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 : UAMA

ACADEMIC YEAR : 2022 – 2023

Minutes of the Board of Studies
Department of Mathematics
To be implemented from 2022-2023 onwards.

Venue : B5
Convened on : 16.3.2022 Convened at : 2pm.

Members Present : (Names with Initial and Designation)

1.	Dr. Pandia Raja Principal Thyagaraja College, Madurai - 625009 Mail ID : pandiaraja.d@gmail.com Mobile No : 7708091177	University Nominee
2.	Dr. M. Navaneethakrishnan Associate Professor & Head Department of Mathematics Kamaraj College, Thoothukudi - 628003 Mail ID : navaneetha n65@yahoo.co.in Mobile No : 9443871893	Subject Expert.
3.	Dr. D. Muthuramakrishnan, Dean of Science. Head of the Department, Department of Mathematics National College. Trichy - 620001 Mail ID : dmuthuramakrishnan@gmail.com	Subject Expert.

4.	MS. S. Sindhuja Senior Statistical officer National Statistical office (FOD) Ministry of Statistics and Programme implementation B Wing 2nd Floor Shastri Bhavan, Haddows Road Nungambakkam, Chennai - 600006	Industrialist.
5.	Dr. K.P.V. Preethi Assistant Professor Department of Mathematics Saiva Bhanu Kshatriya College Aruppukottai - 626101 Mail ID: vpreethi90@yahoo.com Mobile No: 9655234040	Alumna.
6.	Dr. A. PAULIN MARY	Head of the Department
7.	Mrs. A. Sheela Roselin. Dr. Sr. M. Fatima Mary Dr. C. Prasanna Devi Dr. E. Helena Mrs. Nigila Raghavan Mrs. M. Teresa Nirmala Dr. V. Vanitha Dr. M.V. Selvi Meenakshi Mrs. R. Tenovi Rosary Deepa	

Mrs. B. Velkamary Jackquiline
Mrs. J. Annal Mercy.

Minutes of the Board of Studies.
1. Presentation of the Action Taken Report.

Action Taken Report for 2021-2022 - UG

S.No.	Common Suggestions offered in the Previous Board	Action Taken for the Academic year 2021-2022.
1.	The Board recommended to Shift Computer programming with C and object oriented Programming with C++ from V and VI Semesters to I and II Semesters respectively as Allied papers.	Computer programming with C and object oriented programming with C++ are Shifted to I and II Semesters as Allied Papers.
2.	The Board passed the Syllabus for new Self-learning interdisciplinary Course, "Mathematics and Economics for Competitive Examinations" (21UGLM2SL) for advanced learners of I UG.	The Syllabi passed by the Board for new Self-Learning Interdisciplinary Course, "Mathematics and Economics for Competitive Examinations" (21UGLM2SL) for advanced learners of I UG was Implemented

Action Taken Report for 2021-2022 - PG.

S.No.	Common Suggestions offered in the Previous Board	Action Taken for the Academic year 2021-2022
1.	The Board recommended to remove "Crisp Sets and Fuzzy Sets - Unit I, Classical logic an over View, Fuzzy logic & Necessity measures in Unit IV of 19PG3MEI - Fuzzy Sets and its Applications.	Removed Classical Logic an over View, Fuzzy logic in Unit I: Crisp Sets and Fuzzy Sets & Necessity measure, in Unit IV, Fuzzy Measures of 19PG3MEI - Fuzzy Sets and its Applications and the code no is changed to 21PG3ME
2.	The Board passed the Syllabi for new Self-Learning Course, "Verbal and Numerical Aptitude for National Examination", (21PGLM2SL) for advanced learners of I PG.	The Syllabi passed by the Board for new Self-learning inter disciplinary Course, "Verbal and Numerical Aptitude for National Examination (21PGLM2SL) for advanced learners of I PG was Implemented.

Change of Course Title : Nil

S.NO	Old Course Code	New Course Code	Old course Title	New Course Title	Need for Change

New Courses Introduced - UG.

S.No.	Course Code	Course Title	Relevance To Global	Scope for Emp	Need for Introduction
1.	21UGLM2SL	Mathematics and Economics for Competitive Examinations	✓	✓	Enable the Students to appear for Competitive Exams

New Courses Introduced - PG.

S.No	Course Code	Course Title	Relevance To National level	Scope for Emp.	Need for Introduction
1.	21PGLM2SL	Verbal and Numerical Aptitude for National Examinations	✓	✓	Enable the Students to appear for National Examinations

Revised Courses.

S.No	Course Code	Course Title	No & Title of Units Revised with the Content Specified	% of Revision	Need For Revision
1.	21PG3MEI	Fuzzy Sets and its applications	Unit I: Crisp Sets and		

		Fuzzy sets: Classical Logic: an overview, Fuzzy Logic Unit IV Fuzzy Measures: Necessity Measures.	10% removed	Based on the feed back from the Students. Syllabus is too heavy for 4 hrs.

2. Updations of open Educational Resources in the list of references of each Course - UG.

S.No	Course code	Course Title	Details of Updation
1.	19M3CC5/19M3CC5	Modern Algebra	1. https://www.khanacademy.org 2. https://www.britanica.com/
2.	19M4CC6/19M4CC7	Sequences and series	1. https://www.cuemath.com/ 2. https://www.ncert.nic.in/
3.	19M6ME3	Object Oriented Programming with C++.	1. https://www.cplusplus.com/ 2. https://www.cppreference.com/
4.	19M3ACC1	Allied Mathematics - I	1. https://mathworld.wolfram.com 2. www.britannica.com

Updation of open Educational Resources in the list of reference of Course - PG.

S.No.	Course code	Course Title	Details of Updation.
1.	19PG3M10	Optimization Techniques	http://books.google.com/books/about Mathematical Optimization Techniques./
2.	19PG4ME3	Formal Languages	1. http://cse.iitkgp.ac.in/Course theory 2. https://people.cs.uchicago.edu/

3. Revision of Courses - UG.

S.No	Course Code	Course Title	No & Title of Units Revised with the Revised Content.	Y. of Revision	Need for Revision
1.	19M2CC3/ 19G2CC3	Differential Equations	Unit I, Differential Equations of First order; variable Separable Method	21 Included	It is the basic for the other Content of the Unit
2.	21M2AC P2	Allied Mathematics-II	Unit I, Diff. Equations of First order	21 included	Basic of the Unit.

		Variable Separable method			
3.	21M3AcC1	Allied Mathematics - I	Unit II, Differential equations of the first order, variable Separable method	5% included	Basic for the other Content of the Unit
4.	22M6CC14	Dynamics	Unit IV; Simple Harmonic Motion is removed and "Moment of Inertia" is included. Units are rearranged according to the chapters given in the text book	20% changed	Students learn "Simple Harmonic Motion" in XI Std Physics.

Revisions of Courses - PG.

S.No	Course Code	Course Title	No of Units With the Content	% Of Revision	Need for Revision
1.	19PG1M4	Classical Mechanics	Unit V Bertrand's Theorem	2% Removed	Too heavy for the Students.
2.	19PG2M7	Differential Equations	Unit II - Linear Equations	2% Included	It is needed to

			with variable Coefficients Section 9 of Chapter - 3.		prove other theorems
3.	19PM1M2	Real Analysis	Unit I: Remove appendix.	2% Removed.	Too heavy for the Students
4.	22PM2M6	Advanced Real Analysis	Unit V - Functions of Several variables removed and other four Units are converted into V units.	20% Removed.	Board felt the Syllabus is too heavy.
5.	22PM3M9	Measure and Integration	Unit V - Measure and Integration in a Product Space is removed and the first Unit is divided into two Units	20% Removed.	Board felt the Syllabus is heavy.
6.	19PM3M12	Topology	Unit V - Countability and Separation axioms - Tychonoff's Theorem.	2% Introduced	It is an important Concept in Topology

4. New Courses Introduced - UG

S.NO.	Course Code	Course Title	Relevance to Global	Scope for Skill Dev.	Need for Introduction
1.	22M4SB2/ 22G4SB2	Trigonometry	✓	✓	To enhance Conceptual understanding and problem solving ability
2.	22UGMA4 SL	Financial Mathe-matics	National Level	Emp. S.D ✓ ✓	To enhance employabi-lity Skills

New Courses Introduced - PG. - Nil.

5. Introduction of Purely Skill - Embedded certificate / Diploma / Advanced Diploma value added Course other than the value added Course that is already being offered.

The Certificate Course 'Speed Arithmetic' is changed Also 'Computational Mathematics' is changed.

S.No	Course Code	Course Title		Skills Sharpened	Course Out Come
1.	22UGVACM1	Quantitative and Qualitative Methods for Competitive Examinations.	NEW	Analytical Reasoning Skills	1. Develop General Mental Ability 2. Apply Analytical Reasoning 3. Understand Pattern, and Problem Solving techniques to apply for Competitive exams.
2	22UGVACG1	Concrete Mathematics	NEW	Analytical Reasoning Skills	

6. Rubrics for Internship / Project

S.No.	C_1 20mks	C_2 20mks	CIA Total 40mks	External 60mks.
1.	Followup after 15 days	Viva Voce after Completion	40	60.

For the 2020-2023 Batch, ~~the~~ the V and VI Semester Elective papers are interchanged as.

19M5ME1/- Computer Programming with C
19G5ME1

19M5MEP1/19G5MEP1 - C Practical

19M5ME2/- Object Oriented Programming
19G5ME2 with C++

19M5MEP2/- C++ Practical
19G5MEP2

19M6ME3/- Fuzzy Mathematics
19G6ME3

19M6ME4 - Theory of Numbers.

For 2021-2024 Batch the following are the 2nd and 3rd year papers.

19M3CC5/19G3CC5 - Modern Algebra,
19M3CC6/19G3CC6 - Advanced Statistics
19M4CC7/19G4CC7 - Sequences & Series
19M4CC8/19G4CC8 - Linear Algebra
19M5CC9/19M5CC9 - Real Analysis
19M5CC10/19G5CC10 - Statics
19M5CC11/19G5CC11 - Linear Programming

19M5CC12/19G5CC12 – Graph Theory
19M6CC13/19G6CC13 – Complex Analysis
22M6CC14/22G6CC14 – Dynamics
19M6CC15/19G6CC15 – Operations Research
19M3SB1/19G3SB1 – Applications of Calculus and Differential Equations.
22M4SB2/22G4SB2 – Trigonometry

Name	Signature
1. Dr. A. Paulin Mary	
2. Dr D. Pandia Raja	Absent
3. Dr. M. Navaneetha Krishnan	
4. Dr. D. Muthuramakrishnan	
5. Dr. K. P. V. Preethi	
6. Ms. S. Sindhuja	Absent
7. Dr N. Malathi	16/03/22
8. Mrs. A. Sheela Roselin	
9. Dr. Sr. M. Fatima Mary	
10. Dr. C. Prasanna Devi	
11. Dr. E. Helena	

12. Mrs. Nigila Ragavan

13. Mrs. M. Teresa Nirmala

14. Dr. V. Vanitha

15. Mrs. R. Jenovi Rosary Deepa.

16. Mrs. B. Vetha Mary Jackelin

17. Mrs. J. Annal Mercy

18.

18. Dr. K. Amutha

19 Dr. M. Rasi

20. Dr. M. V. Sethu Meenakshi

16/3/22

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

5% added

I B.Sc Mathematics

SEMESTER –II OLD

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M2CC3	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
2.2	Linear equations with variable coefficients	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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
CO 1	3	3	2	2	2
CO 2	2	2	3	2	2
CO 3	2	2	2	2	3
CO 4	2	2	2	3	2
CO 5	2	3	2	2	2

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	3	2	2
CO 2	2	3	2	3
CO 3	3	3	2	2
CO 4	2	3	2	3
CO 5	2	3	2	3

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

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

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

I B.Sc Mathematics

SEMESTER –II NEW

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M2CC3	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.)

Variables Separable method – **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
2.2	Linear equations with variable coefficients	4	Chalk & Talk	Green Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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
CO 1	3	3	2	2	2
CO 2	2	2	3	2	2
CO 3	2	2	2	2	3
CO 4	2	2	2	3	2
CO 5	2	3	2	2	2

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	3	2	2
CO 2	2	3	2	3
CO 3	3	3	2	2
CO 4	2	3	2	3
CO 5	2	3	2	3

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

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

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

5% added

OLD

I B.Sc Physics

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	21M2ACP2	ALLIED MATHEMATICS –II	Lecture	5	5

COURSE DESCRIPTION

This course provides the fundamentals concepts in various branches of Mathematics

COURSE OBJECTIVES

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

UNIT I: DIFFERENTIAL EQUATIONS - I (15 HRS.)

Homogeneous Equations in x and y – Non homogeneous equations of first degree in x and y - Exact equations. Linear equations of 2^{nd} order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S .

UNIT II: DIFFERENTIAL EQUATIONS – II (15 HRS.)

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

UNIT III: LAPLACE TRANSFORMS & FOURIER SERIES (15 HRS.)

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

UNIT IV: VECTOR CALCULUS-DIFFERENTIATION OF VECTORS(15HRS.)

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

UNIT V: INTEGRATION OF VECTOR AND ITS APPLICATIONS (15 HRS.)

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

TEXT BOOK:

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

REFERENCES :

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

Digital Open Educational Resources

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**DIFFERENTIAL EQUATIONS - I**			
1.1	Variable Seperable	2	Chalk & Talk	Black Board
1.2	Homogeneous Equations in x and y – Non homogeneous equations of first degree in x and y	4	Chalk & Talk	LCD
1.3	Exact equations	4	Lecture	PPT & White board
1.4	Linear equations of 2 nd order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S	5	Lecture	Smart Board
UNIT - 2	**DIFFERENTIAL EQUATIONS – II**			
2.1	Equations of second order with variable coefficients (Right hand side of the form e^{ax}, x^{n})	8	Lecture	Green Board Charts
2.2	Equations of second order with variable coefficients (R.H.S of the form cos ax, sin ax, $e^{ax}v$)	7	Chalk & Talk	Green Board
UNIT - 3	**LAPLACE TRANSFORMS & FOURIER SERIES**			
3.1	Standard Transforms	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.2	Inverse Laplace Transforms	4	Chalk & Talk	Black Board
3.3	Application of Laplace transform to differential equations	4	Chalk & Talk	Black Board
3.4	Fourier series	4	Discussion	Black Board
UNIT - 4 VECTOR CALCULUS-DIFFERENTIATION OF VECTORS				
4.1	Vector differentiation, velocity, acceleration, vector operators	4	Chalk & Talk	Black Board
4.2	Gradient , divergence, curl Their simple properties	4	Chalk & Talk	Black Board
4.3	Directional derivatives	3	Discussion	Black Board
4.4	Solenoidal – irrotational vectors	4	Chalk & Talk	Black Board
UNIT -5 INTEGRATION OF VECTOR AND ITS APPLICATIONS				
5.1	Line, surface and volume integrals	8	Chalk & Talk	Black Board
5.2	Gauss, Greens and Stokes theorems	7	Chalk & Talk	Black Board

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

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

CIA	
Scholastic	35
Non Scholastic	5
	40

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	3	2	2
CO 2	2	3	2	2
CO 3	3	2	2	2
CO 4	2	2	2	3
CO 5	3	2	2	2

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr. Sr. Fatima Mary**

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

NEW

I B.Sc Physics

SEMESTER –II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	21M2ACP2	ALLIED MATHEMATICS –II	Lecture	5	5

COURSE DESCRIPTION

This course provides the fundamentals concepts in various branches of Mathematics

COURSE OBJECTIVES

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

UNIT I: DIFFERENTIAL EQUATIONS - I 5% **(15 HRS.)**

Variable separable - Homogeneous Equations in x and y – Non homogeneous equations of first degree in x and y - Exact equations. Linear equations of 2^{nd} order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S .

UNIT II: DIFFERENTIAL EQUATIONS – II **(15 HRS.)**

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

UNIT III: LAPLACE TRANSFORMS & FOURIER SERIES **(15 HRS.)**

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

UNIT IV: VECTOR CALCULUS-DIFFERENTIATION OF VECTORS(15HRS.)

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

UNIT V: INTEGRATION OF VECTOR AND ITS APPLICATIONS (15 HRS.)

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

TEXT BOOK:

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

REFERENCES :

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

Digital Open Educational Resources

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**DIFFERENTIAL EQUATIONS - I**			
1.1	Variable Seperable	2	Chalk & Talk	Black Board
1.2	Homogeneous Equations in x and y – Non homogeneous equations of first degree in x and y	4	Chalk & Talk	LCD
1.3	Exact equations	4	Lecture	PPT & White board
1.4	Linear equations of 2 nd order with constant coefficient with terms of the form $e^{ax}v$ on R.H.S	5	Lecture	Smart Board
UNIT - 2	**DIFFERENTIAL EQUATIONS – II**			
2.1	Equations of second order with variable coefficients (Right hand side of the form e^{ax}, x^{n})	8	Lecture	Green Board Charts
2.2	Equations of second order with variable coefficients (R.H.S of the form cos ax, sin ax, $e^{ax}v$)	7	Chalk & Talk	Green Board
UNIT - 3	**LAPLACE TRANSFORMS & FOURIER SERIES**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Standard Transforms	3	Chalk & Talk	Black Board
3.2	Inverse Laplace Transforms	4	Chalk & Talk	Black Board
3.3	Application of Laplace transform to differential equations	4	Chalk & Talk	Black Board
3.4	Fourier series	4	Discussion	Black Board
UNIT - 4 VECTOR CALCULUS-DIFFERENTIATION OF VECTORS				
4.1	Vector differentiation, velocity, acceleration, vector operators	4	Chalk & Talk	Black Board
4.2	Gradient , divergence, curl Their simple properties	4	Chalk & Talk	Black Board
4.3	Directional derivatives	3	Discussion	Black Board
4.4	Solenoidal – irrotational vectors	4	Chalk & Talk	Black Board
UNIT -5 INTEGRATION OF VECTOR AND ITS APPLICATIONS				
5.1	Line, surface and volume integrals	8	Chalk & Talk	Black Board
5.2	Gauss, Greens and Stokes theorems	7	Chalk & Talk	Black Board

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	3	2	2
CO 2	2	3	2	2
CO 3	3	2	2	2
CO 4	2	2	2	3
CO 5	3	2	2	2

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1.Dr. Sr. Fatima Mary

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

5% added

OLD

II B.Sc Chemistry

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19C3ACM1	ALLIED MATHEMATICS – I	Lecture	5	5

COURSE DESCRIPTION

The course develops Mathematical knowledge needed by the chemistry students.

COURSE OBJECTIVES

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

UNIT I: MATRICES (15 HRS.)

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

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

Derivatives of hyperbolic functions - Successive differentiation and Leibnitz theorem.

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

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

UNIT IV : TRIGONOMETRIC SERIES (15 HRS.)

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

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

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

TEXT BOOKS:

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

REFERENCE BOOK:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1			**MATRICES**	
1.1	Matrices	3	Chalk & Talk	Black Board
1.2	Rank of a Matrix	2	Chalk & Talk	Black Board
1.3	Elementary Transformations	2	Chalk & Talk	Black Board
1.4	Simultaneous Linear Equations	2	Chalk & Talk	Black Board
1.5	Cayley Hamilton theorem	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.6	Eigen Values and Eigen Vectors	3	Chalk & Talk	Black Board
UNIT -2 HIGHER DERIVATIVES OF FUNCTIONS				
2.1	Derivatives of hyperbolic functions	8	Chalk & Talk	Black Board
2.2	Successive differentiation and Leibnitz theorem	7	Chalk & Talk	Black Board
UNIT -3 EXACT DIFFERENTIAL EQUATIONS AND HIGHER ORDER DIFFERENTIAL EQUATIONS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Exact equations	2	Chalk & Talk	Black Board
3.2	Linear equations of 2nd order with constant coefficient with erms of the form $e^{ax}v$ on R.H.S	13	Chalk & Talk	Black Board
UNIT -4 TRIGONOMETRIC SERIES				
4.1	Expansions of sin nx, cos nx, tan nx,	8	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	$\sin^n x$, $\cos^n x$			
4.2	Series of $\sin x$, $\cos x$	7	Chalk & Talk	Black Board
UNIT -5 MEASURES OF DISPERSION AND MOMENTS				
5.1	Mean, Median, Mode, Standard Deviation	7	Chalk & Talk	Black Board
5.2	Karl Pearson's coefficient of skewness	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.3	Moments	1	Chalk & Talk	Black Board
5.4	Skewness and Kurtosis using moments	4	Chalk & Talk	Black Board

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

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

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	3	3	2
CO 2	2	3	2	2
CO 3	2	3	2	2
CO 4	2	2	2	3
CO 5	3	2	2	2

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

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

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

NEW 5%

II B.Sc Chemistry

SEMESTER –III

For those who joined in 2019 onwards

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

COURSE DESCRIPTION

The course develops Mathematical knowledge needed by the chemistry students.

COURSE OBJECTIVES

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

UNIT I: MATRICES (15 HRS.)

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

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

Derivatives of hyperbolic functions - Successive differentiation and Leibnitz theorem.

UNIT III : EXACT DIFFERENTIAL EQUATIONS AND HIGHER ORDER DIFFERENTIAL EQUATIONS 5% **(15 HRS.)**

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

UNIT IV : TRIGONOMETRIC SERIES (15 HRS.)

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

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

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

TEXT BOOKS:

1.S. Arumugam & Isaac, *Ancillary Mathematics*, New Gamma Publishing House, Nov 2004.

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

3.S. Arumugam & Isaac, *Calculus*, New Gamma Publishing House, 2005.

REFERENCE BOOK:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1			**MATRICES**	
1.1	Matrices	3	Chalk & Talk	Black Board
1.2	Rank of a Matrix	2	Chalk & Talk	Black Board
1.3	Elementary Transformations	2	Chalk & Talk	Black Board
1.4	Simultaneous Linear Equations	2	Chalk & Talk	Black Board
1.5	Cayley Hamilton theorem	3	Chalk & Talk	Black Board
1.6	Eigen Values and Eigen	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Vectors			
UNIT -2 HIGHER DERIVATIVES OF FUNCTIONS				
2.1	Derivatives of hyperbolic functions	8	Chalk & Talk	Black Board
2.2	Successive differentiation and Leibnitz theorem	7	Chalk & Talk	Black Board
UNIT -3 EXACT DIFFERENTIAL EQUATIONS AND HIGHER ORDER DIFFERENTIAL EQUATIONS				
3.1	Exact equations	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.2	Linear equations of 2nd order with constant coefficient with erms of the form $e^{ax}v$ on R.H.S	13	Chalk & Talk	Black Board
UNIT -4 TRIGONOMETRIC SERIES				
4.1	Expansions of $\sin nx$, $\cos nx$, $\tan nx$, $\sin^n x$, $\cos^n x$	8	Chalk & Talk	Black Board

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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	sis using moments			Board

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

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

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

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

EVALUATION PATTERN

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

UG CIA Components

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

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Appraise rank of a matrix, Eigen value and Eigen vectors	K1	PSO1

CO 2	Obtain higher derivatives of functions	K1 & K2	PSO3
CO 3	Solve exact and higher order differential equations	K1 & K3	PSO5
CO 4	Expand trigonometric functions	K1, K2 & K3	PSO4
CO 5	Define Moments, kurtosis and to apply the same	K2 & K4	PSO2

Mapping COs Consistency with PSOs

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

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	3	3	2
CO 2	2	3	2	2
CO 3	2	3	2	2
CO 4	2	2	2	3
CO 5	3	2	2	2

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1.Dr. C.Prasanna Devi

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

OLD **20% replaced**

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	19M6CC14	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	4	Chalk &Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	impact, Impact of a Smooth Sphere on a 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	2	Discussion	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	simple harmonic motions of the same 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
CO 1	3	3	2	2	2
CO 2	2	3	2	2	2
CO 3	2	2	2	3	2
CO 4	2	2	2	3	3
CO 5	2	2	2	3	2

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	2	2	3
CO 2	3	2	2	2
CO 3	2	2	2	3
CO 4	2	2	2	3
CO 5	2	2	2	3

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

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

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name

NEW 20%

III B.Sc. MATHEMATICS
SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAMA	22M6CC14	DYNAMICS	Lecture	5	4

COURSE DESCRIPTION

This course will provide a sound knowledge of the concepts and principles in Dynamics.

COURSE OBJECTIVES

The aim of the course is to help the students to understand the behaviour of projectiles, collision of elastic bodies, Simple harmonic motion and its properties, motion under the action of central forces.

UNIT –I PROJECTILES (15 HRS.)

Definitions-Path of a Projectile-Characteristic of the motion of a Projectile – Velocity of the projectile in magnitude and direction- Range on an Inclined Plane– Motion on the surface of a smooth inclined plane - Enveloping parabola.

UNIT –II IMPULSIVE FORCES (10 HRS.)

Impulse-Impulsive forces-Impact of two bodies- -Loss of Kinetic Energy in impact - Motion of a Shot and Gun – Impact of water on a surface.

UNIT –III COLLISION OF ELASTIC BODIES (15 HRS.)

Introduction-Definitions-Fundamental laws of impact-Impact of a Smooth Sphere on a Fixed Smooth Plane-Direct Impact of Two Smooth Spheres-Loss of kinetic energy due to direct impact of smooth spheres-oblique impact of two smooth spheres-Loss of kinetic energy due to oblique impact of two smooth spheres-Dissipation of energy due to impact- Compression and

Restitution.

UNIT –IV MOTION UNDER THE ACTION OF CENTRAL FORCES

(20 HRS.)

Velocity and acceleration in polar coordinates-Equations of motion in polar coordinates-Differential equation of the central orbit-Pedal Equation of some of the well known curves – Velocities in a central orbit – Apses and apsidal distances – **Law of the inverse square-Law of the inverse cube (Self Study)**.

UNIT –V MOMENT OF INERTIA **20%** **(15 HRS.)**

Definition-The Theorem of Parallel Axes- The Theorem of Perpendicular Axes Moment of Inertia in some particular cases- Dr. Routh's Rule –Equimomental systems.

TEXT BOOK:

2. Dr.M.K. Venkataraman, *A Text Book of Dynamics*, Agasthiar Publications-2007.

   UNIT I : Chapter 6
   UNIT II : Chapter 7
   UNIT III : Chapter 8
   UNIT IV : Chapter 11
   UNIT V : Chapter 12

REFERENCES:

4. P. Duraipandian & Lakshmi Duraipandian, *Mechanics*, S. Chand & Co., Fourth edition, Reprint 2003.
5. M.L. Khanna, *Dynamics of a rigid body*, Jai Prakash Nath & Co., Meerut, 1975.
6. Kaushal Kumar Singh, *A Text book of Dynamics*, Asoke K.Ghosh ,PHI Learning Private Limited-2011.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**PROJECTILES**			
1.1	Definitions-Path of a Projectile-Characteristic of the motion of a Projectile, Velocity of the projectile in magnitude and direction, theorems and problems.	6	Chalk & Talk	Black Board
1.2	Range on an Inclined Plane, Motion on the surface of a smooth inclined plane and related problems.	5	Chalk & Talk	Black Board
1.3	Enveloping parabola and related problems.	4	Chalk & Talk	Black Board
UNIT -2	**IMPULSIVE FORCES**			
2.1	Impulse, Impulsive forces, Impact of two bodies and problems.	3	Chalk & Talk	Black Board
2.2	Loss of Kinetic Energy in impact, derivations and problems.	2	Chalk & Talk	Black Board
2.3	Motion of a Shot and Gun- Problems	3	Chalk & Talk	Black Board
2.4	Impact of water on a surface- problems	2	Chalk & Talk	Black Board
UNIT -3	**COLLISION OF ELASTIC BODIES**			
3.1	Definitions, Fundamental laws of impact, Impact of a Smooth Sphere on a Fixed Smooth Plane and	4	Chalk &Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	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 period in two	2	Discussion	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	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
CO 1	3	3	2	2	2
CO 2	2	3	2	2	2
CO 3	2	2	2	3	2
CO 4	2	2	2	3	3
CO 5	2	2	2	3	2

Mapping COs Consistency with POs

CO / PO	PO1	PO2	PO3	PO4
CO 1	2	2	2	3
CO 2	3	2	2	2
CO 3	2	2	2	3
CO 4	2	2	2	3
CO 5	2	2	2	3

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

2. Mrs. A. Paulin Mary

Forwarded By

(Dr.A.Paulin Mary)

HOD's

Signature & Name