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

TANSCHE - **CBC**S With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - M

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

Annexure-8

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

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

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TANSCHE - CBCS with OBE

DEPARTMENT OF MATHEMATICS– UG

(w.e.f. 2023– 2024 Batch onwards)

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

Programme Outcomes for Science Graduates:

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

Sl.No.	Programme Outcomes
PO1	**Disciplinary Knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.
PO2	**Critical Thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.
PO3	**Problem Solving:** Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations
PO4	**Analytical Reasoning:** Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.
PO5	**Scientific Reasoning:** Ability to analyse, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.
PO6	**Self-directed & Lifelong Learning:** Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

Programme Specific Outcomes (PSOs):

PSOs	After completion of B.Sc., Mathematics the students will be able to	PO Addressed
PSO-1	Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.	**PO1**
PSO-2	Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.	**PO2 &PO3**
PSO-3	To prepare the students who will demonstrate respectful engagement with other's ideas, behaviours, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate start-ups and high potential organizations.	**PO3 & PO4**

Qualification for Admission

Candidates should have passed the Higher Secondary Examination, With the subjects Mathematics, conducted by the Board of Higher Education, Government of Tamil Nadu, 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 TANSCHE - CBCS semester pattern with outcome based education.

Medium of Instruction: English.

System: Choice Based Credit System with Outcome Based Model.

Nature of the Course :

Courses are classified according to the following nature:

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

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, Caselets, 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 Upto K4 levels)**
   Assessment through K1, K2, K3 & K4

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TANSCHE - CBCS with OBE

w.e.f. 2023-2024 batch onwards

(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 two tests) (Conducted for 100 marks and converted into 10 marks)	**10**
Assignment	**5**
Seminar	**5**
Quiz/ Documentation/ Case lets/ ICT based Assignment/ Mini Projects	**5**
Total	**25**

- ✓ **Centralized system** of Internal Assessment Tests
- ✓ There will be **Two Internal Assessment** Tests
- ✓ Duration of Internal assessment test will be **2 hours for Test I & II**
- ✓ 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 and II

Section	**Marks**
A- Multiple Choice Question (7x1mark)	7
B- Short Answer (4x2marks)	8
C- Either Or Type (3/6x5marks)	15
D- Open Choice Type (2/3x 10marks)	20
Total	50

Conducted for 100 marks and converted into 10 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 (3/5x10 marks)	30
Total	75

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

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

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	Upto K3	3	(K1/ K2)	3	(K1/ K2)	2 (K2) / 2 (K3) / 2 (K4) (Each set of questions must be in same level)	2 (K3) & 1 (K4)	
2	CLO 2	Upto K3	2	(K1/ K2)					
3	CLO 3	Upto K4	2	(K1/ K2)	1	(K1/ K2)			
No. of Questions to be asked			7		4		6	3	20
No. of Questions to be answered			7		4		3	2	16
Marks for each question			1		2		5	10	-
Total Marks for each section			7		8		15	20	50

Annexure-8

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 3	Upto K4	2	(K1/ K2)	1	(K1/ K2)	2 (K2) / 2 (K3) / 2 (K4) (Each set of questions must be in same level)	2 (K3) & 1 (K4)	
2	CLO 4	Upto K3	2	(K1/ K2)	3	(K1/ K2)			
3	CLO 5	Upto K4	3	(K1/ K2)					
No. of Questions to be asked			7		4		6	3	20
No. of Questions to be answered			7		4		3	2	16
Marks for each question			1		2		5	10	-
Total Marks for each section			7		8		15	20	50

Distribution of Marks with K-Levels CIA I and CIA II

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 & II	K1	4	4	-	-	8	10
	K2	3	4	10	-	17	23
	K3	-	-	10	20	30	40
	K4	-		10	10	20	27
	Marks	**7**	**8**	**30**	**30**	**75**	**100**

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

Sl. No	CLOs	K-Level	Section A MCQs (No choice)		Section B Short Answers (No choice)		Section C (Either/or Type)	Section D (open choice)	Total
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Upto K3	2	K1/K2	1	K1/K2	2 (K3& K3)	1(K2)	
2	CLO 2	Upto K3	2	K1/K2	1	K1/K2	2(K2& K2)	1(K3)	
3	CLO 3	Upto K4	2	K1/K2	1	K1/K2	2 (K4&K4)	1(K4)	
4	CLO 4	Upto K 3	2	K1/K2	1	K1/K2	2 (K3& K3)	1(K3)	
5	CLO 5	Upto 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

Annexure-8

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

EVALUATION (THEORY)

(PART IV - SEC / DSEC)

Internal (Formative) : 25 marks

External (Summative) : 75 marks

Total : 100 marks

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

Components	Marks
Test (Average of two tests) (Conducted for 60 marks and converted into 20 marks)	**20**
Assignment / Seminar/ Quiz/ Documentation (from Unit 5)	**5**
Total	**25**

- ✓ There will be two Internal Assessment Test
- ✓ Duration of Internal assessment test will be 1 hour for Test

Students shall write retest with the approval of HOD on genuine grounds if they are absent.

Annexure-8

Question Paper Pattern for Continuous Internal Assessment Test I & II

Section	Marks
A- Multiple Choice Question (4x1mark)	4
B- Short Answer (3x2marks)	6
C- Either Or type (2/4 x5marks)	10
D- Open choice type (1/2 x10marks)	10
Total	30

Conducted for 60 marks and converted into 20 marks

Question Paper Pattern for External Examination

Section	Marks
A- Multiple Choice Question (10x1mark)	10
B- Short Answer (5x2marks)	10
C- Either Or type (5/5 x5marks)	25
E- Open choice type (3/5 x10marks)	30
Total	75

Annexure-8

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	Upto K3	2	K1	3	K1	1 (K2) / 1 (K3) (Each set of questions must be in same level)	1 (K2) & 1 (K3)	
2	CLO 2	Upto K3	2						
No. of Questions to be asked			4		3		4	2	13
No. of Questions to be answered			4		3		2	1	10
Marks for each question			1		2		5	10	-
Total Marks for each section			4		6		10	10	30

Annexure-8

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 3	Upto K3	2	K1	3	K1	1 (K2) / 1 (K3) (Each set of questions must be in same level)	1 (K2) & 1 (K3)	
2	CLO 4	Upto K3	2						
No. of Questions to be asked			4		3		4	2	13
No. of Questions to be answered			4		3		2	1	10
Marks for each question			1		2		5	10	-
Total Marks for each section			4		6		10	10	30

Distribution of Marks with K Levels – CIA I & II

CIA	K Levels	Section A MCQ	Section B (Short Answers)	Section C (Either Or Type)	Section D (Open Choice)	Total Marks	% of Marks
I & II	K1	4	6	-	-	10	20
	K2	-	-	10	10	20	40
	K3	-	-	10	10	20	40
	Marks	**4**	**6**	**20**	**20**	**50**	**100**

Annexure-8

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		Short Answers				
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Upto K3	2	K1	1	K1	6(K2) & 4(K3) (Each set of questions must be in same level)	2(K2) & 3(K3)	
2	CLO 2	Upto K3	2		1				
3	CLO 3	Upto K3	2		1				
4	CLO 4	Upto K 3	2		1				
5	CLO 5	Upto 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 Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	10	10	-	--	**20**	16
K2	-	-	30	20	**50**	42
K3	-	-	20	30	**50**	42
Total Marks	10	10	50	50	**120**	100

Annexure-8

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TANSCHE – CBCS WITH OBE

DEPARTMENT OF MATHEMATICS –UG

Semester	Part	Course Code	Course Title	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			Credits
						CIA	SE	Total	
I	I	23OU1TA1	Tamil/Hindi	6	3	25	75	100	3
	II	23OU2EN1	General English-I	6	3	25	75	100	3
	III	23OUMA11	**CC-1** Algebra & Trigonometry	4	3	25	75	100	4
		23OUMA12	**CC-2** Differntial Calculus	4	3	25	75	100	4
		23OUMAGECH1 23OUMAGEPH1	**GEC-1** Chemistry For Physical Science –I/Physics	4	3	25	75	100	3
		23OUMAGECH1P 23OUMAGEPH1P	Chemistry Pratical For Physical Science –I /Physics Pratical	2	3	40	60	100	2
	IV	23OUMASECN1	**SEC-1** Mathematics For Competative Exam –I (NME)	2	3	25	75	100	2
		23OUMAFC1	Foundation Course-Bridge Mathematics	2	3	25	75	100	2
II	I	23OU1TA2	Tamil/Hindi	6	3	25	75	100	3
	II	23OU2EN2	General English-II	6	3	25	75	100	3
	III	23OUMA21	**CC-3** Analytical Geometry (2D&3D)	4	3	25	75	100	4
		23OUMA22	**CC-4** Integral Calculus	4	3	25	75	100	4
		23OUMAGECH2 23OUMAGEPH2	**GEC-2** Chemistry For Physical Science –II /Physics	4	3	25	75	100	3
		23OUMAGECH2P 23OUMAGEPH2P	Chemistry Pratical For Physical Science –II /Physics Pratical	2	3	40	60	100	2
	IV	23OUMASECN2	**SEC-2** Mathematics For Competative Exam –II (NME)	2	3	25	75	100	2
		23OUMASEC3	**SEC-3** Computation Mathematics	2	3	25	75	100	2
			Total						46

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Core	23OUMA11	Algebra & Trigonometry	4	4	25	75	100

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

Course Objectives:

1.Basic ideas on the Theory of Equations and Matrices.

2.Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.

Course Content:

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

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

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

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

Unit V: Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities- related problems.

Book for Study:

1.T.K.M. Pillai and S. Narayanan. *Algebra Volume I* S. Viswanathan (Printers & Publishers) Pvt., Ltd. (2013).

2.T.K.M. Pillai and S. Narayanan. *Algebra Volume II* S. Viswanathan (Printers & Publishers) Pvt., Ltd. (2013).

3.T.K.M. Pillai and S. Narayanan. *Trigonometry* ,S. Viswanathan (Printers & Publishers) Pvt., Ltd. (2013).

Unit – I: Chapter 6: Section 16,16.1,16.2,17,19,30(BOOK I)

Unit-II: Chapter 3 :Section 10(BOOK I)

Chapter 4 : Section 3,3.1,5,6,7(BOOK I)

Unit-III: Chapter 2 :Section 16,16.1 to 16.4(BOOK II)

Unit-IV: Chapter 3 :Section 1 to 5.1 (BOOK III)

Unit-V :Chapter 4: Section 1 to 2.3(BOOK III)

Chapter 5: Section 5.1,5.2

Books for Reference:

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

Web Resources/E Books

https://nptel.ac.in

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:

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

Activities to be given:

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

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CLO1	Classify and Solve reciprocal equations	K1 to K3
CLO2	Find the sum of binomial, exponential and logarithmic series	K1 to K3
CLO3	Find Eigenvalues, eigenvectors, verify Cayley – Hamilton theorem and diagonalizable a given matrix	K1 to K4
CLO4	Expand the powers and multiples of trigonometric functions in terms of sine and cosine	K1 to K3
CLO5	Determine relationship between circular and hyperbolic functions and the summation of trigonometric series	K1 to K4

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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60HRS)

Unit	Description	Hrs	Mode
I	Reciprocal Equations-Standard form	12	Lecture, Quiz,
	Increasing or decreasing the roots of a given equation		Lecture,Problem Solving
	Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems.		Chalk and Talk, Group Discussion
II	Binomial– Exponential –Logarithmic series (Theorems without proof)	12	Lecture,Group Discussion
	Approximations - related problems		Lecture, Problem Solving
III	Characteristic equation – Eigen values and Eigen Vectors	12	Lecture, Seminar
	Cayley – Hamilton Theorem (Statement		
	only) - Finding powers of square matrix, Inverse of a square matrix up to order 3		Lecture, Quiz
	Diagonalization of square matrices - related problems		Lecture
IV	Expansions of sinnθ, cosnθ in powers of sinθ, cosθ	12	Lecture, Quiz
	Expansion of tannθ in terms of tan θ, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$		Lecture, Problem Solving
	Expansions of tan(θ1+θ2+,…,+θn)- Expansions of sinθ, cosθ and tanθ in terms of θ related problems		Lecture,Tutorial
V	Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions	12	Lecture,Quiz
	Logarithm of complex quantities		Lecture,, Seminar

Course Designer: Mrs.R.R.Subanya

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Core	23OUMA12	Differential Calculus	4	4	25	75	100

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

Course Objectives:

1. The basic skills of differentiation, successive differentiation, and their applications.
2 Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and involving related problems.

Course Content:

UNIT-I: Successive Differentiation: The n^{th} derivative– Standard results– Fractional expressions – Trigonometrical transformation– Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product

UNIT-II: Partial Differentiation: Partial derivatives– Successive partial derivatives– Function of a function rule– Total differential coefficient– A special case – Implicit Functions.

UNIT-III: Partial Differentiation (Continued): Homogeneous functions–Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers

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

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

Book for Study:

T.K.M. Pillay and S. Narayanan. *Calculus* Volume – I S. Viswanathan (Printers & Publishers) Pvt., Ltd. (2013).

Unit-I Chapter III: Section :1.1 to 1.6, 2.1 & 2.2

Unit-II Chapter VIII: Section :1.1 to 1.5

Unit-III Chapter VIII: Section :1.6 &1.7

Chapter VIII: Section :4 & 5

Unit-IV Chapter X: Section:1.1 to 1.4

Unit-V Chapter X: Section :2.1 to 2.6

Books for Reference:

1. Courant and F. John, *Introduction to Calculus and Analysis* (Volumes I & II), Springer- Verlag,New York, Inc.,1989.
2. Apostol, *Calculus,* Volumes I and II.
3. Goldberg, *Calculus and mathematical analysis.*
4. H. Anton,I. Birensand S. Davis,*Calculus*,John Wileyand Sons, Inc.,2002.
5. G.B. Thomasand R.L. Finney, *Calculus,* Pearson Education, 2010.
6. J. Strauss, G.L. Bradley and K. J. Smith, *Calculus*, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.

Web Resources/E Books

https://nptel.ac.in

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, group discussion and also insist them to check reference books and web resources.

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CLO1	Find the nth derivative, form equations involving derivatives and apply Leibnitz formula	K1 to K3
CLO2	Find the partial derivative and total derivative coefficient	K1 to K3
CLO3	Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers	K1 to K4
CLO4	Find the envelope of a given family of curves	K1 to K3
CLO5	Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates	K1 to K4

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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60HRS)

Unit	Description	Hrs	Mode
I	The n^{th} derivative-Standard results - Fractional expressions	12	Lecture, Quiz,
	Trigonometrical transformation – Formation of equations involving derivatives		Lecture, Problem Solving
	Leibnitz formula for the derivative of a product – Feynman's method of differentiation		Chalk and Talk, Group Discussion
II	Partial derivatives – Successive partial Derivatives	12	Lecture,Group Discussion
	Function of a function rule – Total differential coefficient		Lecture, Problem Solving
	A special case – Implicit Functions		Lecture,Quiz
III	Homogeneous functions – Partial derivatives of a function of two variables	12	Lecture, Seminar
	Maxima and Minima of functions of two Variables		Lecture, Quiz
	Lagrange's method of undetermined multipliers.		Lecture
IV	Method of finding the envelope	12	Lecture, Quiz
	Another definition of envelope		Lecture, Problem Solving
	Envelope of family of curves which are quadratic in the parameter.		Lecture,Tutorial
V	Definition of Curvature – Circle, Radius and Centre of Curvature	12	Lecture,Quiz
	Evolutes and Involutes		Lecture
	Radius of Curvature in Polar Co-ordinates.		Lecture, Seminar

Course Designer: Dr.Mrs.P.Vidhya

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Skill Enhancement Course (NME)	23OUMASECN1	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

Book for Study:

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

Unit I Page Number 3-29 & 67-116
Unit II Page Number 117-138
Unit III Page Number 139-181
Unit IV Page Number 182-194
Unit V Page Number 208-293

Books for Reference:

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

Web Resources/E Books

https://www.safalta.com/quantitative-aptitude-chapter-wise-e-book
https://www.pdfdrive.com/quantitative-aptitude-books.html
https://pdfexam.com/arihant-quantitative-aptitude-book-pdf-free-download/

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, group discussion and also insist them to check reference books and web resources.

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CO1	Understand the basic concepts of Numbers& Simplifications	K1 to K3
CO2	Identify the usage of Square roots and cube roots	K1 to K3
CO3	Apply the knowledge of problems related to problems on numbers and averages	K1 to K3
CO4	Analyze the significance of problems on ages	K1 to K3
CO5	Examine the role of percentages 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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (30 HRS)

Unit	Description	Hrs	Mode
I	Numbers and Simplifications	8	Chalk and Talk, problem solving, Tutorials
II	Square roots and cube roots	6	Chalk and Talk, Problem Solving
III	Average & Problems on Number	5	Chalk and Talk, Quiz
IV	Problems on Ages	5	Chalk and Talk, quiz, group discussion
V	Percentage, Profit and Loss	6	Chalk and Talk, Quiz

Course Designer: Mrs.S.Selvi

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Foundation Course	23OUMAFC1	Foundation Course- Bridge Mathematics	2	2	25	75	100

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

Course Objectives:

1.To bridge the gap and facilitate transition from higher secondary to tertiary education;

2.To insist confidence among take holders and inculcate interest for Mathematics;

Course Content:

UNIT-I: Algebra: Binomial theorem, General term middle term, problems based on these concepts

Unit-II: Sequences and series (Progressions). Fundamental principle of counting. Factorial n.

Unit-III: Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.

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

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

Book for Study:

1. State Board Mathematics text books of class XI

Unit-I Chapter 5: Section5.2:5.2.2 &5.3(Volume I)

Unit-II Chapter 5: Section 5.4:5.4.1,5.4.2,5.4.3(Volume I)

Section 5.5:5.5.1,5.5.2(Volume I)

Unit-III Chapter 4: Section 4.5:4.5.1(Volume I)

Section4.4:4.4.1(Volume I)

Unit-IV Chapter 3: Section:3.5:3.5.1 to 3.5.4(Volume I)

Section 3.7:3.7.1 to 3.7.5(Volume I)

Unit-V Chapter 10: Section :10.4:10.4.1,10.4.4 &10.4.5(Volume II)

Books for Reference:

Web Resources/E Books

https://nptel.ac.in

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:

A bridgecourse is a typeof educational program that helps students transition from one educational level to another. For example, a bridge course might help a student transition from school to college. Bridge courses typically provide students with skills and knowledge they need to be successful in their new educational setting.

Activities to be given:

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

Annexure-8

LESSON PLAN: TOTAL HOURS (30 HRS)

Unit	Description	Total	Mode
I	Binomial theorem. General term, middle term problems based on these concepts.	6	PPT, Chalk and Talk.
II	Sequences and series (Progressions). Fundamental principle of counting. Factorial n.	6	PPT, Chalk and Talk, Assignments and Group discussion
III	Derivation of formulae and their connections. simple applications, combinations with repetitions arrangements within groups. formation of groups.	6	PPT, Chalk and Talk, Assignments
IV	Introduction to trigonometric ratios proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles, sin(2A), cos(2A), tan(2A) etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule	6	PPT, Chalk and Talk, Assignments
V	Limits, standard formulae and problems, differentiation. First principle, uvrule, u/vrule,methods of differentiation, application of derivatives. Integration - product rule and substitution method.	6	Assignments, Seminar and Group discussion

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	23OUMA21	ANALYTICAL GEOMETRY (2D & 3D)	4	4	25	75	100

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

Course Objectives:

1.Necessary skills to analyse characteristics and properties of two- and three-dimensional geometric shapes.

2.To present mathematical arguments about geometric relationships.

3.To solve real world problems on geometry and its applications.

Course Content:

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

UNIT-II: Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal

UNIT-III: System of Planes-Length of the perpendicular–Orthogonal projection

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

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

Book for Study:

1. *Analytical Geometry (2D)* by P.Durai Pandian,Kayalal Pachaiyappa-Muhil Publishers

2. *Analytical Geometry three Dimension*, T.K.M. Pillai and S. Narayanan. (2013). S.Viswanathan (Printers & Publishers) Pvt., Ltd.

Unit – I: Chapter 7 : Section 7.1 to 7.3(BOOK I)

Chapter 8 : Section 8.1 to 8.5(BOOK I)

Unit-II: Chapter 10 :Section 10.1 to 10.8(BOOK I)

Unit-III: Chapter 2 :Section2.1 to 2.11(BOOK II)

Unit-IV: Chapter 3 :Section 3.1 to 3.8& 3.10 (BOOK II)

Unit-V :Chapter 4 : Section 4.1 to 4.8(BOOK II)

Books for Reference:

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

Web Resources/E Books

https://nptel.ac.in

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

Activities to be given:

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

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CLO1	Find pole, polar for conics, diameters, conjugate diameters for ellipse and hyperbola.	K1 to K3
CLO2	Find the polar equations of straight line and circle, equations of chord, tangent and normal	K1 to K3
CLO3	Explain in detail the system of Planes.	K1 to K4
CLO4	Explain in detail the system of Straight lines	K1 to K3
CLO5	Explain in detail the system of Spheres	K1 to K4

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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60HRS)

Unit	Description	Hrs	Mode
I	Pole, Polar - conjugate points and conjugate lines – diameters	12	Lecture, Chalk and Talk
	conjugate diameters of an ellipse - semi diameters conjugate diameters of hyperbola		Problem Solving, Quiz
II	General polar equation of straight line – Polar equation of a circle given a diameter	12	Lecture, Quiz
	Equation of a straight line, circle, conic		Lecture, Chalk and Talk
	Equation of chord, tangent, normal		Lecture, Problem Solving
III	System of Planes-Length of the perpendicular	12	PPT, Lecture, Quiz
	Orthogonal projection		PPT, Tutorial Problem Solving,
IV	Representation of line–angle between a line and a plane–	12	Lecture, Tutorial
	co – planar lines–shortest distance between two skew lines		Lecture, Problem Solving,
	length of the perpendicular–intersection of three planes		Lecture, PPT
V	Equation of a sphere-general equation-section of a sphere by a plane	12	Lecture, Chalk and Talk
	Equation of the circle- tangent plane		Lecture, PPT
	Angle of intersection of two spheres- condition for the orthogonality- radical plane		Lecture, Problem Solving, Assignment

Course Designer:Mrs.R.R.Subanya

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Core	23OUMA22	INTEGRAL CALCULUS	4	4	25	75	100

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

Course Objectives:

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

Course Content:

UNIT-I: Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic Functions-Bernoulli's formula.

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

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

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

UNIT-V: Geometric and Physical Applications of Integral calculus

Book for Study:

1.T.K.M. Pillai and S. Narayanan. *Calculus* S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2013)

2.Dr.S.Arumugam and A.Thangapandi Isaac. *Calculus* New Gamma Publishing House, Palayamkottai.(2013).

Unit – I: Chapter 2: Section1.1 to 1.4

Unit-II: Chapter 3: Section 1.1 to 1.5

Unit-III: Chapter 5:Section 4,5.1,6.1 to 6.3

Unit-IV: Chapter 6 :Section 1.1 &1.2, 2.1 to 2.4

Unit-V :Chapter 7 : Section 2.1 to 2.3 ,3,4,5,6

Books for Reference:

1. H. Anton,I. Birensand S. Davis,*Calculus*,John Wileyand Sons, Inc., 2002.
2. G.B. Thomasand R.L. Finney, *Calculus*, Pearson Education, 2007.
3. D. Chatterjee, *Integral Calculus and DifferentialEquations*,TataMcGraw HillPublishing Company Ltd.
4. P. Dyke, *An Introduction to Laplace Transforms and Fourier Series*, Springer Undergraduate Mathematics Series, 2001 (second edition).

Web Resources/E Books

https://nptel.ac.in

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, group discussion and also insist them to check reference books and web resources.

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CLO1	Determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae	K1 to K3
CLO2	Evaluate double and triple integrals and problems using change of order of integration	K1 to K3
CLO3	Solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution	K1 to K4
CLO4	Explain beta and gamma functions and to use them in solving problems of integration	K1 to K3
CLO5	Explain Geometric and Physical applications of integral calculus	K1 to K4

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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60HRS)

Unit	Description	Hrs	Mode
I	Reduction formulae-Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions-Bernoulli's formula, Feynman's technique of integration.	12	Lecture, Chalk and Talk
II	Multiple Integrals -definition of double integrals -evaluation of double integrals– double integral in polar-coordinates -Change of order of integration.	12	Lecture, Quiz Lecture, Chalk and Talk Lecture, Problem Solving
III	Triple integrals–applications of multiple integrals volumes of solids of revolution- areas of curved surfaces– change of variables - Jacobian.	12	PPT, Lecture, Quiz PPT, Tutorial Problem Solving,
IV	Beta and Gamma functions– infinite integral definitions–recurrence formula of Gamma functions – properties of Beta and Gamma functions-relation between Beta and Gamma functions- Applications.	12	Lecture, Tutorial Lecture, Problem Solving, Lecture, PPT
V	Geometric and Physical Applications of Integral calculus.	12	Lecture, Chalk and Talk Lecture, PPT Lecture, Problem Solving, Assignment

Course Designer:Dr.Mrs.P.Vidhya

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Skill Enhancement Course (NME)	23OUMASECN2	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

Book for Study:

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

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, *Business Mathematics*, Palani paramount Publications, Reprint 2013.

2.U. Mohan Rao, *Quantitative Aptitude for Competitive Examinations*, Scitech Publications, 2016.

3.R.S. Aggarwal *Modern Approach to Verbal & Non-Verbal Reasoning*, Reprint 2018

Web Resources/E Books

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

https://www.pdfdrive.com/quantitative-aptitude-books.html

https://pdfexam.com/arihant-quantitative-aptitude-book-pdf-free-d ownload/

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, group discussion and also insist them to check reference books and web resources.

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CO1	Understand the basic concepts ratio and proportion	K1 to K3
CO2	Identify the usage of time work and time distance	K1 to K3
CO3	Apply the knowledge of problems related to simple and compound interest	K1 to K3
CO4	Analyze the significance of common logarithms	K1 to K3
CO5	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

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

Annexure-8

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

LESSON PLAN: TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Ratio and Proportions	8	Chalk and Talk, problem solving
II	Time and work, Time and Distance	6	Chalk and Talk, Problem Solving
III	Simple interest and Compound interest	6	Chalk and Talk, Quiz
IV	Logarithms	6	Chalk and Talk, quiz, group discussion
V	Calendar	6	Chalk and Talk, Quiz

Course Designer: Mrs.T.Thivya

Annexure-8

Department of Mathematics			Class: I B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	SEC-3	23OUMASEC3	Computation Mathematics	2	2	25	75	100

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

Course Objectives:

- To acquire the knowledge about permutations and combinations with repeated and non-repeated objects.
- To understand the concept of principle of inclusion and exclusion.
- To acquire the knowledge of generating functions and exponential generating functions with repeated and non-repeated objects.
- To understand the concepts of difference equations.

Course Content:

Unit I: Fundamental principles of counting-The sum rule and product rule – permutations

Unit II: Combinations - Permutations and combinations with Repetitions- The Binomial Theorem –(Problems).

Unit III: The Principles of inclusion and exclusion-problems-The pigeon hole principle.

Unit IV: Generating functions-partitions of integers-The exponential generating function-The summation operator –problems.

Unit V: Recurrence Relations-The first order linear recurrence relation -The non-homogeneous recurrence relations.

Book for Study:

C. Vasudev -*Theory and problems of combinatorics*, New age international Publishers 2005.

Unit – I: Chapter I: Section 1.1 & 1.2

Unit-II: Chapter I : Section 1.3 to 1.5

Unit-III: Chapter II : Section 2.1 and 2.3

Unit-IV: Chapter III : Section 3.1,3.3 to 3.5

Unit-V : Chapter IV : Section 4.1 & 4.3

Books for Reference:

1.V.K.Balakrishnan – *Theory and problems of combinatorics*, Schaum' outline series,1995 McGraw Hill Inc. Singapore.

2.R.M.Wilson et.al *A Course in Combinatorics*, Cambridge Universit Press, 2007.

3.V.Krishnamurthy, *Combinatorics Theory and Applications*, East-Wes Press, 2020.

Web Resources/E Books

https://mathigon.org/world/Combinatorics

https://www.cs.uleth.ca/~morris/Combinatorics/Combinatorics.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, group discussion and also insist them to check reference books and web resources.

Course learning Outcomes (CLO's):

At the end of the course, the student will be able to:

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K Levels)
CLO1	Understand the basic concepts permutation	K1 to K3
CLO2	Examine the concept of Binomial Theorem	K1 to K3
CLO3	Apply the knowledge of problems related to problems on Pigeonhole principle	K1 to K4
CLO4	Analyze the significance of problems on generating function	K1 to K3
CLO5	To learn the Knowledge of Recurrence Relations	K1 to K4

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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Fundamental principles of counting-The sum rule and product rule – permutations	8	Chalk and Talk, problem solving, Tutorials
II	Combinations - Permutations and combinations with repetitions Binomial theorem -Problems.	6	Chalk and Talk, Problem Solving
III	The principles of inclusion–exclusion-problems-The pigeonhole principle.	5	Chalk and Talk, Quiz
IV	Generating functions-partitions of a positive integer-The exponential generating functions-the summation operator –problems.	5	Chalk and Talk, quiz, group discussion
V	Recurrence relations-the first order linear recurrence relation the nonhomogeneous recurrence relations.	6	Chalk and Talk, Quiz

Course Designer: MrsR.Revathi

Annexure-8

GENERIC ELECTIVE (ALLIED PAPERS)

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

COURSE STRUCTURE-Allied Papers

(w.e.f. 2023 – 2024 Batch onwards)

(For Physics & Chemistry Major)

Semester	Course Code	Course Title	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			Credits
					CIA	SE	Total	
I	23OUPHGEMA1 / 23OUCHGEMA1	**Generic Elective-1** ALLIED MATHEMATICS-I	6	3	25	75	100	5
II	23OUPHGEMA2 / 23OUCHGEMA2	**Generic Elective-2** ALLIED MATHEMATICS-II	6	3	25	75	100	5

Annexure-8

Department of Mathematics			Class: I B.Sc. (PHYSICS / CHEMISTRY)					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
I	Generic Elective Course	22OUPHGEMA1/ 22OUCHGEMA1	Allied Mathematics-I	3	6	25	75	100

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

Course Objectives:

1. Be able to understand n^{th} degree equation has exactly n roots.
2. The basic skills of differentiation, and applications of differentiation.
3. Knowledge on Evaluation of integrals, double, triple integrals.

Course Content:

UNIT-I: Theory of equations

An n^{th} degree equation has exactly n roots – Relation between the roots and Coefficients.

UNIT-II: Differentiation

n^{th} Derivative of some standard functions, Leibnitz's Theorem.

UNIT-III: Differentiation, Applications of Differentiation

Partial Differentiation, Maxima and Minima of functions of two variables.

UNIT-IV: Evaluation of integrals

Reduction formula for $\sin^n x$, $\cos^n x$, $\sec^n x$, $\cot^n x$, $\operatorname{cosec}^n x$, $\sin^m x \cos^n x$ and simple problems.

UNIT-V: Double and Triple Integrals

Double Integrals, Evaluation of Double Integrals, Triple Integrals.

.

Books for study:

1.T.K.Manicavachagom Pillay, T. Natarajan and K.S.Ganapathy *Algebra* Volume - I S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2008).

2.Dr.S.Arumugam and A.Thangapandi Isaac. *Calculus* New Gamma Publishing House, Palayamkottai.(2013).

Unit I Chapter 6 Section 1 to 11(BOOK I)

Unit II Chapter 2: Section 2.12(BOOK II) (PART-I)

Unit III Chapter 2,3:Section 2.13,3.7 (BOOK II) (PART-I)

Unit IV Chapter 2: Section 2.8(BOOK II) (PART-II)

Unit V Chapter 3: Section 3.1 to 3.3(BOOK II) (PART-II)

Books for Reference:

1.T.K.Manicavachagom Pillay, T. Natarajan and K.S.Ganapathy *Calculus Volume - I* S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2008).

2.T.K.Manicavachagom Pilli, T. Natarajan and K.S.Ganapathy *Calculus Volume - II* S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2008).

3.Dr.S.Arumugam and A.Thangapandi Isaac.*Allied Mathematics Paper -II* New Gamma Publishing House, Palayamkottai.(2013).

Web Resources /E books

1.https://math.stackexchange.com/questions/88917/relation-betwencoefficients-and- roots-of-a-polynomial

2.https://www.youtube.com/watch?v=-EPAhIIQRNo

3.https://math24.net/curvature-radius.html

4.https://www.egyankosh.ac.in/bitstream/123456789/11956/1/Unit-3.pdf

5.https://www2.slac.stanford.edu/comp/winnt/software/scientificworkplace/manuals/domath/chapter4-5.pdf

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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 Levels)
CLO 1	Classify An n^{th} degree equation has exactly n roots – Relation between the roots and Coefficients.	K1 to K3
CLO 2	Find the n^{th} Derivative of some standard functions and apply Leibnitz's Formula.	K1 to K3
CLO 3	Find the Partial Derivative and Determine Maxima and Minima of functions of two variables.	K1 to K4
CLO 4	Determine the Reduction formula for $\sin^n x$, $\cos^n x$, $\sec^n x$, $\cot^n x$, $\csc^n x$, $\sin^m x.\cos^n x$ and simple problems.	K1 to K3
CLO 5	Evaluate Double Integrals, Evaluation of Double Integrals, Triple Integrals.	K1 to K4

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

Annexure-8

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

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

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

LESSON PLAN: TOTAL HOURS (90 HRS)

Unit	Description	Hrs	Mode
I	An n^{th} degree equation has exactly n roots	18	Lecture, Quiz
	Relation between the roots and Coefficients.		Lecture
II	n^{th} Derivative of some standard functions.	18	Lecture, Quiz
	Leibnitz's Theorem.		Quiz
III	Partial Differentiation	18	PPT, Lecture
	Maxima and Minima of functions of two variables.		PPT, Tutorial
IV	Reduction formula for $\sin^n x$, $\cos^n x$, $\sec^n x$, $\cot^n x$, $\csc^n x$, $\sin^m x.\cos^n x$.	18	Lecture, Tutorial
	Simple problems.		Tutorial
V	Double Integrals .	18	PPT, Lecture
	Evaluation of Double Integrals		Lecture
	Triple Integrals.		Lecture

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**	**Ext**	**Total**
II	Generic Elective Course	22OUPHGEMA2/ 22OUCHGEMA2	Allied Mathematics-II	3	6	25	75	100

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

Course Objectives:

1.To know methods of solving differential equations of first order and higher order.

2.To understand the fundamental ideas of Partial differential equations.

3.To know application of Laplace transforms and method of solving ordinary differential equations using Laplace transforms.

Course Content:

UNIT-I: Introduction –Differential equation of first order and first degree – Variable-Separable – Homogeneous and Non-homogeneous differential equations – Exact Differential equations – Problems.

UNIT-II: Introduction – Linear equation with constant coefficients – Methods of finding complementary functions – Methods of finding particular integrals (Simple Problems)– Problems.

UNIT-III: Formation of partial differential equations– Solutions of standard types of first order partial differential equations (Types 1-4) – Lagrange's linear equation --Problems.

UNIT-IV: Introduction –Laplace transforms – Properties– Problems.

UNIT-V: Introduction –Inverse Laplace transforms– Properties– Problems – solution of differential equations using Laplace transforms - Problems.

Books for study:

T.K.M. Pillai and S. Narayanan. *Differential Equations and its Applications*. S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2007).

Unit I Chapter 1,2: Section:1,2,3,6

Unit II Chapter 5 : Section:1,2,3,4

Unit III Chapter :12 Section :1,2,3,4,5

Unit IV Chapter :9 Section :1,2,3,4,5

Unit V Chapter:9 Section :6,7,8,9,10,11

Books for Reference:

1. *Allied Mathematics* by Dr.S.Arumugam & Issac. Vol III, New Gamma Publishing House, Palayamkottai. (2012).
2. *Allied Mathematics* by Dr.S.Arumugam & Issac. Vol II, New Gamma Publishing House, Palayamkottai. (2011).
3. *Ancillary Mathematics*, Volume I, T.K Manikavasagampillai & Others, Viswanathan Printers and Publishers Pvt Ltd.Chennai.
4. *Allied Mathematics*, Volume II, P.Kandasamy, K.Thilagavathy, S.Chand& Company Pvt. Ltd.

Web Resources /E books

1. https://www.math24.net/exact-differential-equations/
2. https://www.math24.net/higher-order-linear-homogeneousdiff erential-equations-constant-coefficients/
3. https://www.brainkart.com/article/Lagrange---s-Linear-Equatio n_6488/
4. https://lpsa.swarthmore.edu/LaplaceXform/FwdLaplace/Laplac eProps.h tml
5. https://www.geeksforgeeks.org/newton-forward-backwardinter polation/

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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 Levels)
CLO 1	Solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous and non-homogeneous differential equation.	K1 to K3
CLO 2	Solve 2nd and higher order differential equations with constant coefficients	K1 to K3
CLO 3	Construct partial differential equations and to solve first order partial differential equations	K1 to K4
CLO 4	Solve Laplace transform of simple functions.	K1 to K3
CLO 5	Solve inverse transform of simple functions and application to differential equations with constant coefficients.	K1 to K4

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)

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (90 HRS)

Unit	Description	Hrs	Mode
I	Differential equation of first order and first degree: Variable – Separable	18	Lecture
	Homogeneous and Non-homogeneous differential equations		Problem Solving
	Exact Differential equations		Problem Solving
II	Introduction – Linear equation with constant coefficients: Methods of finding complementary functions	18	PPT, Tutorial
	Methods of finding particular integrals		PPT, Tutorial
III	Formation of partial differential equations	18	Lecture
	Solutions of standard types of first order partial differential equations Type I		Problem Solving
	Solutions of standard types of first order partial differential equations Type II		Problem Solving
	Solutions of standard types of first order partial differential equations Type III		Lecture, Tutorial
	Solutions of standard types of first order partial differential equations Type IV		Lecture, Tutorial
	Lagrange's linear equation		Problem Solving
IV	Introduction- Properties - Laplace transforms	18	PPT, Quiz, Lecture
	Problems		PPT, Quiz, Lecture
V	Introduction- Properties - Inverse Laplace transforms	18	Lecture
	Problems		Tutorial, Seminar
	Solution of differential equations using Laplace transforms - Problems.		Tutorial, Seminar

Course Designer: Mrs.S.Selvi

Annexure-8

(For Computer Science, B C A., & Data Science and Analytics Major)

Semester	Course Code	Course Title	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			Credits
					CIA	SE	Total	
I	23OUCSGEMA1	**Generic Elective-1** NUMERICAL METHODS	4	3	25	75	100	3
	23OUCSDGEMA1	**Generic Elective-1** STATISTICS - I	4	3	25	75	100	3
II	23OUCSGEMA2 / 23OUCAGEMA2	**Generic Elective-2** DISCRETE MATHEMATICS	4	3	25	75	100	3
	23OUCSDGEMA2	**Generic Elective-2** STATISTICS - II	4	3	25	75	100	3

Annexure-8

Department of Mathematics			Class: I B.Sc. COMPUTER SCIENCE					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
I	Generic Elective Course	23OUCSGEMA1	Numerical Methods	3	4	25	75	100

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

Course Objectives:

The main objectives of this course are:

1.To introduce the various topics in Numerical methods.

2.To make understand the fundamentals of algebraic equations.

3.To apply interpolation and approximation on examples.

4.To solve problems using numerical differentiation and integration.

5.To solve linear systems, numerical solution of ordinary differential equations

Course Content:

Unit-I

FUNDAMENTALS OF ALGEBRAIC EQUATION: Solution of algebraic and transcendental Equations-Bisection method – Fixed point iteration method – Newton Raphson method

Unit-II

LINEAR SYSTEM OF EQUATIONS – Gauss elimination method – Gauss Jordan Method-Iterative methods - Gauss Jacobi and Gauss Seidel Method of iteration.

Unit-III

ITERATIVE METHOD FOR EIGEN VALUES:

Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices-– Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation.

Unit-IV

NUMERICAL DIFFERENTIATION

Introduction-Newton's forward difference Formula-Newton's backward difference formula-Stirling's formula- Maxima and minima of the function.

Unit-V

NUMERICAL INTEGRATION

Introduction-Newton cote's Formula-Trapezoidal Rule-Geometrical Interpretation- Error in Trapezoidal Rule -Romberg's Method-Simpson's One-Third & Three- Eights Rule-Weddle's Rule

Books for study:

P. Kandasamy ,K. Thilagavathy and K. Gunavathy – "*Numerical Methods*", S.Chand& Company Ltd., Reprint 2019.

Unit I Chapter -3: 3.1 ,3.2 &3.4

Unit II Chapter -4:4.1,4.2,4.7,4.8,4.9

Unit III Chapter -13: 13.1 – 13.2, Chapter - 8:8.5,8.7

Unit IV Chapter:9.1 to 9.6

Unit V Chapter:9.7 to 9.16

Books for Reference:

1.S. Arumugam, A. Thangapandi Isaac, A. Somasundaram, - "*Numerical Methods*"- 2022(Reprint) scitech publications(India) Pvt.Ltd.

2.Balasubramaniam, Pand Venkatraman, M.K. (1972) *Numerical Mathematics*, Part I and II, Rochouse and Sons, New Delhi.

3.Saxena, H.C. (1972) *Finite differences*, S. Chand & Co, New Delhi.

4.Rajaraman, V.(1993*) Computer Oriented Numerical Methods*, PHI learning, New Delhi.

5.Sastry, S. S. (1993) *Introductory Methods of Numerical Analysis*, PHI learning, New Delhi.

6. Hutchison, I. H. (2015)*A student guide to Numerical Methods*, Cambridge University Press, Cambridge.

Web Resources /E books

https://nptel.ac.in

https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

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

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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 Levels)
CLO1	Know how to solve various problems on numerical methods	K1 to K3
CLO2	Apply , direct methods for solving linear systems	K1 to K3
CLO3	Use approximation to solve problems	K1 to K4
CLO4	Differentiation concept are applied	K1 to K3
CLO5	Integration concept are applied	K1 to K4

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, analysing, presentation and make inferences with evidences

Annexure-8

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

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60 HRS)

UNIT	Description	Mode	
I	Solution of algebraic and transcendental equations- Bisection method.	12	Problem solving
	Fixed point iteration method – Newton Raphson method		Lecture, Problem solving
II	Iterative methods - Gauss Jacobi and Gauss Seidel	12	Lecture
	linear system of equations – Gauss elimination method – Gauss Jordan method .		PPT,Lecture
III	Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices.	12	Problem solving
	Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation.		Problem solving
IV	Newton's forward and backward difference	12	Lecture
	Stirling's formula		Problem solving
	Maxima and Minima of the function		Lecture
V	Numerical integration using Trapezoidal	12	Tutorial
	Numerical integration using Simpson's 1/3 rule and 3/8 rule		Problem solving
	Weddle's Rule		Problem solving

Course Designer: Mrs.T.Thivya

Annexure-8

Department of Mathematics			Class: I B.Sc. Data Science and Analytics					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
I	Generic Elective Course	23OUCSDEGEMA1	Statistics-I	3	4	25	75	100

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

Course Objectives:

1.Basic ideas and concepts in Statistics.

2.Knowledge to find Statistical methods and interpret the results.

Course Content:

Unit I: Central Tendencies - Arithmetic Mean, Partition values, Mode, Geometric Mean and Harmonic Mean (Problems only)

Unit II: Measures of Dispersion –Measures of Dispersion (Problems only)

Unit III: Moments of Skewness and Kurtosis – Moments, Skewness and Kurtosis (Problems only)

Unit IV: Curve fitting – Principles of least square (Problems only)

Unit V: Correlation and Regression -Correlation, Rank Correlation, Regression (Problems)

Books for study:

S. Arumugam and A.Thangapandi Isaac, *Statistics* New Gamma Publishing House, Palayamkottai (July 2011

Unit I Chapter2 Section 2.1 to 2.4

Unit II Chapter 3: Section 3.1

Unit III Chapter 4: Section 4.1 & 4.2

Unit IV Chapter 5: Section 5.1

Unit V Chapter 6Section 6.1 to 6.3

Books for Reference:

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

Web Resources /E books

https://openstax.org/details/books/introductory-statistics

https://nptel.ac.in

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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 Levels)
CLO1	Classify and Solve Mean, Median and Mode	K1 to K3
CLO2	Find range and Standard deviation	K1 to K3
CLO3	Gain the knowledge of Moments and Skewness	K1 to K4
CLO4	Understanding the Principal of least squares & coefficient of variations	K1 to K3
CLO5	Explain various methods to solve the correlation and Regression	K1 to K4

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)

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60 HRS)

Unit	Description	Hrs	Mode
I	Arithmetic Mean	**12**	Lecture, Quiz,
	Partition values , Mode		Lecture, Problem Solving
	Geometric Mean and Harmonic Mean		Chalk and Talk, Group Discussion
II	Range , Quartile Deviation	**12**	Lecture, Group Discussion
	Standard Deviation		Lecture, Problem Solving
III	Moments	**12**	Lecture, Seminar
	Skewness		Lecture, Quiz
	Kurtosis		Lecture
IV	Curve fitting	**12**	Lecture, Quiz
	Straight Line		Lecture, Problem Solving
	Parabola		Lecture, Tutorial
V	Correlation	**12**	Lecture ,Quiz
	Rank correlation		Lecture
	Regression		Lecture, Seminar

Course Designer: Mrs.D.Selvamathi

Department of Mathematics			Class: I B.Sc, COMPUTER SCIENCE / BCA					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
II	Generic Elective Course	23OUCSGEMA2/ 23OUCAGEMA2	Discrete Mathematics	3	4	25	75	100

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

Course Objectives:

- To provide students with an overview of Discrete Mathematics
- Apply the techniques of IF Statements
- 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

Unit –II Relations and Functions

Relations – Representation of a relation – Operations on relations – equivalence relation – Closures &Warshalls Algorithm

Unit –III Logic

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

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 – shortest path problem.

Books for study:

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

Chapter 1: Section:1.1 to 1.7

Chapter 2: Section:2.2 to 2.6

Chapter 9: Section:9.1 to 9.3,9.6,9.7,9.8

Chapter 5: Section: 5.1 to 5.6

Chapter 11: Section:11.1 ,11.2 & 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, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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 Levels)
CLO1	Understand the basic principles of sets and operations in sets	K1 to K3
CLO2	Understand the basic concepts of Relations	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	K1 to K3
CLO5	Analyze the concepts of Graph Theory	K1 to K4

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)

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

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

Annexure-8

LESSON PLAN: TOTAL HOURS (60 HRS)

Unit	Description	Hrs	Mode
I	Sets, Subsets and Euler Diagram	12	PPT, Chalk and Talk.
	Operation on Sets		
II	Relations, Operations of relations	12	PPT, Chalk and Talk, Assignment sand Group discussion
	Clousure and Warshall Algorithm		
III	IF Statement, Connectives	12	PPT, Chalk and Talk, Assignment s
	Tautology		
IV	Reccurrence Relation	12	PPT, Chalk and Talk, Assignment s
	Generating Functions		
V	Matrix representation of graphs		Assignment s ,Seminar and Group discusisson
	Shortest Path Problem		

Course Designer: Mrs.T.Thivya

Department of Mathematics			Class: I B.Sc. Data Science and Analytics					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
II	Generic Elective Course	23OUCSDEGEMA2	Statistics-II	3	4	25	75	100

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

Course Objectives:

1.Basic ideas and concepts in Statistics.

2.Knowledge to find Statistical methods and interpret the results.

Course Content:

Unit I: Interpolation –Finite Differences-Newton's Formula-Lagrange's formula

Unit II: Theory of attributes-attributes-consistency of Data-Independence and association of data

Unit III: Index Numbers-Consumer price index numbers (cost of living index number

Unit IV: Probability – conditional probability

UnitV: Random Variables-Discrete random variable-continuous random variable-mathematical expectations

Books for study:

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

Unit I Chapter 7: Section 7.1 to 7.3

Unit II Chapter 8: Section 8.1 & 8.3

Unit III Chapter 9: Section 9.1 & 9.2

Unit IV Chapter 11: Section 11.1 & 11.2

Unit V Chapter 12 : Section 12.1 to 12.4

Books for Reference:

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

Web Resources /E books

https://openstax.org/details/books/introductory-statistics

https://nptel.ac.in

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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 Levels)
CLO1	Classify and Solve Newton's and lagrange's formula	K1 to K3
CLO2	Classify and discuss Theory of attributes	K1 to K3
CLO3	Gain the knowledge of index numbers	K1 to K4
CLO4	Understanding the Principal of Probability	K1 to K3
CLO5	Explain various methods to solve the Mathematical Expectation	K1 to K4

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, analysing, presentation and make inferences with evidences

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

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

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

LESSON PLAN: TOTAL HOURS (60 HRS)

Unit	Description	Hrs	Mode
I	Interpolation	12	Lecture, Quiz,
	Newton's formula		Lecture, Problem Solving
	Lagrange's Formula		Chalk and Talk, Group Discussion
II	Attributes	12	Lecture, Group Discussion
	Consistency of data		Lecture, Problem Solving
III	Index numbers Skewness Kurtosis	12	Lecture, Seminar, Quiz
IV	Probability	12	Lecture, Quiz
	Conditional Probability		Lecture, Problem Solving , Tutorial
V	Random Variables	12	Lecture ,Quiz
	Discrete and Continuous random variable		Lecture
	Mathematical Expectation		Lecture, Seminar

Course Designer: Mrs.D.Selvamathi