E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (**3rd Cycle**) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF MATHEMATICS

CBCS With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - M

COURSE STRUCTURE

(w.e.f. 2022 – 2023 Batch onwards)

CRITERION - I

1.1.3 Details of courses offered by the institution that focus on employability / entrepreneurship / skill development during the year.

Syllabus copies with highlights of contents focusing on Employability / Entrepreneurship / Skill Development

To be Noted:

HIGHLIGHTED COLORS	COURSES
	Employability
	Skill Development
	Entrepreneurship
	Skilled & Employability

Annexure - 10

E.M.G. YADAVA WOMENS COLLEGE, MADURAI -14.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)
(Re –accredited (3rd Cycle) with Grade A+ and CGPA 3.51 by NAAC)

DEPARTMENT OF MATHEMATICS– UG

(w.e.f. 2022– 2023 Batch onwards)

CBCS with OBE

Vision

To mold the students to have strong Mathematical and Analytical skills to meet the challenges open to them

Mission

To provide the students with a strong Mathematical foundation through courses which cater to the needs of Industry, Research and Higher Education

Programme Educational Objectives (PEOs):B.Sc. Mathematics

SL.No.	Programme Educational Objective
PEO1	Demonstrate fundamental systematic knowledge of Mathematics and its applications in Engineering, Science, Technology and Mathematical Sciences.
PEO2	Demonstrate educational skills in areas of Calculus, Algebra, Analysis , Geometry, Mechanics, Differential equations etc.,
PEO3	Apply knowledge, understanding and skills to identify the different problems in mathematics and to collect the required information in possible range of sources and try to analyze and evaluate these problems using appropriate Methodologies.
PEO4	Apply one's disciplinary knowledge and skills in mathematics in newer domains.
PEO5	Exhibit subject-specific transferable knowledge in mathematics relevant to job trends and employment opportunities.
PEO6	To develop confidence to appear for SSC (CGL), IBPS, RRB and Civil service examinations and will occupy higher posts in administrative level

Annexure - 10

Programme Outcomes for Science Graduates:

On completion of B.Sc., Programmes students will be able to

SL.No.	Programme Outcomes
PO1	Develop necessary foundation in fundamentals, aptitude, applications of sciences and other related subjects. Able to clear competitive examinations, appear with confidence and possess basic skills on the related subjects. Secure jobs in employment in Government / Private / Industry and entrepreneurship.
PO2	Receive basic experimental skills in the observation and study of nature, biological techniques, and scientific research and demonstrate proficiency in critical analysis or creativity and provide scientific solutions to the problems of the society.
PO3	Enhance the digital knowledge of statistics and to understand its application in interpreting the obtained data.
PO4	Obtain knowledge with emerging trends in their disciplinary and inter-disciplinary areas. Usage of modern tools and software can also be put to use.
PO5	Lead lifelong learning & contribute sustainability to environment, equip students enough to take up higher studies up to research in various disciplines to become professionals.
PO6	Imbibe democratic, ethical, moral, social & spiritual values in the minds of the learners to become responsible citizens and build a healthy nation.

Programme Specific Outcomes (PSOs):

PSOs	Graduate Attributes	After completion of B.Sc., Mathematics the students will be able to
PSO-1	**Knowledge and Proficiency**	Acquire fundamentals understanding of various fields of Mathematics such as Calculus, Differential Equation, Algebra , Analysis, Graph theory statistics etc.,
PSO-2	**Problem Analysis**	Analyze and solve the well-defined problems in Mathematics and Statistics.
PSO-3	**Problem Solving**	Acquire skills in Mathematical logic and to solve a wide range of real life problems associated with Mathematics
PSO-4	**Modern tools usage**	Learn and apply appropriate methods and procedures, resources and computing tools such as Excel, C Programming and R software.
PSO-5	**Social Responsibilities**	Adopt changing scientific environment in the process of sustainable development by using Mathematical techniques.
PSO-6	**Lifelong Learning**	Provide knowledge on topics in pure and applied mathematics, empowering the students to pursue higher degrees.
PSO-7	**Ethics and Values**	Discover openings and use novel thoughts for creating value and wealth for the betterment of the individual and society.
PSO-8	**Leadership ,Teamwork and Communication**	Apply knowledge and understanding of principles of mathematics effectively as an individual, and as a member or leader in diverse teams to manage projects in multidisciplinary environment. Being able to comprehend and write effective reports and design documentation, make effective presentation

Qualification for Admission

Candidates should have passed the Higher Secondary Examination with the subjects Mathematics conducted by the Board of Higher Education, Government of Tamilnadu, CBSC & ICSE or any other examination approved by Madurai Kamaraj University as equivalent.

Duration of the Course

The students shall undergo prescribed course of study for the period of three academic years under Choice Based Credit System (CBCS) semester pattern with Outcome Based Education (OBE).

Medium of Instruction: English

System: Choice Based Credit System with Outcome Based Education Model

Courses of Study with Credit Distribution for B.Sc. Mathematics

Category	No. of Courses	No. of Credits
Part-I	4	12
Part –II	4	12
Major Core Paper	13	63
Discipline Specific Elective Courses	4	16
Generic Elective Courses	6	18
Skill Enhancement Courses	6	12
Inter Disciplinary Courses	2	4
Ability Enhancement Compulsory Courses	2	2
NSS/Physical Education	1	1
Total	**42**	**140**

Nature of the Course

Courses are classified according to the following nature

1. Knowledge and skill oriented
2. Employability oriented
3. Entrepreneurship oriented

Annexure - 10

Outcome Based Education (OBE) &Assessment

Students understanding must be built on and assessed for wide range of learning activities, which includes different approaches and are classified along several basis, such as

1. **Based on purpose:**

- Continuous Assessment (Internal tests, Assignment, Seminar, Quiz, Documentation, ICT based Assignment, Mini projects administered during the learning process)
- External Assessment (Evaluation of students' learning at the end of instructional unit)

2. **Based on Domain Knowledge:(for UG Up to K4 levels)**

Assessment through K1, K2, K3& K4

Annexure - 10

EVALUATION (THEORY)

(PART I/PART II/PART III)

Internal (Formative) : 25 marks

External (Summative) : 75 marks

Total : 100 marks

Formative Test (CIA-Continuous Internal Assessment) : 25 Marks

Components	**Marks**
Test (Average of three tests) (Conducted for 100 marks and converted into 20 marks)	**20**
Assignment(Quiz/Documentation/Case lets/ ICT based Assignment/ Mini Projects)	**5**
Total	**25**

- ✓ **Centralized system** of Internal Assessment Tests
- ✓ There will be **Three Internal Assessment Tests**
- ✓ Duration of Internal assessment test will be **1 hour for Test I and 2 hours for Test II and III**
- ✓ Students shall write **retest** with the approval of HOD on genuine grounds if they are absent.

Question Paper Pattern for Continuous Internal Assessment- Test I

Section		**Marks**
A-Multiple Choice Question	(3x1mark)	3
B-Short Answer	(1x2marks)	2
C-Either Or type	(1/2x5marks)	5
D-Open choice type	(1/2 x10marks)	10
Total		**20**

Annexure - 10

Question Paper Pattern for Continuous Internal Assessment–Test II and III

Multiple choice for Section		**Marks**
A-Multiple Choice Question	(6x1mark)	6
B-Short Answer	(2 x2marks)	4
C-Either Or Type	(2/4 x5marks)	10
D-Open Choice Type	(2/3x 10marks)	20
Total		**40**

Conducted for 100 marks and converted into 20 marks

Question Paper Pattern for Summative Examination

Section		**Marks**
A-Multiple choice Questions without Choice	(10x1 mark)	10
B-Short Answer without choice	(5x2marks)	10
C-Either Or type	(5/10x5marks)	25
D-Open Choice type	(3out of 5x10 marks)	30
Total		**75**

In respect of Summative Examinations passing minimum is **36% for UG.**

Distribution of Marks in % with K levels CIAI, II, III & External Assessment

Blooms Taxonomy	**Internal Assessment**			**External Assessment**
	I	**II**	**III**	
Knowledge(K1)	12%	12%	12%	13%
Understanding(K2)	44%	22%	22%	21%
Apply(K3)	44%	33%	33%	33%
Analyze(K4)	-	33%	33%	33%

Latest amendments and revision as per **UGC** and **TANSCHE** norms is taken into consideration in curriculum preparation.

Annexure - 10

BLUE PRINT FOR INTERNAL ASSESSMENT - I
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 1	Up to K 3	3	(K1)	1	(K1)	2 (K2) (Each set of questions must be in the same level)	1(K2) & 2 (K3)	
No. of Questions to be asked			3		1		2	3	9
No. of Questions to be answered			3		1		1	1	6
Marks for each question			1		2		5	10	-
Total Marks for each section			3		2		5	10	20

BLUE PRINT FOR INTERNAL ASSESSMENT – II
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 2	Up to K 3	3	(K1/K2)	1	(K1/K2)	2(K2)/ 2(K4) (Each set of questions must be in the same level)	2(K3) & 1(K4)	
2	CLO 3	Up to K 4	3	(K1/ K2)	1	(K1/K2)			
No. of Questions to be asked			6		2		4	3	15
No. of Questions to be answered			6		2		2	2	12
Marks for each question			1		2		5	10	-
Total Marks for each section			6		4		10	20	40

Annexure - 10

BLUE PRINT FOR INTERNAL ASSESSMENT – III
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 4	Up to K 3	3	(K1/K2)	1	(K1/K2)	2(K2)/ 2(K4) (Each set of questions must be in the same level)	2(K3) & 1(K4)	
2	CLO 5	Up to K 4	3	(K1/K2)	1	(K1/K2)			
No. of Questions to be asked			6		2		4	3	15
No. of Questions to be answered			6		2		2	2	12
Marks for each question			1		2		5	10	-
Total Marks for each section			6		4		10	20	40

Distribution of Marks with choice K Levels CIA I, CIA II and CIA III

CIA	K Levels	Section- A MCQ (No choice)	Section -B Short Answer (No choice)	Section- C (Either or Type)	Section-D (Open Choice)	Total Marks	% of Marks
I	K1	3	2	-	-	5	**12**
	K2	-	-	10	10	20	**44**
	K3	-	-	-	20	20	**44**
	K4	-	-	-	-	-	**-**
	Marks	**3**	**2**	**10**	**30**	**45**	**100**
II	K1	5	2	-	-	7	**12**
	K2	1	2	10	-	13	**22**
	K3	-	-	-	20	20	**33**
	K4	-	-	10	10	20	**33**
	Marks	**6**	**4**	**20**	**30**	**60**	**100**
III	K1	5	2	-	-	7	**12**
	K2	1	2	10	-	13	**22**
	K3	-	-	-	20	20	**33**
	K4	-	-	10	10	20	**33**
	Marks	**6**	**4**	**20**	**30**	**60**	**100**

Annexure - 10

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/ or Type)	Section D (open choice)	Total
			MCQs (No choice)		Short Answers (No choice)				
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	2	K1/K2	1	K1/K2	2 (K3 & K3)	1(K2)	
2	CLO 2	Up to K3	2	K1/K2	1	K1/K2	2(K2 & K2)	1(K3)	
3	CLO 3	Up to K4	2	K1/K2	1	K1/K2	2 (K4 &K4)	1(K4)	
4	CLO 4	Up to K 3	2	K1/K2	1	K1/K2	2 (K3 & K3)	1(K3)	
5	CLO 5	Up to K 4	2	K1/K2	1	K1/K2	2 (K4 & K4)	1(K4)	
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		25	30	75 (Marks)

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S) (No choice)	Section B (Short Answer) (No choice)	Section C (Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	9	6	-	-	**15**	**13**
K2	1	4	10	10	**25**	**21**
K3	-	-	20	20	**40**	**33**
K4	-	-	20	20	**40**	**33**
Total Marks	**10**	**10**	**50**	**50**	**120**	**100**

K1- Remembering and recalling facts with specific answers.
K2- Basic understanding of facts and stating main ideas with general answers.
K3- Application oriented- Solving Problems, Justifying the statement and deriving Inferences.
K4- Examining, analyzing, presentation and make inferences with evidences.

Annexure - 10

EVALUATION (THEORY)

(PART IV - SBE & NME)

Internal (Formative) : 25 marks
External (Summative) : 75 marks
Total : 100 marks

Formative Test (CIA-Continuous Internal Assessment) : 25 Marks

Components	Marks
Test (Conducted for 50 marks and converted into 25 marks)	**25**

- ✓ There will be Only one Internal Assessment Test
- ✓ Duration of Internal assessment test will be 2 hour for Test
- ✓ Students shall write retest with the approval of HOD on genuine grounds if they are absent.

Question Paper Pattern for Continuous Internal Assessment- Test

Section		Marks
A-Multiple Choice Question	(5x1 mark)	5
B-Short Answer	(5x2 marks)	10
C-Either Or type	(3x 5 marks)	15
D-Open choice type	(2/3 x 10 marks)	20
Total		50

Conducted for 50 marks and converted into 25 marks

Question Paper Pattern for External Examination

Section		Marks
A-Multiple Choice Question	(10x1 mark)	10
B-Short Answer	(5x2 marks)	10
C-Either Or type	(5x 5 marks)	25
D-Open choice type	(3/5 x 10 marks)	30
Total		75

Annexure - 10

BLUE PRINT FOR INTERNAL ASSESSMENT

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1.	CLO1	Up to K 3	1	K1	1	K1	4(K2) & 2(K3) (Each set of questions must be in the same level)	1(K2) & 2(K3)	
2.	CLO2	Up to K 3	1		1				
3.	CLO3	Up to K 3	1		1				
4	CLO4	Up to K 3	1		1				
5	CLO5	Up to K 3	1		1				
No. of Questions to be asked			5		5		6	3	19
No. of Questions to be answered			5		5		3	2	15
Marks for each question			1		2		5	10	
Total Marks for each section			**5**		**10**		**15**	**20**	**50**

Distribution of Marks with K Levels - CIA

CIA	K Levels	Section A MCQ	Section B (Short Answers)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of Marks
I	K1	5	10	-	-	15	20
	K2	-	-	20	10	30	40
	K3	-	-	10	20	30	40
	K4	-	-	-	-	-	-
	Marks	**5**	**10**	**30**	**30**	**75**	**100**

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Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)	Total
			MCQs		Short Answers				
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	2	K1	1	K1	3(K2) & 2(K3) (Each set of questions must be in the same level)	2(K2) & 3(K3)	
2	CLO 2	Up to K3	2		1				
3	CLO 3	Up to K3	2		1				
4	CLO 4	Up to K 3	2		1				
5	CLO 5	Up to K 3	2		1				
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		25	30	75

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S)	Section B (Short Answer)	Section C (Either/or)	Section D (Open Choice)	Total Marks	% of Marks without choice
K1	10	10	-	--	**20**	16
K2	-	-	30	20	**50**	42
K3	-	-	20	30	**50**	42
Total Marks	10	10	50	50	**120**	100

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(An Autonomous Institution – Affiliated to Madurai Kamaraj University)
(Re –accredited (3rd Cycle) with Grade A+ and CGPA 3.51 by NAAC)

DEPARTMENT OF MATHEMATICS –UG
(with Allied Chemistry and Allied Physics)
CBCS with OBE

COURSE STRUCTURE
(w.e.f. 2022 – 2023 Batch onwards)

Semester	Part	Course Code	Title of the paper	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks allotted			Credits
						CIA	SE	Total	
1	I	22OU1TA1	Tamil	6	3	25	75	100	3
	II	22OU2EN1	English	6	3	25	75	100	3
	III	22OUMA11	**Core** – Calculus	5	3	25	75	100	5
	III	22OUMA12	**Core** - Theory of Equations and Trigonometry	5	3	25	75	100	5
	III	22OUMAGECH1/ 22OUMAGEPH1	**GEC** - Chemistry-I- Inorganic, Organic & Physical Chemistry / Mechanics and Properties of Matter	4	3	25	75	100	4
			GEC- Chemistry Practical-I- Salt Analysis/ Physics Practical- I	2	-	-	-	-	-
	IV	22OUMAID1	**IDC**- Mathematics for Competitive Examinations - I	2	3	25	75	100	2
2	I	22OU1TA2	Tamil	6	3	25	75	100	3
	II	22OU2EN2	English	6	3	25	75	100	3
	III	22OUMA21	**Core** – Analytical Geometry of 3Dimension and Vector Calculus	5	3	25	75	100	5
	III	22OUMA22	**Core** - Differential Equations	5	3	25	75	100	5
	III	22OUMAGECH2/ 22OUMAGEPH2	**GEC** - Chemistry-II - Organic, Applied & Analytical Chemistry / Thermal Physics	4	3	25	75	100	4
		22OUMAGECH2P/ 22OUMAGEPH2P	**GEC**- Chemistry Practical-I - Salt Analysis / Physics Practical-I	2	3	40	60	100	1
	IV	22OUMAID2	**IDC** - Mathematics for Competitive Examinations –II	2	3	25	75	100	2
	I	22OU1TA3	Tamil	6	3	25	75	100	3
	II	22OU2EN3	English	6	3	25	75	100	3

Annexure - 10

3	III	**22OUMA31**	**Core –** Modern Algebra	6	3	25	75	100	6
	III		**DSEC-I**	4	3	25	75	100	4
	III	**22OUMAGECH3/ 22OUMAGEPH3**	**GEC-** Chemistry-III- Industrial Chemistry / Electricity and Electronics	4	3	25	75	100	4
			GEC- Chemistry Practical-II- Volumetric Analysis/ Physics Practical-II	2	-	-	-	-	-
	IV	**22OUMASE3**	**SEC-**Applications of Calculus	2	3	25	75	100	2
4	I	**22OU1TA4**	Tamil	6	3	25	75	100	3
	II	**22OU2EN4**	English	6	3	25	75	100	3
	III	**22OUMA41**	**Core** – Sequences and Series	6	3	25	75	100	6
	III		**DSEC-II**	4	3	25	75	100	4
	III	**22OUMAGECH4/ 22OUMAGEPH4**	**GEC-** Chemistry-IV- Medicinal, Green & Nano Chemistry / Optics	4	3	25	75	100	4
		22OUMAGECH4P/ 22OUMAGEPH4P	**GEC-** Chemistry Practical-II- Volumetric Analysis / Physics Practical –II	2	3	40	60	100	1
	IV	**22OUMASE4**	**SEC-**Applications of Differential Equations	2	3	25	75	100	2
5	III	**22OUMA51**	**Core –** Modern Analysis	6	3	25	75	100	6
	III	**22OUMA52**	**Core –** Statistics	6	3	25	75	100	5
	III	**22OUMA53**	**Core –** Mechanics	6	3	25	75	100	5
	III		**DSEC-III**	6	3	25	75	100	4
	IV	**22OUMASE51**	**SEC-**Quantitative Aptitude	2	3	25	75	100	2
	IV	**22OUMASE52**	**SEC-** Latex	2	3	25	75	100	2
	IV	**22OUAECEV5**	**AECC-**Environmental Studies	2	3	25	75	100	1
6	III	**22OUMA61**	**Core –**Complex Analysis	6	3	25	75	100	6
	III	**22OUMA62**	**Core –** Linear Algebra	6	3	25	75	100	4
	III		**DSEC-IV**	6	3	25	75	100	4
	III	**22OUMA63**	**Core-** Programming in C	4	3	25	75	100	4
	III	**22OUMA6P**	**Core-** Practical in C	2	3	40	60	100	1
	IV	**22OUMASE61**	**SEC-** Discrete Mathematics	2	3	25	75	100	2
	IV	**22OUMASE62**	**SEC-** Combinatorics	2	3	25	75	100	2
	IV	**22OUAECVE6**	**AECC-** Value Education	2	3	25	75	100	1
	V	**22OU5NS4/ 22OU5PE4**	**Extension Activities:** N.S.S/Physical Education	-	3	25	75	100	1
	Total			**180**					**140**

GEC- Generic Elective Course

SEC- Skill Enhancement Course

DSEC- Discipline Specific Elective Course

AECC- Ability Enhancement Compulsory Course

IDC- Inter Disciplinary Course

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DSEC: Discipline Specific Elective Course:

Semester III (DSEC –I Choose any one)

1. Operations Research - 22OUMADSE3A
2. Astronomy - 22OUMADSE3B

Semester IV (DSEC – II Choose any one)

1. Number Theory - 22OUMADSE4A
2. Stochastic Process - 22OUMADSE4B

Semester V (DSEC- III Choose any one)

1. Numerical Methods - 22OUMADSE5A
2. Fuzzy Mathematics - 22OUMADSE5B

Semester VI (DSEC –IV Choose any one)

1. Graph Theory – 22OUMADSE6A
2. Automata theory and Formal Language -22OUMADSE6B

NOTE:

The students are permitted to obtain additional credits (Optional)

- MOOCs
- Project

Annexure - 10

COURSE STRUCTURE- GENERIC ELECTIVE COURSE

(w.e.f. 2022 – 2023 Batch onwards)

(For Physics & Chemistry Major)

Semester	Course Code	Title of the Paper	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			
					CIA	SE	Total	Credits
I	**22OUPHGEMA1/ 22OUCHGEMA1**	**Mathematics-I** Theory of Equations , Trigonometry, Analytical Geometry 3D and Vector Calculus	6	3	25	75	100	4
II	**22OUPHGEMA2/ 22OUCHGEMA2**	**Mathematics-II** Calculus, Differential Equations and Applications	6	3	25	75	100	5
III	**22OUPHGEMA3/ 22OUCHGEMA3**	**Mathematics-III** Algebra and Statistics	6	3	25	75	100	4
IV	**22OUPHGEMA4/ 22OUCHGEMA4**	**Mathematics-IV** Linear Programming	6	3	25	75	100	5

Annexure - 10

(For Computer Science and B.C.A Major)

Semester	Course Code	Title of the Paper	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			
					CIA	SE	Total	Credits
I	**22OUCSGEMA1**	Discrete Mathematics	5	3	25	75	100	5
II	**22OUCSGEMA2/ 22OUCAGEMA2**	Probability and Statistics	5	3	25	75	100	5
III	**22OUCSGEMA3/ 22OUCAGEMA3**	Numerical methods	5	3	25	75	100	5
IV	**22OUCSGEMA4/ 22OUCAGEMA4**	Resource Management Techniques	5	3	25	75	100	5

Annexure - 10

Compulsory Courses:

Year	Semester	Nature of the course	Course code	Title of the Course	Hours	Offered to students of
I	I	Add on Course	**22MAAOC**	MS- Office	30	I B.Sc. Mathematics
			22MAAOCP	Practical in MS-Office		
I	I &II	Certificate Course	**22MAC**	Certificate Course in Operations Research	90	I Year Students of all other disciplines
			22MACP	Practical I- Certificate Course in Operations Research		
II	III & IV	Diploma Course	**22MAD**	Diploma Course in Operations Research	90	Students of all discipline who have already completed Certificate course in Operations Research
			22MADP	Practical II- Diploma Course in Operations Research		
III	V & VI	Advanced Diploma Course	**22MAAD**	Advanced Diploma Course in Operations Research	90	Students of all discipline who have already completed Diploma course in Operations Research
			22MAADPR	Project		
III	V	Value Added Course	**22MAVAC**	Introduction to R Software	30	III B.Sc. Mathematics
			22MAVACP	Practical in R Programming		

Annexure - 10

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Core	**22OUMA11**	Calculus	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To know more about differentiation.
2. To introduce envelopes & curvatures.
3. To acquire knowledge about finding the radius of curvature in polar co-ordinates.
4. To get skill to solve double and triple integration.
5. To learn idea to find change of variable.

Course Content:

UNIT-I

Successive differentiation -The n^{th} derivative - standard results - Trigonometrically transformation - Formation of equations involving derivatives - Leibnitz formula for the n^{th} derivative of a product.

UNIT-II

Envelopes- Curvature-Circle, radius and center of curvature- Cartesian formula for the radius of curvature- The coordinates of the center of curvature.

UNIT-III

Radius of curvature when the curve is given in polar coordinates - p-r equation – pedal equation of a curve.

UNIT –IV

Reduction formulae for $x^n e^{ax}$, $x^n \cos ax$, $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sec^n x$, $x^m(\log x^n)$, $e^{ax}\cos bx$, - Evaluation of double integrals –triple Integrals.

UNIT –V

Jacobian - Change of variables in double and triple integrals.

Books for Study:

1. T.K.M. Pillai and S. Narayanan(2013) *Calculus* Volume – I
   S.Viswanathan (Printers & Publishers) Pvt., Ltd.
2. Arumugam .S and Thangapandi Isaac .A, (2005)
   Calculus New Gamma Publishing House, Palayamkottai
   Unit I Chapter 3: 1.1 to 1.6 & 2.1 to 2.2
   Unit II Chapter 10: 1.1 to 1.4 & 2.1 to 2.4
   Unit III Chapter 10: 2.6 to 2.8 & 3.1
   Unit IV Chapter 2: 2.8 (Text Book II)
   Chapter 3: 3.1 to 3.3
   Unit V Chapter 3: 3.9 & 3.4 (Text Book II)

Books for Reference:

1. SantiNarayan, (1993) *Differential Calculus* Shyam Lal Charitable Trust
2. SantiNarayan (1994) *Integral Calculus* S.Chand & Company Ltd(1st Edition)
3. T.K.M. Pillai and S. Narayanan. (2013). *Calculus* Volume – II
   S.Viswanathan (Printers & Publishers) Pvt., Ltd.

Web Resources/E Books

https://ocw.mit.edu/ans7870/resources/Strang/Edited/Calculus/Calculus.pdf

http://www.freebookcentre.net/maths-books-download/gotoweb.php?id=9484

https://people.math.wisc.edu/~angenent/Free-Lecture-Notes/free221.pdf

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz and on the spot test.

Rationale for nature of Course:

Knowledge and Skill:

To make students able to identify, formulate, analyze and solve problems.

Activities to be given:

We will be providing students with intellectual problems, application problems, group discussion and also insist them to check reference books and web resources.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Up to K level)
CLO1	Understand the concepts of successive differentiation.	K1 to K3
CLO2	Examine the Cartesian formula and parametric formula for radius of curvature	K1 to K3
CLO3	Understand the Radius of curvature.	K1 to K4
CLO4	To know about double and triple integration.	K1 to K3
CLO5	To know about change of variables.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	2	2	-
CLO2	3	3	2	3	3	-
CLO3	3	3	1	2	3	-
CLO4	3	2	2	1	2	-
CLO5	3	3	3	3	3	-

1-Basic Level **2-Intermediate Level** **3-Advanced Level**

Annexure - 10

LESSON PLAN: TOTAL HOURS (75HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Successive differentiation The n^{th} derivative-standard results Trigonometrical transformation-Formation of equations involving derivatives, Leibnitz formula for the n^{th} derivative of a product	12	Chalk and Talk
II	Envelopes Curvature-Circle, radius and center of curvature Cartesian formula for the radius of Curvature ,The coordinates of the center of curvature.	15	Chalk and Talk& PPT
III	Radius of curvature when the curve is given in polar coordinates, p-r equation, pedal equation of a curve	15	Chalk and Talk & On the spot test
IV	Reduction formulae for $x^n e^{ax}$, $x^n \cos ax \sin^n x$, $\cos^n x$, $\tan^n x$, $\sec^n x$, $x^m(\log x^n)$, $e^{ax}\cos bx$,Evaluation of Double integrals Triple Integrals	18	Chalk and Talk & Group discussion
V	Change of variables in double and triple integrals , Jacobian	15	Chalk and Talk

Course Designer:

Dr.Mrs.A.Manimegalai

Annexure - 10

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Core	**22OUMA12**	Theory of Equations & Trigonometry	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. Acquire the basic knowledge of roots and coefficients of equation.
2. Acquire skills of solving problems in transformation of equations.
3. Obtain skills to solve a cubic equation.
4. Gain knowledge of trigonometric functions and related problems.
5. Know about the various types of hyperbolic functions.

Course Content:

Unit I

Theory of Equations: Formation of equations – Relation between roots and coefficients – Sum of the powers of the roots of an equation.

Unit II,

Reciprocal equations, Transformation of equations, Removal of terms- Multiple roots

Unit III

Nature and position of roots - Cubic equations.

Unit IV

Expression for $\sin n\theta$, $\cos n\theta$, $\tan n\theta$, $\sin^n\theta$, $\cos^n\theta$. Expansion of $\sin\theta$, $\cos\theta$, $\tan\theta$ in powers of θ

Unit V

Hyperbolic functions: definition-Inverse hyperbolic functions.

Books for Study:

Dr.S.Arumugam, Prof. A.Thangapandi Isaac, *(2011) ALGEBRA -Theory of Equations, Theory of Numbers and Trigonometry* New gamma Publishing House, Palayamakottai.

Unit I Chapter 5:5.1, 5.2 & 5.3

Unit II Chapter 5: 5.4, 5.5 & 5.6

Unit III Chapter 5: 5.7, 5.8 &5.9

Unit IV Chapter 6: 6.1, 6.2 & 6.3

Unit V Chapter 7:7.1 & 7.2

Books for Reference:

1. P.R.Vittal and V.Malini, (2003) *Algebra and Trigonometry*, Margam Publishers, Chennai.
2. Dr.A.Singaravelu, (2003), *Algebra and Trigonometry* Vol I &II Meenakshi Agency, Chennai.
3. Dr.M.D. Raisinghania, H.C.Saxena,H.K.Dass, (1999) *Trigonometry*, S. Chand& company Pvt. Ltd, New Delhi.

Web Resources /E books

https://www.gutenberg.org/files/29785/29785-pdf.pdf

https://www.forgottenbooks.com/de/download/TheTheoryofEquations_10455554.pdf

https://www.ikbooks.com/home/samplechapter?filename=165_Sample-Chapter.pdf

https://www.cimt.org.uk/projects/mepres/alevel/fpure_ch2.pdf

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz and on the spot test

Rationale for nature of Course:

Knowledge and Skill:

They study some properties of polynomial equations, formation of polynomial equation with given roots, fundamental theorem of algebra and to know about the number of real and imaginary roots of equation. Develop their skill in solving polynomial equations of certain types.

Activities to be given:

We will be providing students with intellectual problems, application oriented problems, group discussion and also insist them to check e-books and other web resources

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy (Up to K level)
CLO1	Determine the relation between root and coefficients of a polynomial equation. Form the equations using symmetric roots of a given equation	K1 to K3
CLO2	Know about transformation of equation and reciprocal equation	K1 to K3
CLO3	Find an approximation of roots of cubic equation	K1 to K4
CLO4	Expand sine and cosine of θ in terms of functions of multiples of θ	K1 to K3
CLO5	Determine the hyperbolic functions, inverse hyperbolic function and study the relation between them.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	-	2	3	-
CLO2	3	3	-	3	3	-
CLO3	3	3	1	3	3	-
CLO4	3	3	2	2	2	-
CLO5	3	3	3	3	2	-

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 10

LESSON PLAN: TOTAL HOURS (75 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction about polynomial, Reminder theorem, roots of the polynomial-simple problems Discuss equation with real coefficients, imaginary roots occur in pair- problems Discuss equation with rational coefficients irrational roots occur in pair – problems .Relation between roots and coefficients of equation. symmetric functions of the roots.	18	Chalk , Talk& PPT
II	Sum of the powers of the roots of an equation.- problems Newton's theorem, Discuss various type of Transformation of Equations, Discuss different types of Reciprocal equations	12	Chalk and Talk & On the spot test
III	To increase or decrease the roots of a given equation by a given quantity Descartes rule of signs. Multiple roots. strum theorem - problems	18	Chalk and Talk& Group discussion
IV	Discuss expansion of Sin nx, Cos nx, tan nx, related problems Discuss expansion of Sin x, Cos x, tan x in ascending powers of x Limits Problems	15	Chalk and Talk& PPT
V	Hyperbolic Functions. Standard results on hyperbolic functions Problems on hyperbolic function Inverse hyperbolic functions -problems Relation between hyperbolic functions Inverse hyperbolic functions. Discuss Related problems.	12	Chalk and Talk& Group discussion

Course Designer:

Dr.(Mrs.).P.VIDHYA

Annexure - 10

Department of Mathematics			Class: I UG					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Inter Disciplinary Course	**22OUMAID1**	Mathematics for Competitive Examinations -I	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	Entrepreneurship oriented
	✔	

Course Objectives

1. To learn new techniques and methods to solve quantitative Aptitude
2. To enhance the problem solving skill
3. To improve the basic mathematical skills
4. To help students who are preparing for any type of competitive exam
5. To solve real time problems such as percentage, profit & loss

Course Content:

Unit I

Numbers and Simplifications

Unit II

Square roots and cube roots

Unit III

Average & Problems on Numbers

Unit 1V

Problems on Ages

Unit V

Percentage, Profit and Loss

Books for Study:

1. R.S. Aggarwal, (2017) *Quantitative Aptitude*, S. Chand and Company Ltd., New Delhi,
   Unit I Page Numbers 3-29 & 67-116
   Unit II Page Numbers 117-138
   Unit III Page Numbers 139-181
   Unit IV Page Numbers 182-194
   Unit V Page Numbers 208-293

Books for Reference:

1. Dr.M.Manoharan, Dr.C.Elango and Prof K.L.Eswaran, (2013)*Business Mathematics*, Palani paramount Publications, Reprint.
2. U. Mohan Rao, (2016) *Quantitative Aptitude for Competitive Examinations*, Scitech Publications,.
3. R.S. Aggarwal (2018) *Modern Approach to Verbal & Non-Verbal Reasoning*, Reprint.

Web Resources/E-Books:

https://www.safalta.com/quantitative-aptitude-chapter-wise-e-book

https://youtu.be/Te5ArlVGxqw

https://youtu.be/T2odvmxqi1I

Pedagogy:

Chalk and Talk, Group discussion, Quiz.

Rationale for nature of Course:

Knowledge and Skill:

Provide intellectual problems and motivate students to find new ways to knowledge about profit and loss.

Activities to be given:

Make practice with competitive exam question paper, apply shortcuts and tricks while solving the quantitative aptitude question..

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy) (Up to K level)
CLO1	Understand the basic concepts of Numbers& Simplifications	K1 to K3
CLO2	Identify the usage of Square roots and cube roots	K1 to K3
CLO3	Apply the knowledge of problems related to problems on numbers and averages	K1to K3
CLO4	Analyze the significance of problems on ages	K1 to K3
CLO5	Examine the role of percentages in day to day life	K1 to K3

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented, Justifying the statement and deriving inferences

K4-Examining, analyzing, presentation and make inferences with evidences

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

(SCIENCE)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	1	1	2	3	3
CLO2	3	2	2	1	3	3
CLO3	3	1	1	2	3	3
CLO4	3	1	2	3	3	3
CLO5	3	1	1	2	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 10

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

(ARTS)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3	1	2	3	2
CLO2	3	3	2	3	3	2
CLO3	3	3	1	2	2	1
CLO4	3	2	2	1	1	2
CLO5	3	3	1	2	3	1

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Numbers and Simplifications	6	Chalk & Talk
II	Square roots and cube roots	6	Chalk & Talk
III	Average & Problems on Number	6	Chalk &Talk
IV	Problems on Ages	6	Chalk &Talk
V	Percentage, Profit and Loss	6	Chalk &Talk

Course Designer:

Mrs.R.Revathi

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Core	**22OUMA21**	Analytical Geometry of 3Dimension and Vector Calculus	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives

1. To explain angle and distance between two planes and bisecting planes.
2. To calculate the symmetric form of straight lines.
3. To explain the sphere, equations of the tangent plane and orthogonal sphere.
4. To understand the concept of gradient, divergence and curl.
5. To obtain the knowledge of evaluating line and surface integrals by applying Green, Gauss and Stokes theorem.

Course Content:

UNIT-I

Equation of a plane -Angle between two planes- Angle Bisectors of two planes.

UNIT-II

Equation of the straight line. A plane and a Line.

UNIT-III

Sphere-Equation of a sphere-Tangent line and Tangent plane-Section of a sphere

UNIT –IV

Differentiation of Vectors-Gradient-Divergence and Curl

UNIT –V

Line Integrals -Surface Integrals -Theorems of Green, Gauss and Stokes

Books for Study:

S. Arumugam and A. Thangapandi Isaac(2014), *Analytical Geometry of 3D and Vector calculus*, New Gamma Publishing House.,

Unit – I: Chapter 2:2.1 to 2.3

Unit – II: Chapter 3: 3.1& 3.2

Unit – III: Chapter 4: 4.1 to 4.3

Unit – IV: Chapter 5: 5.2 to 5.4

Unit – V: Chapter 7: 7.1 to 7.3

Books for Reference:

1.Manikavachagam Pillay .T.K. and Natarajan, (1997), A Text Book of Analytical Geometry (Two & Three dimension), S.Vishwanathan (Printers & Publishers) Ltd.

2.T.K.M.Pillai and S.Narayanan, (2012) Calculus, Volume III, S.Viswanathan Publishing Company,.

Web Resources/E Books

https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMT1303.pdf

https://oms.bdu.ac.in/ec/admin/contents/175_16SACMM2_2020051905134587.pdf

http://fhscastormath.weebly.com/uploads/1/2/4/7/12476962/chapter11_precal.pdf

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz and On the spot test.

Rationale for nature of Course:

Knowledge and Skill:

To know about concepts formulae and important results of 3-Dimensional Geometry from basics to advance.

To get the skill to solving the problems in plane, straight line and sphere.

Activities to be given:

We will be providing students with intellectual problems, theory application problems, group discussion and other practical works and also insist them to refer e books and other web resources.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge (According to Bloom's Taxonomy) (Up to K level)
CLO1	Find angle and distance between two planes, lengths of perpendicular, bisecting planes.	K1 to K3
CLO2	Learn the symmetric form of straight line, image of a point about a plane, image of a line about a plane.	K1 to K3
CLO3	Know the concept of sphere- Evaluate tangent line and tangent plane.	K1 to K4
CLO4	Understand the of gradient and divergence. Use vector differentiation in solving problems.	K1 to K3
CLO5	Discuss about Green, Gauss Divergence theorem, Stokes theorem and apply it to solve the problems.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	2	2	-
CLO2	3	3	2	3	3	-
CLO3	3	3	1	2	3	-
CLO4	3	3	2	2	2	-
CLO5	3	3	3	3	3	-

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 10

LESSON PLAN : TOTAL HOURS (75HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Equation of a plane -Angle between two planes- Angle Bisectors of two planes.	15	Chalk and Talk
II	Equation of the straight line. A plane and a Line.	15	Chalk and Talk
III	Sphere-Equation of a sphere-Tangent line and Tangent plane-Section of a sphere	15	Chalk and Talk& PPT
IV	Differentiation of Vectors- Gradient- Divergents and Curl	15	Chalk and Talk
V	Line Integrals -Surface Integrals –Problems on Green, Gauss and Stokes theorem.	15	Chalk and Talk& Group discussion

Course Designer:

Dr.P.Vidhya

Annexure - 10

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Core	**22OUMA22**	Differential Equations	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives

1. To study the exact differential equations.
2. To classify differential equations by order, linear equations and homogeneous Linear Equations.
3. To study the Simultaneous linear differential equations.
4. To apply Laplace transforms to solve differential equations.
5. To understand the concepts of partial differentiation.

Course Content:

UNIT – I

Differential Equations of First order: Exact differential equations- Integrating factors – Equations of first order and higher degree.

UNIT – II

Linear equations of higher order:-Linear equations with constant coefficients- Methods of finding complementary functions- Methods of finding particular integrals- Homogeneous linear equations- Linear equations with variable coefficients (Type A only).

UNIT – III

Simultaneous linear differential equations- Total differential equations.

UNIT – IV

Laplace Transform-Inverse Laplace Transform - Solution of differential equations using Laplace Transform.

UNIT – V

Partial Differential Equations: Formation of Partial differential equations-First order partial differential equations- Methods of solving first order partial differential equations.

Books for Study:

S.Arumugam and A. Thangapandi Issac, (2011) *Differential Equations and Applications*, New Gamma publishing House, Palayamkottai.

Unit I Chapter 1: 1.2 to 1.4 & 1.7

Unit II Chapter 2: 2.1 to 2.5

Unit III Chapter 2: 2.6 & 2.7

Unit IV Chapter 3: 3.1 to 3.3

Unit V Chapter 4 : 4.1 to 4.3

Books for Reference :

1. Bali N .P. (2011) *Differential Equations*, Firewall Media
2. Frank Ayres JR, (1988). *Differential Equations*, Schaum's Outline Series
3. Narayanan S. and Manicavachagom Pillay T.K., (2004). *Differential Equations*, S.Viswanathan (Printers& Publishers) Pvt., Ltd.The National Publishing Company .

Web Resources / E Books:

https://tutorial.math.lamar.edu/classes/de/de.aspx

https://www.math.hkust.edu.hk/~machas/differential-equations.pdf

https://www.math.uni-leipzig.de/~miersemann/pdebook.pdf

Pedagogy:

Chalk and Talk, PPT, Group discussion , Quiz and On the spot test.

Rationale for nature of Course:

Knowledge and Skill:

Students will get the knowledge to classify the first order differential equations and Linear equation of higher order.

Students will get the skill to solve differential equations using Laplace Transform.

Activities to be given:

We will be providing students with intellectual problems, theory application problems, group discussion and also insist them to check the books for references and web resources.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy (Up to K level)
CLO1	Find the solution of Exact differential equations of the first order and higher degree.	K1 to K3
CLO2	Understand the methods to find the complementary function and particular integral.	K1 to K3
CLO3	Solve simultaneous linear equations with constant coefficients and total differential equations.	K1 to K4
CLO4	Assimilate knowledge about laplace transforms and inverse laplace transforms and solving ordinary differential equation.	K1 to K3
CLO5	Formulate partial differential equations and solve it.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	2	2	-
CLO2	3	3	2	3	3	-
CLO3	3	3	1	2	2	-
CLO4	3	3	3	3	3	-
CLO5	3	3	2	2	3	-

1-Basic Level **2-Intermediate Level** **3-Advanced Level**

Annexure - 10

LESSON PLAN: TOTAL HOURS (75Hrs.)

UNIT	DESCRIPTION	HRS	MODE
I	Differential Equations of First order: Exact differential equations Integrating factors Differential Equations of first order and higher degree.	12	Chalk and Talk & On the spot test
II	Linear equations with constant coefficients Methods of finding complementary functions Methods of finding particular integrals Homogeneous Linear equations Linear equations with variable coefficients (Type A only).	18	Chalk and Talk& PPT
III	Simultaneous linear Differential Equations , Total Differential Equations	15	Chalk and Talk
IV	Laplace Transform and Inverse Laplace Transform Solution of Differential equations using Laplace Transform.	15	Chalk and Talk & Group discussion
V	Partial differential equations Applying Laplace Transform of Partial Differential Equations First order Partial Differential Equations , Methods of solving first order Partial Differential Equations.	15	Chalk and Talk

Course Designer:

Dr.(Mrs.) A.Manimegalai

Annexure - 10

Department of Mathematics			Class: I UG					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Inter Disciplinary Course	**22OUMAID2**	Mathematics for Competitive Examinations –II	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	Entrepreneurship oriented
	✔	

Course Objectives

1. To learn new techniques and methods to solve quantitative aptitude
2. To enhance the problem solving skill
3. To improve the basic mathematical skills
4. To help students who are preparing for any type of competitive exam
5. To solve real time problems such as calendar

Course Content:

Unit I

Ratio and Proportions

Unit II

Time and work, Time and Distance

Unit III

Simple interest and Compound interest

Unit 1V

Logarithms

Unit V

Calendar

Books for Study:

R.S. Aggarwal, (2017) *Quantitative Aptitude*, S. Chand and Company Ltd., New Delhi,.

Unit I Page Number 294-310

Unit II Page Number 341-370 & 384-404

Unit III Page Number 445-486

Unit IV Page Number 487-498

Unit V Page Number 593-596

Books for Reference:

1. Dr.M.Manoharan, Dr.C.Elango and Prof K.L.Eswaran,(2013) *Business Mathematics*, Palani paramount Publications, Reprint.
2. U. Mohan Rao, (2016) *Quantitative Aptitude for Competitive Examinations*, Scitech Publications,.
3. R.S. Aggarwal(2018) *A Modern Approach to Verbal & Non-Verbal Reasoning*, Reprint

Web Resources/E.Books:

https://www.safalta.com/quantitative-aptitude-chapter-wise-e-book

https://youtu.be/cGDWgMXEtzs

https://youtu.be/KE7tQf9spPg

Pedagogy:

Chalk and Talk, Group discussion, Quiz and on the spot test

Rationale for nature of Course:

Knowledge and Skill:

Provide intellectual problems related ratio and proportions and motivate students to find new ways to knowledge about percentages and calendar

Activities to be given:

Make practice with competitive exam question paper, apply shortcuts and tricks while solving the quantitative aptitude question.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy (Up to K level)
CLO1	Understand the basic concepts ratio and proportion	K1to K3
CLO2	Identify the usage of time work and time distance	K1 to K3
CLO3	Apply the knowledge of problems related to simple and compound interest	K1 to K3
CLO4	Analyze the significance of common logarithms	K1 to K3
CLO5	Examine the role of Calendar in day to day life	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (SCIENCE)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	1	1	2	3	3
CLO2	3	2	2	1	3	3
CLO3	3	1	1	2	3	3
CLO4	3	1	2	3	3	3
CLO5	3	1	1	2	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 10

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (ARTS)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3	1	2	3	2
CLO2	3	3	2	3	3	2
CLO3	3	3	1	2	2	1
CLO4	3	2	2	1	1	2
CLO5	3	3	1	2	3	1

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Ratio and Proportions	6	Chalk & Talk
II	Time and work, Time and Distance	6	Chalk & Talk
III	Simple interest and Compound interest	6	Chalk &Talk
IV	Logarithms	6	Chalk &Talk
V	Calendar	6	Chalk &Talk

Course Designer:

Mrs.R.Revathi

Annexure - 10

Department of Mathematics			Class: I B.Sc.(Physics & Chemistry)					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Generic Elective Course	**22OUPHGEMA1/ 22OUCHGEMA1**	**Mathematics-I** Theory of Equations & Trigonometry, Analytical Geometry 3D and Vector Calculus	4	6	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To solve cubic and bi quadratic equations
2. To explore trigonometry as a tool in solving problems.
3. To study the concept of sphere.
4. To learn about vector differentiation.
5. To Solve surface area and volume using vector integration.

Course Content:

Unit – I

Theory of Equations: Formations of Equations (Fundamental Theorem of Algebra. Relation between roots and coefficients

Unit – II

Trigonometry: Hyperbolic functions – Inverse hyperbolic Functions – Logarithm of Complex numbers.

Unit – III

The Sphere: Equation of a Sphere – Tangent Line and Tangent Plane – Section of a Sphere.

Unit – IV

Vector Differentiation: Gradient – Divergence and Curl

Unit – V

Vector Integration: Line Integrals – Surface Integrals.

Books for study:

1. S.Arumugam & Issac, (2006) *Theory of Equations & Trigonometry* New Gamma Publishing House, November.
2. S.Arumugam & Issac, (2014) *Analytical Geometry 3D and Vector Calculus* New Gamma Publishing House, January.

Unit I Chapter 5: 5.1 & 5.2 (Text Book 1)

Unit II Chapter 7& 8: 7.1 ,7.2 &8.1(Text Book 1)

Unit III Chapter 4: 4.1 to 4.3 (Text Book 2)

Unit IV Chapter 5: 5.3&5.4 (Text Book 2)

Unit V Chapter 7: 7.1 &7.2(Text Book 2)

Books for Reference:

1. Dr. S.Arumugam, Prof. A.Thangapandi Isaac, *(2011)* "*ALGEBRA -Theory of Equations, Theory of Numbers and Trigonometry"* New gamma Publishing House, Palayamakottai.
2. P.R.Vittal and V.Malini, (2003) "*Algebra and Trigonometry"*, Margam Publishers, Chennai.
3. TK Manicavachagom Pillay, T Natarajan , K S Ganapathy (2008) *" Algebra Volume I* " S.Viswanathan (Printers & Publishers) PVT.LTD.

Web Resources /E books

1. https://www.forgottenbooks.com/de/download/TheTheoryofEquations_104555pdf
2. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMT1303.pdf
3. https://youtu.be/5nNPf_EB7Es

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

- Have a good introduction to the study of Theory of equation and Trigonometry.
- Learn Analytical Geometry 3D and Vector Calculus.

Activities to be given:

We will be providing students with intellectual problems, theory application problems, group discussion and other practical works and also insist them to refer e – books.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy (Up to K level)
CLO1	Solve the Formation of Equations, Relation between roots and coefficients	K1to K3
CLO2	Obtain the solutions of Hyperbolic Functions, Inverse hyperbolic functions, Logarithm of Complex Numbers.	K1 to K3
CLO3	Understand the concept of Sphere, Standard Equations, Tangent line and Tangent plane, Section of a Sphere.	K1 to K4
CLO4	Understand the concept of Vector Differentiation, Gradient Divergence, Curl and their Properties, Solenoidal , Irrotational Vectors , Directional Derivative.	K1 to K3
CLO5	Solve the Vector Integration, Line Integrals and Surface Integrals.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	2	1	3
CLO2	3	3	2	1	1	3
CLO3	3	3	1	2	2	3
CLO4	3	3	2	3	2	3
CLO5	3	3	1	2	1	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 10

LESSON PLAN: TOTAL HOURS (90 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	• Formations of Equations (Fundamental Theorem of Algebra. • Relation between roots and coefficients	18	Chalk and Talk
II	• Hyperbolic functions • Inverse hyperbolic Functions • Logarithm of Complex numbers.	18	Chalk and Talk
III	• Equation of a Sphere • Tangent Line and Tangent Plane • Section of a Sphere.	18	Chalk and Talk
IV	• Gradient • Divergence and Curl	18	Chalk and Talk
V	• Line Integrals • Surface Integrals.	18	Chalk ,Talk

Course Designer:

Mrs.S.Selvi

Department of Mathematics			Class: I B.Sc.(Physics & Chemistry)					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Generic Elective Course	**22OUPHGEMA2/ 22OUCHGEMA2**	**Mathematics-II** Calculus, Differential Equations and Applications	5	6	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. Develop strong background on finding solutions to n^{th} – derivatives and curvature.
2. To solve the Reduction formula and Integrals.
3. To study the differential equations.
4. To find the solution of Partial differential equations.
5. To know about Laplace Transforms.

Course Content:

Unit –I

Differentiation: n^{th} – derivatives and Leibnitz Theorem, Curvature, Center of Curvature, Radius of curvature, Circle of curvature.

Unit –II

Integration: Reduction formula – Double integrals - Evaluation of Double Integrals – Triple integrals

Unit –III

Linear equations of Higher Order: Equations of the first order and higher degree - Linear equations with constant co-efficient – Methods of finding complementary functions – Methods of finding particular integrals.

Unit –IV

Partial Differential Equations: Formations of Partial Differential Equations – First order partial differential equations – Methods of solving first order PDE – Some standard forms

Unit –V

Laplace Transform: Laplace transform, inverse Laplace transform and Solution of differential equation using Laplace transform.

Books for study:

1. Dr. S. Arumugam & Issac, (2014) *Calculus*" New Gamma Publishing House, June.
2. Dr. S. Arumugam & Isaac (2014) *Differential Equations and Applications* New Gamma Publishing House, July.

Unit I Chapter 2&3: 54 to 72 & 123 to 152(Text Book 1, Part I)

Unit II Chapter 2& 3: 381 to 398 & 407 to 439(Text Book 1, Part II)

Unit III Chapter 1,2: 1.35 to 1.54 & 2.1 to 2.23 (Text Book 2)

Unit IV Chapter 4: 4.1 to 4.31(Text Book 2)

Unit V Chapter 3: 3.1 to 3.26 (Text Book 2)

Books for Reference:

1. SantiNarayan, (1993) "*Differential Calculus"* Shyam Lal Charitable Trust
2. SantiNarayan (1994) "*Integral Calculus"* S.Chand& Company Ltd 1st Edition,
3. S Narayanan, TK Manicavachagom Pillay.(2007) *" Calculus Volume I "* S.Viswanathan (Printers & Publishers) PVT.LTD

Web Resources /E books

1. https://books.google.co.in/books?id=dl1jDwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0
2. https://is.muni.cz/el/1431/jaro2018/M6201/Chicone-Ordinary_Differential_Equations_with_Applications.pdf
3. **https://youtu.be/LBZcfl97LwY**

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

- Analyze and solve differentiation, integrations problems and solve differential equation using Laplace Transform.

Activities to be given:

We will be providing students with intellectual problems, theory application problems, group discussion and other practical works and also insist them to refer web resource and e – books.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge(According to Bloom's Taxonomy (Up to K level)
CLO1	To be able to solve n^{th} – derivatives and Leibnitz Theorem, Curvature.	K1to K3
CLO2	Understand the concept of Reduction formula, Double and Triple integrals.	K1to K3
CLO3	Solve the Equations of the first order Linear equations.	K1 to K4
CLO4	Describe the partial differential equations.	K1 to K3
CLO5	Understand the concept of Laplace transform and solve differential equation using Laplace transform.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	1	2	1	3
CLO2	3	3	2	1	1	3
CLO3	3	3	1	2	2	3
CLO4	3	3	2	3	2	3
CLO5	3	3	1	2	1	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure - 10

LESSON PLAN: TOTAL HOURS (90 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	• n^{th} – derivatives and Leibnitz Theorem • Curvature, Center of Curvature, Radius of curvature, Circle of curvature.	18	Chalk and Talk
II	• Reduction formula • Double integrals - Evaluation of Double Integrals • Triple integrals	18	Chalk and Talk
III	• Equations of the first order and higher degree • Linear equations with constant co-efficient • Methods of finding complementary functions • Methods of finding particular integrals.	18	Chalk and Talk
IV	• Formations of Partial Differential Equations • First order partial differential equations • Methods of solving first order PDE – Some standard forms	18	Chalk and Talk
V	• Laplace transform • Inverse Laplace transform • Solution of differential equation using Laplace transform.	18	Chalk and Talk& Group discussion

Course Designer:

Mrs.R.Revathi

Annexure - 10

Department of Mathematics			Class: I B.Sc.(Computer Science)					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Generic Elective Course	**22OUCSGEMA1**	Discrete Mathematics	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To explore the fundamental concepts of Mathematics
2. To provide students with an overview of Discrete Mathematics
3. To study the concept of Lattices
4. Apply the techniques of IF Statements
5. To know about the Graph Theory

Course Content:

Unit –I Set Theory

Introduction – Sets – Notation and Description of Sets – Subsets – Venn – Euler Diagrams – Operation on sets – Properties of set operations – Verification of basic laws and algebra by Venn Diagram.

Unit –II Relations and Functions

Relations – Representation of a relation – Operations on relations – equivalence relation – Closures &Warshalls Algorithm – Partial order Relation – Hasse Diagrams – Lattices.

Unit –III Logic

Introduction – IF statements – Connectives – Truth table of a formula – Tautology – Tautological implications and Equivalence of formulae – Quantifiers.

Unit –IV Recurrence relations and Generating functions

Recurrence relation – an introduction – Polynomial and their evaluations – Recurrence relations – Solutions of finite order homogeneous (linear) relations – Solutions of non-homogeneous relations – Generating functions (for all the theorem consider the statements without proofs).

Unit –V Graph Theory

Basic concepts – Matrix representations of graphs – Trees – Spanning tree – shortest path problem.

Books for study:

M.Venkataraman, N.Sridharan and N.Chandrasekaran(2009) *'Discrete Mathematics'* – The National Publishing Company, May.

. Unit I Chapter 1: 1.1 to 1.8

Unit II Chapter 2,10: 2.2 to 2.6 and 10.1

Unit III Chapter 9: 9.1 to 9.3

Unit IV Chapter 5: 5.1 to 5.6

Unit V Chapter 11: 11.1 to 11.5

Books for Reference:

1. T. Veera Rajan , *Discrete Mathematics with Graph theory & Combinatorics*, First Edition, Tata McGraw -Hill Publications Company Ltd.
2. J. P. Tremblay & R.Manohar,*Discrete Mathematical structure with application to Computer Science*,McGraw Hill Book Company, New York
3. S.Arumugam & S.Ramachandran, *Invitation to Graph theory*, SCITECH PUBLICATIONS(INDIA)PVT.LTD,New Delhi

Web Resources /E books

https://youtube.com/shorts/V0N60gs_sfE?feature=share

http://www2.cs.uh.edu/~arjun/courses/ds/DiscMaths4CompSc.pdf

https://discrete.openmathbooks.org/pdfs/dmoi-tablet.pdf

Pedagogy:

Chalk and Talk, Power Point Presentations, Group Discussions, Quiz, Assignment and Seminar

Rationale for nature of Course:

Knowledge and Skill:

- Have a Knowledge of Functions, Relations and Logic
- Know the applications of Graph Theory

Activities to be given:

We providing students with intellectual problems, application oriented problems, group discussion practical works and also insist them to refer books in website.

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge (According to Bloom's Taxonomy) (Up to K level)
CLO1	Understand the basic principles of sets and operations in sets	K1 to K3
CLO2	Understand the basic concepts of Relations Functions and Lattices	K1 to K3
CLO3	Construct truth table for the given Proposition, interpret tautology and equivalences.	K1 to K4
CLO4	Understand the concept of solution of homogeneous equation, solution of Non homogeneous equation & Generating function	K1to K3
CLO5	Analyze the concepts of Graph Theory	K1 to K4

Annexure - 10

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	3	1	2	3
CLO2	3	3	3	1	2	3
CLO3	3	3	3	2	1	3
CLO4	3	3	3	1	2	3
CLO5	3	3	2	1	2	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS (75 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	• Sets, Subsets and Euler Diagram • Operation on Sets	15	Chalk and Talk
II	• Relations, Operations of relations • Closure and Warshall Algorithm • Lattices	15	Chalk and Talk
III	• IF Statement, Connectives • Tautology • Quantifiers	15	Chalk and Talk
IV	• Recurrence Relation • Generating Functions	15	Chalk and Talk
V	• Matrix representation of graphs	15	Chalk and Talk

Course Designer:

Mrs.T.Thivya

Annexure - 10

Department of Mathematics			Class: I B.Sc.(Computer Science) & I BCA					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Generic Elective Course	**22OUCSGEMA2/ 22OUCAGEMA2**	Probability and Statistics	5	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives

1. To provide on understanding of the basic concepts in probability theory and statistical analysis.
2. To understand the major hypothesis of correlation and regression.
3. To understand the notion of moment generating function in probability.
4. To learn the overview of distribution theory.
5. To know about the fundamental of sampling distribution.

Course Content:

Unit – I

Central Tendencies: Introduction – Arithmetic Mean. Measures of Dispersion: Introduction – Measures of Dispersion.

Unit – II

Correlation and Regression: Introduction – Correlation – Rank Correlation – Regression.

Unit – III

Probability: Introduction- Probability- Conditional Probability, Mathematical Expectation of random variables– Moment Generating Function – Characteristic Function.

Unit – IV

Some Special Distributions: Introduction – Binomial distribution – Poisson distribution - Normal Distribution (only problems)

Unit – V

Concept of sampling distributions: standard error – Tests of significance based on t, Chi- square and F distributions with respect to mean, variance.

Books for study:

Arumugam. S. and Thangapandi Isaac. A., (2011) "*Statistics"*, New Gamma Publishing House, Palayamkotai.

Unit I Chapter 2 & 3 : 2.0 , 2.1 & 3.0,3.1
Unit II Chapter 6: 6.0 to 6.3
Unit III Chapter 11 & 12 : 11.0 to 11.2 &12.4 to 12.6
Unit IV Chapter 13 : 13.0 to 13.3
Unit V Chapter 14,15 &16 : 14.2,15.1,15.2&16.1

Books for Reference:

1. Dr.Gupta S.P. (2008) *Statistical methods*, Sultan Chand & Sons, Educational publishers ,New Delhi
2. Pillai R.S.N., Bagavathi V .(2014)*Statistics* ,7th Edition , S, Chand and Company Ltd
3. Veerarajan T., *Probability , Statistics and Random Processes* ,3rd Edition, Tata McGraw Hill Education Pvt Ltd.

Web Resources/ E-Books

1. https://weblibrary.miu.edu.my/upload/ebook/engineering/2018_Book_ProbabilityAndStatisticsForCom.pdf
2. https://youtu.be/V8F8We_-nuo
3. https://youtube.com/shorts/sGmALyDDcvk?feature=share

Pedagogy:

Chalk and Talk, Power point presentations, Group Discussions, Quiz, Assignment and Seminar

Rationale for nature of Course:

Knowledge and Skill:

- Have a good introduction to the study of Probability concepts.
- Learn Statistical Methods.

Activities to be given:

We will be providing students with intellectual problems, theory application problems, group discussion and other practical works and also insist them to check the books for references and web resource

Course learning Outcomes (CLO's):

CLO	Course Outcomes Statement	Knowledge (According to Bloom's Taxonomy) (Up to K level)
CLO1	Calculate the Arithmetic mean and Measures of dispersion.	K1 to K3
CLO2	Obtain the solutions of the Correlation coefficient, Rank correlation, and Regression.	K1 to K3
CLO3	Understand the concepts of Probability and Moment generating functions.	K1 to K4
CLO4	Obtain the solution for the Binomial distribution ,Poisson distribution and Normal distribution.	K1to K3
CLO5	Obtain the solution of standard error ,Tests of significance based on t, Chi- square and F distributions with respect to mean and variance	K1 to K4

Annexure - 10

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	3	1	2	3
CLO2	3	3	3	1	2	3
CLO3	3	3	3	2	1	3
CLO4	3	3	3	1	2	3
CLO5	3	3	2	1	2	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS (75 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	• Arithmetic Mean • Measures of Dispersion	15	Chalk and Talk
II	• Correlation • Rank Correlation • Regression	15	Chalk and Talk
III	• Probability and Conditional Probability • Mathematical Expectation of random variables • Moment Generating Function • Characteristic Function.	15	Chalk and Talk
IV	• Binomial distribution • Poisson distribution • Normal Distribution (only problems)	15	Chalk and Talk
V	• Sampling Distributions • Tests of significance	10	Chalk and Talk

Course Designer:

Mrs.T.Thivya