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

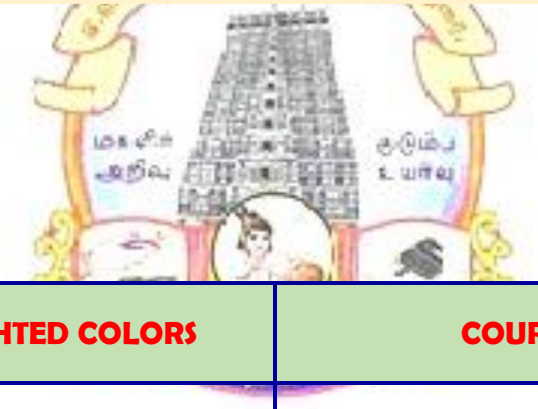
COURSE STRUCTURE

(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

(with Allied Chemistry and Allied Physics)

CBCS with OBE

COURSE STRUCTURE

(w.e.f. 2022 – 2023 Batch onwards)

Semester	Part	Sub Code	Title of the paper	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks allotted			Credits
						C.A	S.E	Total	
3	I	22OU1TA3	Tamil	6	3	25	75	100	3
	II	22OU2EN3	English	6	3	25	75	100	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 – Allied Chemistry-III / Electricity and Electronics	4	3	25	75	100	4
	III		GEC –Chemistry Practical-II :Volumetric Analysis/ Physics Practical-II	2	-	-	-	-	-
	IV	22OUMASE3	SEC-Application 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- Allied Chemistry-IV/ Optics	4	3	25	75	100	4
	III	22OUMAGECH4P/ 22OUMAGEPH4P	GEC –Chemistry Practical-II :Volumetric Analysis / Physics Practical –II	2	3	40	60	100	1
	IV	22OUMASE4	SEC-Application of Differential Equations	2	3	25	75	100	2
	Total			**60**					**45**

GEC- Generic Elective Course

SEC- Skill Enhancement Course

DSEC- Discipline Specific Elective Course

AECC- Ability Enhancement Compulsory Course

IDC- Inter Disciplinary Course

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-Allied Papers

(w.e.f. 2022 – 2023 Batch onwards)

(For Physics & Chemistry Major)

Sem	Sub Code	Title of the Paper	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			
					C.A	S.E	Total	Credit
III	**22OUPHGEMA3/ 22OUCHGEMA3**	**Allied Mathematics-III** Algebra and Statistics	6	3	25	75	100	4
IV	**22OUPHGEMA4/ 22OUCHGEMA4**	**Allied Mathematics-IV** Linear Programming	6	3	25	75	100	5

Annexure - 10

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

Sem	Course	Sub Code	Title of the Paper	Teaching hrs (per week)	Duration of Exam (hrs.)	Marks Allotted			
						C.A	S.E	Total	Credit
III	B.Sc. Computer science & B.C.A	**22OUCSGEMA3/ 22OUCAGEMA3**	Numerical methods	5	3	25	75	100	5
IV	B.Sc. Computer science & B.C.A	**22OUCSGEMA4/ 22OUCAGEMA4**	Resource Management Techniques	5	3	25	75	100	5

Department of Mathematics			Class: II B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
III	Core	**22OUMA31**	Modern Algebra	6	6	25	75	100

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

Course Objectives:

1. To enrich with the knowledge of Abstract Algebra.
2. To learn a method to count the elements of a finite groups.
3. To understand algebraic concepts of Groups and Rings.
4. To have a good foundation in Groups and Rings.
5. To study some standard theorems in Ideals and Prime Ideals.

Course Content:

UNIT-I

Groups: Definition and Examples - Elementary properties of groups–Equivalent definitions of a group – Permutation Groups-Subgroups.

UNIT-II

Cyclic groups – Order of an Element-Cosets and Lagrange's Theorem-Normal Subgroups and Quotient Groups

UNIT-III

Isomorphism, Homomorphism –Rings: Definitions and Examples - Elementary properties of rings.

UNIT –IV

Isomorphism - Types of Rings – Characteristic of a ring –Subrings

UNIT –V

Ideals-Quotient rings- Maximal and prime ideals

Book for Study:

S. Arumugam and A. Thangapandi Isaac, *Modern Algebra*, 2008 SCITECH Publications (INDIA) PVT., LTD.,

Unit – I: Chapter 3:3.1 to 3.5

Unit – II: Chapter 3: 3.6 to 3.9

Unit – III: Chapter 3: 3.10 & 3. 11

Chapter 4: 4.1 &4.2

Unit – IV: Chapter 4: 4.3 to 4.6

Unit – V: Chapter 4: 4.7 to 4.9

Books for Reference:

1. Narayanan K.S. and Manicavachagom Pillay T.K.,*Modern Algebra Volume – II*, S. Viswanathan (Printers&Publishers) PVT., LTD(1996).

2. Venkatachalapathy S.G., *Modern Algebra*, Margham Publications, Second Edition(2004).
3. Prof.Chatterji P.N., *Modern Algebra*, Rajhan Prakasan Mandir Educational Publishers, Meerut U.P (1986).

Web Resources/E Books

1. https://users.metu.edu.tr/serge/courses/116-2015/Textbook116.pdf
2. https://mathcs.clarku.edu/~djoyce/ma225/algebra.pdf
3. https://mis.alagappauniversity.ac.in/siteAdmin/ddeadmin/uploads/5/__UG_B.Sc._Mathematics_113%2051_Modern%20Algebra_BSc%20MATHS_5665.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):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Ability to demonstrate the importance of algebraic properties with regard to working with in various number system.	K1 to K3
CLO2	Gain knowledge about different types of subgroups such as normal subgroups and Quotient groups.	K1 to K3
CLO3	Learn the elementary theorems and proof techniques of group and ring theory.	K1 to K4
CLO4	Apply the theorems, proof techniques and standard computations of group and ring theory to solve problems.	K1 to K3
CLO5	Analyze and demonstrate examples of ideals, quotient rings and prime ideals.	K1 to K4

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

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

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

LESSON PLAN: TOTAL HOURS (90 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Groups: Definition and Examples - Elementary properties of groups– Equivalent definitions of a group – Permutation groups - Subgroups.	18	Chalk and Talk & PPT
II	Cyclic groups – Order of an Element- Cosets and Lagrange's Theorem-Normal Subgroups and Quotient Groups	18	Chalk and Talk
III	Isomorphism, Homomorphism –Rings: Definitions and Examples - Elementary properties of rings.	18	Chalk and Talk& Group discussion
IV	Isomorphism - Types of Rings – Characteristic of a ring –Subrings	18	Chalk and Talk& On the spot test
V	Ideals-Quotient rings- Maximal and prime ideals	18	Chalk and Talk

Course Designer: Mrs.A.Manimegalai

Department of Mathematics			Class: II B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
III	DSEC	**22OUMADSE3A**	Operations Research	4	4	25	75	100

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

Course Objectives:

1. To apply various optimization techniques for decision making.
2. To aim at building capabilities in the students for analyzing different situations in the industrial/ business scenario involving limited resources
3. To find the optimal solution within constraints.
4. To enable the student to understand and analyze managerial and engineering problems to equip him to use the resources
5. To deal with the various transshipment techniques using Transportation and Assignment problems.

Course Content:

UNIT-I

Linear programming problem (LPP): Introduction-Mathematical formulation of the Linear Programming problem - Graphical solution method –Some exceptional casesGeneral linear programming problem-Canonical &standard form of LPP(problems only).

UNIT-II

LPP Simplex Method: Introduction-Fundamental properties of solutions -The computational procedure - Use of Artificial Variable (problems only)

UNIT-III

Duality in LPP: Introduction-General primal –Dual pair-Formulating a dual problem-Primal dual pair in matrix form –Duality and simplex method- Dual simplex method(problems only)

UNIT –IV

Transportation Problem: Introduction-LP formulation of the Transportation Problem – Solution of a transportation problem – Finding an initial basic feasible solution – Test for optimality – Transportation algorithm (MODI method) — Solution method of assignment problem- Travelling salesman Problems (problems only)

UNIT –V

Games and strategies : Two-person zero-sum games – Some basic terms – The Maxmini – Minimax Principle - Games without saddle points- Mixed Strategies – Graphic Solution of 2xn and mx2 games – Dominance Property(problems only)

Book for Study:

Kanthi Swarup, P.K. Gupta and Man Mohan, *Operations Research*, Sultan Chand & Sons Educational Publishers, 2014 .

Unit – I : Chapter 2, Chapter 3: (3.1-3.5)

Unit – II : Chapter 4: (4.1 to 4.4)

Unit – III : Chapter 5: (5.1to 5.4 , 5.7 ,5.9)

Unit – IV : Chapter 10: (10.1to 10.13) & Chapter 11:(11.1 to 11.3,11.7)

Unit – V : Chapter 17: (17.1 to 17.7)

Books for Reference:

1. Arumugam S.& Thangapandi Isaac A., *Linear Programming*, New Gamma Publishing House, 2004.
2. Gupta P.K., Man Mohan, *Problems in Operations Research*, Sultan Chand & Sons,Delhi, 2003.
3. Sharma J.K.4th Edition. *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., 2010.

Web Resources/E Books

1. https://books-library.net/files/books-library.online-01251340Yz1V8.pdf
2. https://ncert.nic.in/ncerts/l/lemh206.pdf
3. https://www.uobabylon.edu.iq/eprints/publication_11_26905_31.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):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Capable of obtaining best solution using Graphical Method.	K1 to K3
CLO2	Formulate linear programming problems and find their solutions	K1 to K3
CLO3	Convert the given LPP into its dual and solve dual simplex method	K1 to K4
CLO4	Solve the special cases of LPP such as Transportation and Assignment Problems.	K1 to K3
CLO5	Model competitive real-world phenomena using concepts from game theory. Analyse pure and mixed strategy games	K1 to K4

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

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

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

LESSON PLAN: TOTAL HOURS (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Linear programming problem (LPP):** Introduction-Mathematical formulation of the Linear Programming problem - Graphical solution method –Some exceptional cases-General linear programming problem-Canonical &standard form of LPP	12	Chalk and Talk & PPT
II	**LPP Simplex Method**: Introduction Fundamental properties of solutions The computational procedure - Use of Artificial Variable	12	Chalk and Talk
III	**Duality in LPP:** Introduction-General primal – Dual pair-Formulating a dual problem-Primal dual pair in matrix form –Duality and simplex method-Dual simplex method (problems only)	12	Chalk and Talk& Group discussion
IV	**Assignment Problem**: Introduction LP formulation of the Transportation Problem – Solution of a transportation problem – Finding an initial basic feasible solution – Test for optimality – Transportation algorithm(MODI method) — Solution methods of assignment problem- Travelling salesman Problems	12	Chalk and Talk& On the spot test
V	**Games and strategies**: Two-person zero-sum games – Some basic terms – The Maxmini – Minimax Principle - Games without saddle points-Mixed Strategies – Graphic Solution of 2xn and mx2 games – Dominance Property	12	Chalk and Talk

Course Designer: Mrs.R.R.SUBANYA

Department of Mathematics			Class: II B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
III	SEC	**22OUMASE3**	Application of Calculus	2	2	25	75	100

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

Course Objective:

1. Trace some curves whose equations are given in Cartesian, parametric or polar form.
2. Determine whether a curve is concave, or convex, or neither in a given interval;
3. Apply maxima and minima in real life situations;
4. Find the asymptotes parallel to axes;
5. Explain the concept of area under a curve and between two curves and length of a curves.

Course Content:

Unit I

Maxima and Minima – Concavity and Convexity, Point of inflexion – indetermined forms.

Unit II

Tangent and Normal – Angle of intersection of curves – Singular points.

Unit III

Linear Asymptotes – Asymptotes Parallel to the axes – Another method for find asymptotes – asymptotes by inspection intersections of a curve with its asymptotes.

UNIT IV

Tracing a Curves - Cartesian Equation and Polar Equation (except well known curves).

UNIT V

Area of plane region and length of a plane curve.

Books for Study:

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

Unit I : Chapter 5 (1.1 to 1.5 & 2)
Chapter 6 (4.1, 4.2)
Unit II : Chapter 9 (1.1 to 1.4)
Chapter 12 (1 to 7)
Unit III : Chapter 11 (1 to 7)
Unit IV : Chapter 13 (1.1, 1.2 & 2)
Unit V : Chapter 7 (7.1)
Chapter 8 (8.1 to 8.3)

Books for Reference:

1. SantiNarayan, *Differential Calculus* Shyam Lal Charitable Trust (1993) .
2. T.K.M. Pillai and S. Narayanan *Calculus Volume – I* S.Viswanathan (Printers & Publishers) Pvt., Ltd (2013).
3. Arumugam .S and Thangapandi Isaac .A, *Calculus* New Gamma Publishing House, Palayamkottai (2005).

Web Resources/E Books

1. https://ocw.mit.edu/ans7870/resources/Strang/Edited/Calculus/Calculus.pdf
2. https://amsi.org.au/ESA_Senior_Years/PDF/AppsDiff3c.pdf
3. https://web.pdx.edu/~erdman/CALCULUS/CALCULUS_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	KnowledgeAccording to Bloom's Taxonomy(Upto K level)
CLO1	Understand the concepts of Extrema	K1 to K3
CLO2	Determine concavity and singular points	K1 to K3
CLO3	Determine Asymptotes Parallel to the Axes and Oblique Asymptotes	K1 to K3
CLO4	Tracing a curve in parametric, polar and cartesian	K1 to K3
CLO5	Determine area and length of a curve	K1 to K3

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**

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Maxima and Minima – Concavity and Convexity, Point of inflexion – indetermined forms	6	Chalk & Talk , PPT
II	Tangent and Normal – Angle of intersection of curves – Singular points.	6	Chalk & Talk ,PPT
III	Linear Asymptotes – Asymptotes Parallel to the axes – Another method for find asymptotes – asymptotes by inspection intersections of a curve with its asymptotes.	6	Chalk & Talk ,PPT
IV	Tracing a Curves - Cartesian Equation and Polar Equation (except well known curves).	6	Chalk & Talk ,PPT
V	Area of plane region and length of a plane curve.	6	Chalk & Talk ,PPT

Course Designer: Dr.P.Vidhya

Department of Mathematics			Class: II B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I V	Core	**22OUMA41**	Sequences and Series	6	6	25	75	100

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

Course Objectives:

1. To impart the knowledge of sequences and summation of series.
2. To recognize when a sequences are increasing, decreasing, bounded, or monotone
3. To determine the sequences are converge or diverge.
4. To Classify a sequence as arithmetic, geometric or neither.
5. To develop the skill of computation with real sequence and series.

Course Content:

UNIT-I

Sets and functions-intervals in R-Bounded Sets-Least Upper Bound and Greatest Lower Bound Inequalities-Triangle Inequalities-Cauchy –Schwarz Inequalities.

UNIT-II

Sequences- Bounded, Monotonic Sequences-Convergent Sequences-Divergent and Oscillating Sequences-Algebra of limits.

UNIT-III

Behaviour of monotonic sequences-Sum theorems on limits – Subsequences – Limit Points - Cauchy sequences.

Unit-IV

Series of positive terms-Infinite series– Comparison test – Kummer's test – Root test and Condensation test- Integral test**.**

Unit-V

Alternating series – Absolute convergence – Tests for convergence of series of arbitrary terms.

Book for Study:

1. Arumugam .S. Thangapandi Isaac.A ,*Sequence and Series and Fourier Series* New Gamma Publishing House, Palayamkottai (2006)

Unit I : Chapter 1(1.1 to 1.5)
Chapter 2 (2.1, 2.2, 2.5)
Unit II : Chapter 3 (3.1 to 3.6)
Unit III : Chapter 3 (3.7 to 3.11)
Unit IV : Chapter 4 (4.1 to 4.5)
Unit V : Chapter 5 (5.1 to 5.3)

Books for Reference:

1. Bali N.P, *Sequences and Infinite series,* Golden Maths Series, Firewall Media, An Imprint of Laxmi Publications Pvt, Ltd.(2009).
2. Dr.Chandrasekhara Rao K & Dr.Narayanan K.S *Real Analysis Volume I* (Chapters 4 &5) S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2008)
3. ViswanathNaik, K.- *Real Analysis,* Emerald Publishers, Chennai.

Web Resources/E Books

1. **https://people.math.osu.edu/fowler.291/sequences-and-series.pdf**
2. **https://kanchiuniv.ac.in/coursematerials/Sequence%20and%20Series.pdf**
3. **https://www.teachmint.com/tfile/studymaterial/bsc/mathematics/sequencesnotes-pdfpdf/2957493e-0c87-4cce-8831-ea455e6da73f**

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	Recall the basic concepts in Sets and Functions and get the knowledge of Bounded sets and least upper bound and greatest lower bound.	K1 to K3
CLO2	Recognize Bounded, Convergent, divergent Cauchy sequence	K1 to K3
CLO3	Find the sequence of partial sum for an infinite series.	K1 to K4
CLO4	Understanding the concept of Inequalities and Recognize when the series converges and diverges.	K1 to K3
CLO5	Acquire the information about Alternating series and Absolute convergence series.	K1 to K4

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

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

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

Annexure - 10

LESSON PLAN: TOTAL HOURS (90HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Sets and functions-intervals in RBounded Sets-Least Upper Bound and Greatest Lower Bound InequalitiesTriangle Inequalities-Cauchy – Schwarz Inequalities	18	Chalk and Talk
II	Sequences- Bounded, Monotonic Sequences-Convergent SequencesDivergent and Oscillating SequencesAlgebra of limits.	18	Chalk and Talk& PPT
III	Behaviour of monotonic sequences-Sum theorems on limits – Subsequences – Limit Points - Cauchy Sequences.	18	Chalk and Talk & On the spot test
IV	Series of positive terms-Infinite series– Comparison test – Kummer's test – Root test and Condensation test- Integral test.	18	Chalk and Talk & Group discussion
V	Alternating series – Absolute convergence – Tests for convergence of series of arbitrary terms.	18	Chalk and Talk

Course Designer: Mrs. R.R.SUBANYA

Department of Mathematics			Class: II B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	DSEC	**22OUMADSE4A**	Number Theory	4	4	25	75	100

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

Course Objectives:

1. To provide a deep knowledge of Number theory
2. To learn the concept about Congruence and Residue classes
3. To know the applications of Wilson's theorem and Factor theorem for polynomials.
4. To have a good foundation of Quadratic residues and non-residues.
5. To study some standard theorems like Wolstenholme.

Course Content:

UNIT-I

Introduction –Divisibility, Prime and Composite numbers-**Congruences -** Defenition-Residue classes-complete and least residue systems –reduced residue systems-casting out 9-magic numbers-Divisibility tests

UNIT-II

Congruences – linear congruences- solution of congruences-Chinese remainder theorem.

Theorems of Fermat and Wilson- Little Fermat's theorem-Euler's extension

UNIT-III

Theorems of Fermat and Wilson-Inverse modulo-Wilson's theorem and its converseLagrange's theorem –Wolstenholme theorem. **Algebraic Congruences**- Factor theorem for polynomials-Number of solutions

UNIT –IV

Algebraic Congruences-Congruences of prime power moduli-Composite moduli-identical congruence-conditional congruences- multiple roots

UNIT –V

Quadratic Reciprocity- Quadratic residues and nonresidues –Euler criterion-Primitive root is a quadratic non residue –Legendre symbol

Book for Study:

Kumaravelu and Susheela Kumaravelu, *Elements of Number Theory*, SKV Publications (INDIA) PVT,2002.

Unit – I: Chapter 6 page 163 to 188

Unit – II: Chapter 6 (page 189 to 206)& chapter7 (page 208 to 226)

Unit – III: Chapter 7(page 227 to 244)& chapter 8 (page 248 to 258)

Unit – IV: Chapter 8 (page 259 to 271)

Unit – V: Chapter 10(page 318 to 332)

Books for Reference:

1. Ivan Niven.Herbert S Zuckarman and Hugh L.Montgometry.*An Introduction to thethory of numbers*, 5th Edition , John Wiley and sons, Inc 2001
2. V.K Krishnan ,*Elementary Number Theory*, Universities Press, 2017

Web Resources/E Books

1. https://www.maths.ed.ac.uk/~v1ranick/papers/borevich.pdf
2. **https://joshua.smcvt.edu/numbertheory/book.pdf**
3. **https://www.youtube.com/live/_5PG8bF2aDs?feature=share**

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):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Ability to demonstrate the importance of residue classes, magic numbers and divisibility tests	K1 to K3
CLO2	Gain knowledge about linear congruences and Chinese remainder theorem	K1 to K3
CLO3	Learn the elementary theorems and proof techniques of inverse modulo and lagrange theorem.	K1 to K4
CLO4	Apply the theorems, proof techniques and standard computations of congruence of prime power moduli and multiple roots of congruences	K1 to K3
CLO5	Analyze the concept of quadratic residues and nonresidues	K1 to K4

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

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

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

Annexure - 10

LESSON PLAN: TOTAL HOURS (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction –Divisibility, Prime and Composite numbers-Congruences-Definition-Residue classes-complete and least residue systems – reduced residue systems-casting out 9-magic numbers-Divisibility tests	12	Chalk and Talk & PPT
II	Congruences – linear congruences- solution of congruences-Chinese remainder theorem. Theorems of Fermat and Wilson- Little Fermat's theorem-Euler's extension	12	Chalk and Talk
III	Theorems of Fermat and Wilson-Inverse modulo-Wilson's theorem and its converse-Lagrange's theorem –Wolstenholme theorem. Algebraic Congruences- Factor theorem for polynomials-Number of solutions	12	Chalk and Talk& Group discussion
IV	Algebraic Congruences-Congruences of prime power moduli-Composite moduli-identical congruence-conditional congruences -multiple roots	12	Chalk and Talk& On the spot test
V	Quadratic Reciprocity- Quadratic residues and non residues –Euler criterian-primitive root is a quadratic non residue –Legendre symbol	12	Chalk and Talk

Course Designer: Dr.(Mrs) R.Mangayarkarasi

Department of Mathematics			Class: II B.Sc.					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	SEC	**22OUMASE4**	Applications of Differential Equations	2	2	25	75	100

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

Course Objectives:

1. To provide a deep knowledge of orthogonal trajectories
2. To learn the concept about growth and decay
3. To know the applications of Brachistochrone problem
4. To have a good foundation of electric circuits
5. To have a basic knowledge about simple pendulum

Course Content:

UNIT-I

Orthogonal Trajectories

UNIT-II

Growth and decay

UNIT-III

Continuous Compound Interest-The Brachistochrone problem

UNIT –IV

Simple Electric Circuits-Falling Bodies

UNIT –V

Simple Harmonic Motion-Simple Pendulum

Book for Study:

Dr.S.Arumugam &A.Thangapandi Isaac, *Differential Equations And Applications*, New Gamma Publishing House, Palayamkottai 2014

Unit – I: Chapter 6 – 5.1

Unit – II: Chapter 6 -5.2

Unit – III: Chapter 6- 5.3, 5.4

Unit – IV: Chapter 6-5.6,5.7

Unit – V: Chapter 6- 5.8,5.9

Books for Reference:

1. S.Narayanan& T.K manickavachagam pillay. *Differential Equations and its Applications*, S.viswanathan (printers and publishers) PVT, LTD 2008
2. Bali N .P. *Differential Equations*, Firewall Media (2011).
3. Frank Ayres JR, *Differential Equations*, Schaum's Outline Series(1988).

Web Resources/E Books

1. http://mdudde.net/pdf/study_material_DDE/M.Sc.MAthematics/DIFFERENTIAL%20EQUATIONS.pdf
2. https://www.math.hkust.edu.hk/~machas/differential-equations.pdf
3. https://youtu.be/Ziu0y2kWTCM

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):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(Up to K level)
CLO1	Ability to demonstrate the importance of orthogonal trajectories	K1 to K3
CLO2	Gain knowledge about Growth and decay	K1 to K3
CLO3	Learn the concept of Brachistochrone problem	K1 to K3
CLO4	Apply the concept of electric circuit	K1 to K3
CLO5	Analyze the concept of simple Harmonic Motion	K1 to K3

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

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

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

LESSON PLAN: TOTAL HOURS (30Hrs.)

UNIT	DESCRIPTION	HRS	MODE
I	Orthogonal Trajectories	6	Chalk and Talk & On the spot test
II	Growth and decay	6	Chalk and Talk
III	Continuous Compound Interest-The Brachistochrone problem	6	Chalk and Talk
IV	Simple Electric Circuits-Falling Bodies	6	Chalk and Talk & Group discussion
V	Simple Harmonic Motion-Simple Pendulum	6	Chalk and Talk

Course Designer: Dr.(Mrs) R.Mangayarkarasi

Department of Mathematics			Class: II B.Sc. (Physics&Chemistry)					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
III	Generic Elective Course	**22OUPHGEMA3/ 22OUCHGEMA3**	Allied Mathematics-III Algebra and Statistics	4	6	25	75	100

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

Course Objectives:

1. To learn characteristic equations of Matrix.
2. To solve the Rank Correlation and Regression.
3. To study the Finite Differences.
4. To find the solution of Attributes, Consistency of Data, Independence and Association of Data.
5. To know about Index Numbers.

Course Content:

Unit –I

Matrices: characteristic equations of a Matrix- Eigen Values and Eigen Vectors.

Unit –II

Correlation and Regression: Correlation-Rank Correlation-Regression.

Unit –III

Interpolation: Finite Differences-Newton's Formula (Problems only)-Lagrange's Formula (Problems only).

Unit –IV

Theory of Attributes: Attributes-Consistency of Data- Independence and Association of Data.

Unit –V

Index Numbers: Index Numbers-Consumer Price Index Numbers (cost of living index numbers)-Conversion of Chain Base Index Number into Fixed Base Index and Conversely.

Books for study:

1. Arumugam.S and Thangapandi Isaac.A "*Allied Mathematics-II"*, New Gamma Publishing House, 2011.
2. Arumugam.S and Thangapandi Isaac.A, "*Statistics",* New Gamma Publishing House, july (2009).

Unit I Chapter 3: 3.1,3.3 and 3.4(Text Book I)

Unit II Chapter 6: 6.1 to 6.3(Text Book II)

Unit III Chapter 7: 7.1 to 7.3(Text Book II)

Unit IV Chapter 8: 8.1 to 8.3(Text Book II)

Unit V Chapter 9: 9.1 to 9.3 (Text Book II)

Books for Reference:

1. T.Veerarajan, *Fundamentals of Mathematical Statistics,* YesDee Publishing House,July2016.
2. B.L.Agarwal,*Basic Statistics,* New Age International Publishers, 6th Edition.

Web Resources /E books

1. https://www.gacwrmd.in/learning/Maths/Algebra%20and%20trignometry%20Unit%20I%20to%20V.pdf
2. https://www.gacwrmd.in/learning/Maths/STATISTICS-I-%207BMA5C2.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 eigen values and eigen vectors, Rank Correlation problems and solve Interpolation, Index Numbers

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	Able to solve characteristic equations of Matrix, eigen values and eigen vectors.	K1to K3
CLO2	Understand the concept of Rank Correlation, Regression.	K1to K3
CLO3	Solve the Finite Differences-Newton's Formula, Lagrange's Formula.	K1 to K4
CLO4	Describe the Attributes-Consistency of Data, Independence and Association of Data.	K1 to K3
CLO5	Understand the concept of Index Numbers	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	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

LESSON PLAN: TOTAL HOURS (90 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	• Characteristic Equations of Matrix • Eigen Values and Eigen Vectors.	18	Chalk and Talk
II	• Rank Correlation • Regression	18	Chalk and Talk
III	• Finite Differences • Newton's Formula • Lagrange's Formula.	18	Chalk and Talk
IV	• Attributes • Consistency of Data • Independence and Association of Data.	18	Chalk and Talk
V	• Index Numbers • Consumer Price Index Numbers (cost of living index numbers) • Conversion of Chain Base Index Number into Fixed Base Index and Conversely.	18	Chalk Talk&Group discussion

Course Designer: Mrs.S.Selvi

Department of Mathematics			Class: II B.Sc. (Physics&Chemistry)					
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
IV	Generic Elective Course	**22OUPHGEMA4/ 22OUCHGEMA4**	Allied Mathematics-IV Linear Programming	5	6	25	75	100

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

Course Objectives:

1. To introduce the fundamental concepts of LPP.
2. To develop the skills in decision making.
3. To equip the students in solving real time problems.
4. To Construct and solve a minimization problem.
5. To develop formulation skill in transportation model and finding solutions.

Course Content:

Unit- I:

Linear Programming Problems-Formulation of LPP – Mathematical formulation of a Linear Programming Problem-solution of Linear Programming Problem-Graphical method

Unit- II:

Simplex Method

Unit- III

Big–M Method-Two Phase Method

Unit- IV:

Mathematical formulation of Transportation Problem-Degeneracy in T.P.

Unit- V:

Mathematical formulation of an assignment problem-Solution to assignment problem.

Book for study:

S.Arumugam and A.Thangapandi Isaac, *"Topics in Operations Research - Linear Programming* "New Gamma Publishing House, Palayamkottai, 2012.

Unit – I : Chapter 3 : 3.1 to 3.4

Unit – II : Chapter 3: 3.5

Unit – III : Chapter 3: 3.6 & 3.7

Unit – IV : Chapter 4: 4.1 & 4.2

Unit – V : Chapter 5: 5.1 & 5.2

Books for Reference:

1. Gupta P.K., ManMohan," *Problems in Operations Research",* (2003) Sultan Chand & Sons, Delhi,

2. Kanthi swarup, Gupta P.K., and ManMohan, "*Operations Research", (*1997) Sultan Chand & Sons Educational Publishers , .

3. Sharma J.K,4th Edition. "*Operations Research Theory and Applications"*, (2010)Macmillan Publishers India Ltd.

Web Resources /E books

1. https://www.bbau.ac.in/dept/UIET/EME-601%20Operation%20Research.pdf
2. https://mdu.ac.in/UpFiles/UpPdfFiles/2021/Jun/4_06-11-2021_16-06-34_OPERATIONS%20RESEARCH%20TECHNIQUES(20MAT22C5).pdf
3. https://youtu.be/SNc9NGCJmns**Pedagogy:**

Pedagogy:

Chalk and Talk, PPT, group discussion & Quiz

Rationale for nature of Course:

Knowledge and Skill:

- Have a good introduction to the study of Linear Programming Problem.

- Learn Mathematical formulation of Transportation Problem and assignment problem

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 solution of Linear Programming Problem, Graphical method	K1to K3
CLO2	Obtain the solutions of Simplex Method	K1 to K3
CLO3	Understand the concept of Big–M Method-Two Phase Method	K1 to K4
CLO4	Solve the Mathematical formulation of Transportation Problem	K1 to K3
CLO5	Solve the Mathematical formulation of an assignment problem	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	3	1	2	1	3
CLO2	3	2	2	1	1	3
CLO3	3	3	1	2	2	3
CLO4	3	2	2	3	2	3
CLO5	3	3	1	2	1	3

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

LESSON PLAN: TOTAL HOURS (90 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	• Linear Programming Problems • Formulation of LPP • Mathematical formulation of a Linear Programming Problem. • Solution of Linear Programming Problem. • Graphical method	18	Chalk and Talk
II	• Simplex Method	18	Chalk and Talk
III	• Big–M Method • Two Phase Method	18	Chalk and Talk
IV	• Mathematical formulation of Transportation Problem. • Degeneracy in T.P.	18	Chalk and Talk
V	• Mathematical formulation of an assignment problem. • Solution to assignment problem.	18	Chalk and Talk, Group discussion

Course Designer: Mrs.R.Revathi

Department of Mathematics			Class: II B.Sc. & II BCA					
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
III	Generic Elective Course	**22OUCSGEMA3/ 22OUCAGEMA3**	Numerical Methods	5	5	25	75	100

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

Course Objectives

1. To Find the numerical solution for the nonlinear equations.
2. To introduce the various topics in Numerical methods.
3. To solve linear system of equations by various methods.
4. To know curve fitting by method of least square.
5. To know more about interpolation.

Course Content:

Unit – I

Theory of Equations: Introduction – Formation of Equations – Relation between Roots and Coefficients – Reciprocal Equations.

Unit – II

Curve Fitting: Introduction – Linear Law – Method of Group Averages – Method of Moments – Method of Least Squares.

Unit – III

Algebraic and Transcendental Equations: Iterative method – Bisection method – Regula Falsi Method (No derivative of Formula Required) – Newton Raphson Method.

Unit – IV

Simultaneous Equations: Back substitution – Gauss Elimination – Method – Gauss Jordan Elimination Method – Calculation of Inverse of a Matrix (Problems Only)

Unit –V

Interpolation: Newton's Interpolation Formulae – Central Difference Interpolation Formulae – Lagrange's Interpolation Formula. (Problems Only)

Book for study:

Arumugam. S. and Thangapandi Isaac. A. Somasundaram, *Numerical Methods 2nd Edition*, Scitech Publications Pvt Ltd, Chennai,2009.

Unit I	Chapter 1: 1.1 to 1.4
Unit II	Chapter 2: 2.0 to 2.4
Unit III	Chapter 3: 3.2 to 3.5
Unit IV	Chapter 4: 4.1 to 4.5
Unit V	Chapter 7: 7.0 to 7.3

Books for Reference:

1. Kanda Samy P., Thilagavathy K., Gunavathy K., *Numerical Methods*, Second Revised Edition, Sultan Chand & Company Ltd, 1999.
2. Singaravelu A., *Numerical Methods*, First Edition, Meenakshi Publications, 2001.
3. Venkataraman M.S., *Numerical Methods in Science and Engineering* – National Publishing Company, 2001.

Web Resources/ E-Books

1. https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.sciencedirect.com/topics/engineering/numericalmethod&ved=2ahUKEwj_joOi1pT_AhVt-TgGHTzQAMoQFnoECE8QAQ&usg=AOvVaw1qijfBa5RDwLnTDDUUKHBF
2. https://youtu.be/sANUGXAGmcw
3. https://youtu.be/jw4_1XLwBCQ

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 Numerical Integration Solutions.
- Learn Numerical 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 Theory of Equations and Reciprocal Equations.	K1 to K3
CLO2	Obtain the solutions of the Curve Fitting, Method of Least Squares and Method of Moments.	K1 to K3
CLO3	Understand the concepts of Algebraic and Transcendental Equations.	K1 to K4
CLO4	Obtain the solution for the Simultaneous Equations.	K1to K3
CLO5	Obtain the solution of Interpolation.	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	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	• Theory of Equations • Reciprocal Equations	15	Chalk and Talk
II	• Linear Law • Method of Group Averages • Method of moments • Method of Least Squares	15	Chalk and Talk
III	• Iterative Method. • Bisection Method • Regula Falsi Method (No Derivation For Formula Required) • Newton Raphson method	15	Chalk and Talk
IV	• Back Substitution • Gauss Elimination Method • Gauss Jordan Elimination Method • Inverse of Matrix	15	Chalk and Talk
V	• Newton's Interpolation • Central Difference Interpolation • Lagrange's interpolation Formula (Problems only)	15	Chalk and Talk

Course Designer: Mrs. N.Hemalatha

Department of Mathematics			Class: II B.Sc. & II BCA					
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**Ext**	**Total**
IV	Generic Elective Course	**22OUCSGEMA4/ 22OUCAGEMA4**	Resource Management Techniques	5	5	25	75	100

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

Course Objectives

1. To know about Linear Programming Problems.
2. Under the Mathematical tools that are needed to solve optimization problems.
3. To equip the students in solving real time problems.
4. To construct and solve a minimization problem.
5. To develop formulation skills in transportation model and finding solutions.

Course Content:

Unit- I

Linear programming problem-Mathematical formulation of L.P.P-Slack and Surplus variables-Solution of Linear programming problem

Unit- II

Graphical solution of L.P.P- Simplex Method-Computational procedure

Unit- III

Artificial variables technique-Two Phase method -Big–M method

Unit- IV

Mathematical formulation of Transportation Problem -Methods for obtaining an initial feasible solution- Optimal solution of T.P -Unbalanced T.P.

Unit- V

Mathematical formulation of assignment problem-Method for solving the assignment problem.

Book for study:

Arumugam. S. and Thangapandi Isaac. A., 2011, *Linear Programming*, New Gamma Publishing House(2004)

Unit-I: Chapter 3: Section 3.1-3.3

Unit-II: Chapter 3:Section 3.4 & 3.5

Unit-III: Chapter 3: Section 3.6 & 3.7

Unit-IV: Chapter 4: Section 4.1

Unit-V: Chapter 5:Section 5.1 & 5.2

Books for Reference:

1. Kanthiswarup, P.K. Gupta and Man Mohan, *Operations Research*, Sultan Chand & Sons Educational Publishers(2011).
2. Gupta P.K., ManMohan, *Problems in Operations Research*,Sultan Chand & Sons, Delhi, (2003).
3. Sharma J.K.,4th Edition. *Operations Research Theory and Applications*, Macmillan Publishers India Ltd.,(2010).

Web Resources/ E-Books

1. https://www.brainkart.com/article/Linear-programming-problem_37039/
2. https://www.gatexplore.com/transportation-problem-study-notes/
3. https://youtu.be/MZ843Vvia0A

Pedagogy:

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

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, 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	Understand the basic concepts of Linear Programming Problems	K1 to K3
CLO2	Solve the problems of Graphical Methods & Simplex Methods.	K1 to K3
CLO3	To know how to find the solution of Lpp using Big-M method and Two - Phase method.	K1 to K4
CLO4	Formulation of the Transportation Problems	K1 to K3
CLO5	Construct the assignment problems for the given algorithms	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	3	1	1	2	3
CLO2	3	3	2	2	3	3
CLO3	3	2	2	2	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3

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

Annexure - 10

LESSON PLAN: TOTAL HOURS (75 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	★ Mathematical formulation of LPP ★ Canonical form ★ Standard form ★ Degenerate basic feasible solution ★ Non-Degenerate basic feasible solution	15	Chalk and Talk
II	★ Graphical Method ★ Simplex Method	15	Chalk and Talk
III	★ Big-M Method ★ Two Phase Method	15	Chalk and Talk
IV	★ Transportation Problems	15	Chalk and Talk
V	★ Assignment Problems	15	Chalk and Talk

Course Designer: MrsT.Thivya