations and its Applications

EC3 - Mathematics for Computer Science-I
Linear Programming

SEC 4 - MATLAB.
SEC 5 - Fourier Transforms.

Semester IV

CC7 - Industrial Statistics.

CC8 - Mathematical Analysis

EC4 - 1. Mathematics for Computer Science II

2. Mathematics II for Chemistry

SEC7 - Applications of Differential Equations and Calculus

Semester V

CC9 - Abstract Algebra

CC10 - Real Analysis

CC11 - Mathematical Modelling

EC5 - Numerical Methods.

EC6 - Fuzzy Sets and its Applications

CC12 - Project with Viva Voce.

Semester VI

CC13 - Linear Algebra

CC 14 - Complex Analysis

CC 15 - Mechanics.

EC7 - Operations Research.

EC8 - Lattices and Boolean Algebra

The Board Scrutinized II & III UG Syllabus and there are no changes in the Syllabus. The following are the Papers without any change.

UG - 19M3CC5/19G3CC5 - Modern Algebra
19M3CC6/19G3CC6 - Advanced Statistics.
19M4CC7/19G4CC7 - Sequences and Series
19M4CC8/19G4CC8 - Linear Algebra
19M5CC9/19G5CC9 - Real Analysis
19M5CC10/19G5CC10 - Statics
19M5CC11/19G5CC11 - Linear Programming
19M5CC12/19G5CC12 - Graph Theory
19M6CC13/19G6CC13 - Complex Analysis
22M6CC14/22G6CC14 - Dynamics
19M6CC15/19G6CC15 - Operations Research
19M6ME3/19G6ME3 - Fuzzy Mathematics
19M6ME4/19G6ME4 - Theory of Numbers
19M6ME5/19G6ME5 - Lattices and Boolean Algebra
19M6ME6/19G6ME6 - Discrete Mathematics

PG - 19PG3M9 - Measure and Integration
19PG3M10 - Optimization Techniques
19PG3M11 - Combinatorics
19PG3M12 - Topology
21PG3ME1/19PG3ME2 - Fuzzy Sets and its Applications/Numerical Analysis
19PG4M13 - Complex Analysis
19PG4M14 - Statistics
19PG4M15 - Methods of Applied Mathematics
19PG4M16 - Functional Analysis
19PG4ME3 - Formal Languages
19PG4ME4 - Algebraic Graph Theory

NAME	SIGNATURE
1. Dr. A. Paulin Mary	A.P
2. S. MURALISANKAR	5/4/23
3. Dr. M. Navaneethakrishnan	5/4/23
4. Dr. D. Muthuramakrishnan	5/4/2023
5. Dr. K.P.V. Preethi	5/04/2023
6. A. Sheela Roselin	
7. Dr. Sr. M. Fatima Mary	
8. Dr. C. Prasanna Devi	
9. Dr. E. Helena	

10. Mrs. Nigila Ragavan

11. M. Teresa Nirmala M. Teresa Nil

12. Dr. V. Vanitha

13. Dr. M.V. Sethu Meenakshi M.V.

14. Dr. Jose Little Flower A. Joselif

15. Mrs. R. Rajeswari R.R

16. Mrs. R. Jenovi Rosary Deepa

17. Mrs. B. VETHAMARY JACQULINE B.V

18. Mrs. J. Annaal Mercy J. Anl M

~~19.~~

19. Dr. K. Amutha.

20. Dr. M. Subha M.S

21. Dr. J. JOSELINE CHARISMA

22. Dr. A. Rajeswari 5/04/2023

05/04/2023

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

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	23G1CC1	Algebra and Trigonometry	5	5	40	60	100
2.		23G1CC2	Differential Calculus	5	5	40	60	100
3.	II	23G2CC3	Analytical Geometry (Two & Three Dimensions)	5	5	40	60	100
4.		23G2CC4	Integral Calculus	5	5	40	60	100
5.	III	19G3CC5	Modern Algebra	6	4	40	60	100
6.		19G3CC6	Advanced Statisics	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.		22G6CC14	Dynamics	5	4	40	60	100
15.		19G6CC15	Operations Research	5	4	40	60	100
			TOTAL	**83**	**60**			

ELECTIVES-15 CREDITS

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	V	5ME1/ 23G5ME2	Numerical Methods / Vector Calculus and Fourier Transforms	5	5	40	60	100
2.	VI	19G6ME3 /19G6ME4	Fuzzy Mathematics / Theory of Numbers	5	5	40	60	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	23G1GEI1/ 23G1GEJ1	Discrete Mathematics (offered to BCA & IT)	5	5	40	60	100
2.	II	23G2GEI2/ 23G2GEJ2	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	23G1VE	Personal Values	1	1	40	60	100

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
2.		23G1SE1	Quantitative Aptitude	2	2	40	60	100
3.		23G1FC	Bridge Mathematics	2	2	40	60	100
4.	II	23G2VE	Values for Life	1	1	40	60	100
5.		23G2SE2	Mathematics for Competitive Examinations	2	2	40	60	100
6.		23G2SE3	Data Interpretation	2	2	40	60	100
7.	III	21G3EE	Environmental Education	1	1	40	60	100
8.		19G3SB1	Applications of Calculus and Differential Equations	2	2	40	60	100
9.	IV	21G4EE	Gender Studies	1	1	40	60	100
10.		22G4SB2	Trigonometry	2	2	40	60	100
11.	V	21UAD5ES	Family Life Education	1	1	40	60	100
12.		19G5SB3	Data Interpretation & Analytical Aptitude	2	2	40	60	100
13.		19G5SB4	Cryptography	2	2	40	60	100
14.	VI	21UAD6ES	Life Skills	1	1	40	60	100
15.		19G6SB5	MATLAB	2	2	40	60	100
16.		19G6SB6	Combinatorial Mathematics	2	2	40	60	100
			TOTAL	**20**	**20**			

EXTRA CREDIT COURSES

COURSE CODE	COURSE	HRS.	CREDITS	SEMESTER IN WHICH THE COURSE IS OFFERED	CIA MKS	ESE MKS	TOTAL MARKS
21UGGE2SL	Mathematics and Economics for Competitive Exams	-	2	II	40	60	100
22UGGA4SL	Financial Mathematics	-	2	VI	40	60	100
19UGG6SL	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

22UGVACG1 – Value Added Crash Course (Concrete Mathematics)

PART – V – 1 CREDIT

OFF-CLASS PROGRAMMES - ALL PART-V

SHIFT - I

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

OFF-CLASS PROGRAMMES

ADD-ON COURSES

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

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

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

I B.Sc. Mathematics

SEMESTER – I

For those who joined in 2023 onwards

Employablility-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	23G1CC1	ALGEBRA & TRIGONOMETRY	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on Algebra and Trigonometry.

COURSE OBJECTIVES

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

UNIT –I **(15 HRS.)**

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

UNIT –II **(15 HRS.)**

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

UNIT –III **(15 HRS.)**

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

UNIT –IV **(15 HRS.)**

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

UNIT –V **(15 HRS.)**

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

TEXT BOOKS:

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

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

COURSE CONTENTS & LECTURE SCHEDULE:

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

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

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr. V. Vanitha)

I B.Sc. Mathematics

SEMESTER – I

For those who joined in 2023 onwards

Employablitiy-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	23G1CC2	DIFFERENTIAL CALCULUS	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on differential and integral calculus.

COURSE OBJECTIVES

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

UNIT –I SUCCESSIVE DIFFERENTIATION: (15 HRS.)

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

UNIT –II PARTIAL DIFFERENTIATION (15 HRS.)

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

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

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

UNIT –IV ENVELOPE: (15 HRS.)

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

UNIT –V CURVATURE **(15 HRS.)**

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

TEXT BOOKS:

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

REFERENCES:

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

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

COURSE CONTENTS & LECTURE SCHEDULE:

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

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

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.V. Vanitha)

I B.Sc Mathematics

SEMESTER –I

For those who joined in 2023 onwards

Employability-40%

Skill Development-60%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	23G1SE1	QUANTITATIVE APTITUDE	Lecture	2	2

COURSE DESCRIPTION

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

COURSE OBJECTIVES

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

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

Problems related with ages

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

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

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

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

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

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

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

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

TEXT BOOK:

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

UNIT I : Chapter 8

UNIT II : Chapter 12

UNIT III : Chapter 14

UNIT IV : Chapter 17

UNIT V : Chapter 18

COURSE CONTENTS & LECTURE SCHEDULE:

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

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

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. V. Vanitha**

Forwarded By

(Dr.V. Vanitha)

I B.Sc. Mathematics

SEMESTER – I

For those who joined in 2023 onwards

Employability-60%

Skill Development-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	23G1FC	FOUNDATION COURSE –BRIDGE MATHEMATICS	Lecture	2	2

COURSE DESCRIPTION

This course provides the basic concepts in various branches of Mathematics

COURSE OBJECTIVES

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

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

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

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

Fundamental principle of counting. Factorial n.

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

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

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

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

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

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

TEXT BOOK:

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

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ALGEBRA				
1.1	Binomial theorem, General term, middle term	3	Chalk & Talk	Green Board
1.2	problems based on these concepts	3	Chalk & Talk	Green Board
UNIT -2 SEQUENCES AND SERIES				
2.1	Fundamental principle of counting	3	Chalk & Talk	Green Board
2.2	Factorial n	3	Chalk & Talk	Green Board
UNIT -3 PERMUTATIONS AND COMBINATIONS				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board

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

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. V. Vanitha**

Forwarded By

(Dr.V. Vanitha)

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	23G1GEI1/ 23G1GEJ1	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	5	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Equations Coefficient of Determination		Talk	Board
3.2	Eigen Values, Eigen Vectors	5	Chalk & Talk	Black Board
3.3	Digitalization Process	8	Chalk & Talk	Black Board
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. R. Rajeshwari

2. J. Annaal Mercy

Forwarded By

(Dr. V. Vanitha)

HOD's

Signature & Name

I B.Sc. Mathematics

SEMESTER – II

For those who joined in 2023 onwards

Employability-

Skill Development-

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	23G2CC3	ANALYTICAL GEOMETRY (Two & Three Dimensions)	Lecture	5	5

COURSE DESCRIPTION

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

.

COURSE OBJECTIVES

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

UNIT –I **(15 HRS.)**

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

UNIT –II **(15 HRS.)**

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

UNIT –III **(15 HRS.)**

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

UNIT –IV **(15 HRS.)**

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

UNIT –V **(15 HRS.)**

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
2. Robert C. Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York, 1961.
3. Earl W. Swokowski and Jeffery A. Cole, Algebra and Trigonometry with Analytic Geometry, Twelfth Edition, Brooks/Cole, Cengage Learning, CA, USA, 2010.
4. William H. McCrea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, New York, 2006.
5. John F. Randelph, Calculus and Analytic Geometry, Wadsworth Publishing Company, CA, USA, 1969.
6. Ralph Palmer Agnew, Analytic Geometry and Calculus with Vectors, McGraw-Hill Book Company, Inc. New York, 1962.

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Pole, Polar - conjugate points and conjugate lines	5	Chalk & Talk	Green Board
1.2	diameters – conjugate diameters of an ellipse	5	Chalk & Talk	Green Board
1.3	semi diameters- conjugate diameters of hyperbola	5	Chalk & Talk	Green Board
UNIT -2				
2.1	Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter	5	Chalk & Talk	Green Board
2.2	Equation of a straight line, circle, conic	5	Chalk & Talk	Green Board
2.3	Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola	5	Chalk & Talk	Green Board
UNIT -3				
3.1	System of Planes	5	Chalk & Talk and Discussion	Green Board
3.2	Length of the perpendicular	5	Chalk & Talk	Green Board
3.3	Orthogonal projection	5	Chalk & Talk	Green Board
UNIT - 4				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.1	Representation of line–angle between a line and a plane	5	Chalk & Talk	Green Board
4.2	co – planar lines–shortest distance between two skew lines	5	Chalk & Talk	Green Board
4.3	length of the perpendicular– intersection of three planes	5	Chalk & Talk	Green Board
UNIT -5				
5.1	Equation of a sphere-general equation	5	Chalk & Talk	Green Board
5.2	section of a sphere by a plane-equation of the circle-tangent plane-	5	Chalk & Talk	Green Board
5.3	angle of intersection of two spheres- condition for the orthogonality- radical plane	5	Discussion	Green Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	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
CO 1	Find pole, polar for conics, diameters, conjugate diameters for ellipse and hyperbola
CO 2	Find the polar equations of straight line and circle, equations of chord, tangent and normal and to find the asymptotes of hyperbola
CO 3	Explain in detail the system of Planes
CO 4	Explain in detail the system of Straight lines
CO 5	Explain in detail the system of Spheres

Mapping COs Consistency with PSOs

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

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

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr. V. Vanitha)

I B.Sc. Mathematics

SEMESTER – II

For those who joined in 2023 onwards

Employablity-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
USMA	23G2CC4	INTEGRAL CALCULUS	Lecture	5	5

COURSE DESCRIPTION

This course provides broad view on Integral Calculus.

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COURSE OBJECTIVES

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

UNIT –I . **(15 HRS.)**

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

UNIT –II **(15 HRS.)**

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

UNIT –III **(15 HRS.)**

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

UNIT –IV **(15 HRS.)**

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

UNIT –V **(15 HRS.)**

Geometric and Physical Applications of Integral calculus.

TEXT BOOKS:

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

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

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions	5	Chalk & Talk	Green Board
1.2	integration of product of powers of algebraic and logarithmic functions	5	Chalk & Talk	Green Board
1.3	Bernoulli's formula, Feyman's technique of integration	5	Chalk & Talk	Green Board
UNIT -2				
2.1	Envelopes	5	Chalk & Talk	Green Board
2.2	Multiple points	4	Chalk & Talk	Green Board
2.3	classification of double points	4	Chalk & Talk	Green Board
2.4	cusps, nodes and conjugate	4	Chalk &	Green

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	points		Talk	Board
2.5	Asymptotes	4	Chalk & Talk	Green Board
2.6	Curve Tracing	4	Chalk & Talk	Green Board
UNIT -3 REDUCTION FORMULA				
3.1	Reduction formula for sinnx, cosnx, tannx, secnx	4	Chalk & Talk and Discussion	Green Board
3.2	Reduction formula for cosnx cotnx, cosecnx,	4	Chalk & Talk	Green Board
3.3	Reduction formula for sinmxcosnx	2	Chalk & Talk	Green Board
UNIT - 4 MULTIPLE INTEGRALS				
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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.3	Cosine Series	5	Discussion	Green Board

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

CO5	2	2	2	3	2

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.V. Vanitha)

I B.Sc. MATHEMATICS
SEMESTER – II

For those who joined in 2023 onwards

Employability-40%

Skill Development- 40%

Entrepreneurship-20%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	23G2SE3	DATA INTERPRETATION	Lecture	2	2

COURSE DESCRIPTION

This course helps the students to prepare for competitive examinations.

COURSE OBJECTIVES

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

UNIT –I DATA INTERPRETATION **(6 HRS.)**

Tabulation, Bar Graphs, Pie Charts, Line Graphs

UNIT –II ANALOGY **(6 HRS.)**

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

UNIT –III CODING AND DECODING **(6 HRS.)**

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

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

Direction sense & Logical Venn Diagrams

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

Inserting the missing Character and Mathematical operations

TEXT BOOK:

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

   UNIT I: Section II

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

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

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

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

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

COURSE CONTENTS & LECTURE SCHEDULE:

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

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

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

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

Scholastic									12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

CO5	2	2	2	3	2

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. V. Vanitha**

Forwarded By

(Dr.V. Vanitha)

I B.Sc Mathematics

SEMESTER –II

For those who joined in 2023 onwards

Employablitiy-100%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	23G2SE2	Mathematics for Competitive Examinations	Lecture	2	2

COURSE DESCRIPTION

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

COURSE OBJECTIVES:

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

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

Problems related Simplification of numbers

UNIT II: PERCENTAGE **(6 HRS.)**

Percentage-Important facts and formulae-Problems.

UNIT III: PERMUTATION AND COMBINATION **(6 HRS.)**

Permutations and Combinations – formulae and problems.

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

Blood Relations- Direction Sense Test-Problems

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

Arithmetical Reasoning – Problems

TEXT BOOK:

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

UNIT I : Chapter 4

UNIT II : Chapter 11

UNIT III : Chapter 30

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

UNIT IV : Section I-Chapter 5 & 8

UNIT V : Section I-Chapter15

REFERENCE BOOKS:

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

2. R.Gupta - Super Quicker Arithmetic.

COURSE CONTENTS & LECTURE SCHEDULE:

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

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

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

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.V.Vanitha**

Forwarded By

(Dr.V. Vanitha)

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	23G2GEI2/ 23G2GEJ2	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Complementary Slackness Theorem, Duality and Simplex Method	8	Chalk & Talk	Black Board
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	% 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	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
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. V. Vanitha)

HOD's

Signature & Name

III B.Sc. Mathematics

SEMESTER –V

For those who joined in 2023 onwards

Employability-40%

Skill Development-40%

Entrepreneurship-20%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	23G5ME1	NUMERICAL METHODS	UG-Elective	5	5

COURSE DESCRIPTION

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

COURSE OBJECTIVE

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

UNIT I: ALGEBRAIC AND TRANSCENDENTAL EQUATIONS [15 HRS]

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

UNIT II: SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS [15 HRS]

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

UNIT III: FINITE DIFFERENCES & INTERPOLATION [15 HRS]

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

UNIT IV: NUMERICAL DIFFERENTIATION AND INTEGRATION [15 HRS]

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

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

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

TEXT BOOK:

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

Unit I : Chapter III -Sections 1 to 5

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

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

Chapter VI - Sections 1 to 5.

Chapter VII-Sections 1 to 5.

Chapter VIII - Sections 1 to 5

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

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

REFERENCE BOOKS:

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

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

COURSE OUTCOMES

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

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

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

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

EVALUATION PATTERN

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

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. **Teresa Nirmala**
2. **R. Rajeshwari**

Forwarded By

(Dr.V. Vanitha)

HOD's

Signature & Name

III B.Sc. Mathematics

SEMESTER –V

For those who joined in 2023 onwards

Employability-20%

Skill Development-40%

Entrepreneurship-40%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
USMA	23G5ME2	VECTOR CALCULUS AND FOURIER TRANSFORMS	UG-Elective	5	5

COURSE DESCRIPTION

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

COURSE OBJECTIVE

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

.

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

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

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

Divergence and Curl – solenoidal and irrotational vectors.

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

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

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

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

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

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

TEXT BOOKS:

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

   UNIT I: Chapter 5: Sections – 5.0 - 5.3

   UNIT II: Chapter 5: Section – 5.4

   UNIT III: Chapter 7: Sections – 7.0 - 7.3

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

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

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

REFERENCE BOOKS:

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

COURSE OUTCOMES

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

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

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

EVALUATION PATTERN

UG CIA Components

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

			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

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. **R. Rajeshwari**
2. **Dr. K. Amutha**

Forwarded By

(Dr.V. Vanitha)

HOD's

Signature & Name