V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

PEOs, POs, PSOs and COs
B.Sc. MATHEMATICS

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements, that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/TeamWork, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

On successful completion of the Programme, the students will be able to

1 Apply effectively the acquired knowledge and skill in the field of Arts, Physical Science, Life Science, Computer Science, Commerce and Management for higher studies and employment. (*Disciplinary Knowledge*)

2 Communicate proficiently and confidently with the ability to express original/complex ideas effectively in different situations. (*Communication Skills*)

3 Identify, formulate and solve problems in real life situations scientifically/ systematically by adapting updated skills in using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

4   Critically analyse, synthesise and evaluate data, theories and ideas to provide valid suggestions for the betterment of the society. (*Critical Thinking and Analytical Reasoning*)

5   Use ICT in a variety of self-directed lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)

6   Self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/TeamWork and Multicultural Competence*)

7   Uphold the imbibed ethical and moral values in personal, professional and social life for sustainable environment. (*Moral and Ethical Awareness*)

Programme Educational Objectives (PEOs)

The students will be able to

➢ become successful teachers in schools, Bank officers, government officials, Statisticians and IT professionals.

➢ apply mathematical skills in analyzing and solving problems in real life situations.

➢ upgrade themselves by pursuing higher education and engaging in social work to boost their morality.

Key Components of the Mission Statement	PEO1	PEO2	PEO3
Pro found knowledge in Mathematics	√	√	√
Logical reasoning and analytical Skills	√	√	-
Focus on moral and ethical Values	√	-	√

Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each UG Programme. Programme Specific Outcomes denote what the students would be able to do at the time of graduation. They are Programme specific. It is mandatory that each PO should be mapped to the respective PSO.

On completion of B.Sc. Mathematics Programme, the students will be able to PO1- *DisciplinaryKnowledge*

PSO1.a: apply the strong knowledge acquired in core and related areas of mathematics and its applications to continue higher studies or for employment.

PSO 1.b: apply the concrete subject knowledge and skill obtained in mathematics and carrier oriented courses to appear for competitive examinations.

PO2– *Communication Skills*

PSO2: communicate efficaciously on complex mathematical concepts, theorems and models with mathematics community and with society at a large.

PO3– *Scientific Reasoning and Problem Solving*

PSO 3.a: implement logical reasoning and analytical skills in mathematics as foundation for advanced cases in other disciplines.

PSO3.b: formulate real life problems into mathematical model and apply mathematical techniques to find solutions to the problems.

PO4– *Critical Thinking and Analytical Reasoning*

PSO 4.a: consider the social, cultural, economic and environmental constraints, apply the mathematical knowledge and skills to arrive at optimal solutions.

PSO 4.b: analyse mathematical data using principles of mathematics, interpret the results and provide valid conclusions applicable to various sectors of the nation.

PO5– *Digital Literacy, Self-directed and Lifelong Learning*

PSO5: make use of e-resources and strive for self- directed life long learning in their field of interest to face career challenges.

PO6– *Co-operation / Team Work and Multicultural Competence*

PSO6: work effectively as a member or leader of a diverse team in multidisciplinary environment to bring multicultural richness in mathematics.

PO7– *Moral and Ethical Awareness*

PSO7: practice the code of ethics of mathematics community in their career.

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester I		Hours/Week:4	
Core Course-1	DIFFERENTIAL CALCULUS	Credits:4	
Course Code 20UMTC11		**Internal** 25	**External** 75

COURSE OUTCOMES

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

CO1: convey the fundamental concepts in differential calculus and its applications. [K1]

CO2: explain the concepts and method of finding tangent, normal, curvature, envelopes and asymptotes of a given curve. **[K2]**

CO3: find the p–r equations, polar subtangent and polar subnormal of the curve. [K2]

CO4: apply the knowledge gained in calculus to find nth derivative, maxima and minima, curvature, evolutes, asymptotes and p-r equation of given curves**. [K3]**

CO5: analyse the concept of Leibnitz's formula in finding nth derivative of a function, curvature, evolutes, p-r equations and asymptotes of a curve. [K4]

Course Code 20UMTC11	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4.a**	**PSO 4.b**	**PSO 5**	**PSO 6**	**PSO 7**
CO1	H	H	M	M	H	L	H	H	L	-
CO2	H	M	M	M	H	L	H	H	L	-
CO3	H	M	L	M	H	L	H	M	L	-
CO4	H	M	L	H	H	M	H	M	L	-
CO5	H	M	L	M	H	M	H	M	L	-

Semester I		**THEORY OF EQUATIONS**	Hours/Week:4	
CoreCourse-2			Credits:4	
Course Code			**Internal**	**External**
20UMTC12			**25**	**75**

COURSE OUTCOMES

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

CO1: communicate the relation between roots and coefficients of an equation. [K1]

CO2: explain the transformed equation whose roots are related to the roots
   of the given equation. [K2]

CO3: solve the polynomial equation with multiple roots. [K3]

CO4: identify the number of positive and negative real roots for any polynomial. [K3]

CO5: estimate the real roots of a cubic and biquadratic equation by Cardon's method
   and Ferrari's method. [K4]

Course Code 20UMTC12	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO6	PSO7
CO1	H	H	M	M	H	M	M	L	L	-
CO2	H	H	M	M	H	M	M	L	L	-
CO3	H	H	M	M	H	M	M	L	L	-
CO4	H	H	M	M	H	M	M	L	L	-
CO5	H	H	M	M	H	M	M	L	L	-

Semester I		Hours/Week:4	
CoreCourse-2	**THEORY OF EQUATIONS**	Credits:4	
Course Code 20UMTC12N		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to
CO1: communicate the relation between roots and coefficients of an equation. [K1]

CO2: explain the transformed equation whose roots are related to the roots of the

given equation. [K2]

CO3: solve the polynomial equation with multiple roots. [K3]
CO4: identify the number of positive and negative real roots for any polynomial. [K3]

CO5: estimate the real roots of a cubic and biquadratic equation by Strum's Theorem

and Cardon's method [K4]

Course Code 20UMTC12N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	H	M	M	L	L	-
CO2	H	H	M	M	H	M	M	L	L	-
CO3	H	H	M	M	H	M	M	L	L	-
CO4	H	H	M	M	H	M	M	L	L	-
CO5	H	H	M	M	H	M	M	L	L	-

Semester I		Hours/Week: 4	
Allied Course I	**Properties of Matter, Heat and Electricity**	Credits: 4	
Course Code 20UPMA11 18UPHA31		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the basic laws, concepts in gravitation, properties of matter, relativity, electricity and heat. [K1]

CO2: derive mathematical relations involved in gravitation, properties of matter, relativity, heat, static and current electricity by applying the relevant concepts. [K2]

CO3: discuss the experimental methods to determine the physical parameters related to gravitation, relativity, properties of matter and heat. [K2]

CO4: illustrate the applications of relativistic variation, properties of matter, heat and electricity. [K3]

CO5: analyze the different moduli of elasticity, molecular theory of surface tension, acceleration due to gravity at different places and relativistic variation of length, time and mass with velocity. [K4]

Course Code 20UPMA11	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	L	-	-	-	M
CO2	H	H	H	L	-	-	-
CO3	H	M	M	M	-	-	-
CO4	H	H	H	M	-	L	-
CO5	H	M	M	M	H	-	-

Semester I	VALUE EDUCATION (2020 -21 onwards)	Hours/Week: 2	
Ability Enhancement Compulsory Course		Credits: 2	
Course Code 20UGVE11		Internal 100	External -

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: describe the general human values and their associated values that are essential to make them committed and responsible individuals. [K1]

CO2: indicate the importance and benefits of upholding human values. [K2]

CO3: explain the steps to be taken for upholding human values and human rights. [K2]

CO4: practice the individual values needed for maintaining harmonious Relationship With members of family, institution, organization or society for preserving transmitting its tradition and culture. [K3]

CO5: uphold the legal, moral, ethical and spiritual values for nurturing health and Happiness Leading to national integrity and peace and for the existence of human beings with humanity. [K3]

Course Code 20UGVE11	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	L	-	H
CO2	H	M	-	-	L	-	H
CO3	H	M	-	-	L	-	H
CO4	H	M	-	-	H	H	H
CO5	H	M	-	-	L	H	H

Semester II		Hours/Week:4	
Core Course-3		Credits:4	
Course Code 20UMTC21	**INTEGRAL CALCULUS**	Internal 25	External 75

COURSE OUTCOMES

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

CO1: list the various properties of proper and improper integrals. [K1]

CO2: explain the properties of various integrals, Beta and Gamma functions and their applications. [K2]

CO3: determine the given integrals, Fourier series for a given function and solve problems using its applications. [K3]

CO4: apply integration techniques and Fourier series in higher mathematics. [K3]

CO5: analyze the application of integration in real life problems. [K4]

Course Code 20UMTC21	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	H	H	H	M	H	H	L	-	
CO2	H	H	H	H	H	M	H	L	L	-
CO3	H	H	H	H	H	M	M	L	L	-
CO4	H	H	M	M	H	H	M	L	L	-
CO5	H	M	M	H	M	M	H	L	L	-

Semester II	ANALYTICAL GEOMETRY OF THREE DIMENSIONS	Hours/Week:4	
Core Course-5		Credits:4	
Course Code 20UMTC22		Internal 25	External 75

COURSE OUTCOMES

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

CO1: list the different forms of equations of planes, straight lines, sphere and cone. [K1]

CO2: explain the basic concept of straight lines, planes, plane and line, angle between

two planes, sphere and cone. [K2]

CO3: describe the properties of straight lines, planes, plane and line, sphere and cone. [K2]

CO4: apply the appropriate formulae to solve problems in straight lines, planes, sphere and

cone. [K3]

CO5: analyze different forms of equations of straight lines, planes, sphere and cone. [K4]

Course Code 20UMTC22	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	H	M	M	H	M	M	L	L	-
CO2	H	M	M	L	M	L	L	L	M	-
CO3	H	M	M	L	M	L	L	L	M	-
CO4	H	M	L	L	H	L	L	L	M	-
CO5	H	M	M	L	H	L	L	L	L	-

Semester II	ANALYTICAL GEOMETRY OF THREE DIMENSIONS	Hours/Week:4	
Core Course-5		Credits:4	
Course Code 20UMTC22N		Internal 25	External 75

COURSE OUTCOMES

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

CO1: list the different forms of equations of planes, straight lines, sphere and cone. [K1]

CO2: explain the basic concept of straight lines, planes, plane and line, angle between Two planes, sphere and cone. [K2]

CO3: describe the properties of straight lines, planes, plane and line, sphere and cone. [K2]

CO4: apply the appropriate formulae to solve problems in straight lines, planes, sphere and cone. [K3]

CO5: analyze different forms of equations of straight lines, planes, sphere and cone. [K4]

Course Code 20UMTC22N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	H	M	M	L	L	-
CO2	H	M	M	L	M	L	L	L	M	-
CO3	H	M	M	L	M	L	L	L	M	-
CO4	H	M	L	L	H	L	L	L	M	-
CO5	H	M	M	L	H	L	L	L	L	-

Semester I & II	OFFICE AUTOMATION FOR MATHEMATICS AND DTP - PRACTICAL	Hours/Week:2	
Core Practical-1		Credits:2	
Course Code 20UMTC21P		Internal	External
		40	60

COURSE OUTCOMES

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

CO1: apply the acquired skills to design the documents. [K3]

CO2: demonstrate different types of charts in MS-Excel. [K3]

CO3: apply their creativity skill in power point presentation. [K3]

CO4: manipulate the Microsoft office programs to create professional and academic documents**.** [K3]

CO5: analyze the data using mathematical functions, charts in spreadsheets and develop their technical skill**.** [K4]

Course Code 20UMTC21P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO5	PSO6	PSO7
CO1	H	H	M	M	M	M	L	M	L	L
CO2	H	H	L	M	M	M	L	H	H	M
CO3	H	H	M	M	M	M	L	M	L	L
CO4	H	H	M	L	L	M	L	M	M	L
CO5	H	H	H	L	L	M	L	M	L	-

Semester II		Hours/Week: 4	
Allied Course I	Electromagnetism, Optics and Electronics	Credits: 4	
Course Code 20UPMA21 18UPHA31		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the fundamentals aspects of electromagnetism, optics, analog and digital
electronics. [K1]

CO2: derive mathematical relations as well as the experimental concepts related to
electromagnetism, geometrical and physical optics. [K2]

CO3: discuss the construction, working principle of electronic components also interpret
the Boolean equations with number system & Boolean algebra. [K2]

CO4: apply the related concepts to solve the problems in electromagnetism, optics and
basic Electronics. [K3]

CO5: compile the applications of electromagnetism, optics, amplifiers and number
Systems. [K4]

Course Code 20UPMA21	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	L	-	-	-	M
CO2	H	H	H	L	-	-	-
CO3	H	M	M	M	-	-	-
CO4	H	H	H	M	-	L	-
CO5	H	M	M	M	H	-	-

Semester II	ELECTROMAGNETISM, OPTICS AND ELECTRONICS	Hours/Week: 4	
Allied Course- 2		Credits: 4	
Course Code 20UPMA21N		Internal 25	External 75

COURSE OUTCOMES

On successful completion of the course, the learners should be able to

CO1: explain the fundamentals aspects of electromagnetism, optics, electronics [K1]

CO2: derive mathematical expressions related to electromagnetism, geometrical and physical optics [K2]

CO3: illustrate the experimental aspects of electromagnetism, optics, and electronics [K2]

CO4: apply the learned concepts to find physical parameters related to electromagnetism, optics, electronics. [K3]

CO5: analyze the factors influencing magnetic field in current carrying conductors, resonant frequency, interference & diffraction, transistor action and simplification of logical circuits.[K4]

PO/CO	PO1		PO2	PO3		PO4		PO5	PO6	PO7
Course Code **20UPMA21N**	PSO 1a	PSO 1b	PSO 2	PSO 3a	PSO 3b	PSO 4a	PSO 4b	PSO 5	PSO 6	PSO 7
CO 1	M	M	H	–	–	L	L	–	–	M
CO 2	M	H	L	M	M	M	M	–	–	–
CO 3	L	M	M	M	M	L	L	–	–	–
CO 4	M	H	L	H	H	M	M	–	–	–
CO 5	M	H	L	H	H	H	M	H	–	–

Semester I/II	GENERAL PHYSICS	Hours/Week: 2	
Allied Course I Practical		Credits: 2	
Course Code 20UPMA21 18UPHA31		Internal 40	External 60

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the theoretical concepts in Mechanics and Properties of matter, Optics and
     Electronics related experiments. [K3]

CO2: draw the circuit diagram /experimental set up with tabular column/model graph and
     write the formula to calculate the required physical parameters. [K3]

CO3: execute the technical skills in handling the equipment and observe the required
     measurements related to the experiment. [K3]

CO4: calculate the necessary parameters using the formula/graph and complete the record
     work. [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical
     value. [K4]

Course Code 20UPMA21P	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	L	H	L	-	-	M
CO2	H	H	H	M	-	-	L
CO3	H	H	H	M	L	H	-
CO4	H	H	H	M	L	M	H
CO5	M	M	M	H	M	M	H

Semester II	**FUNDAMENTALS OF ACCOUNTING**	Hours/Week:2	
SEC		Credits:2	
Course Code		Internal	External
20UMTS21		40	60

COURSE OUTCOMES

On completion of this course, the students will be able to

CO1: identify and be familiar with the classification of accounts and accounting terminology. [K1]

CO2: describe the rules of accounting and accounting process. [K2]

CO3: apply the rules for journalising, preparing day book and balancing the accounts. [K3]

CO4: prepare the final accounts. [K4]

CO5: integrate the trial balance and balance sheet. [K4]

Course Code 20UMTS21	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	H	-	-	-	-	-
CO2	H	H	-	-	-	-	L
CO3	H	H	L	L	-	-	L
CO4	H	H	L	L	-	-	L
CO5	H	H	L	L	-	L	L

Semester II	FUNDAMENTALS OF ACCOUNTING	Hours/Week: 2	
Skill Enhancement Course		**Credits: 2**	
Course Code		**Internal**	**External**
20UMTS21N		**40**	**60**

COURSE OUTCOMES

On completion of this course, the students will be able to

CO1: identify the accounting terminology and the purpose of preparing accounts. [K1]

CO2: explain the types, rules and format of statements and accounts. [K2]

CO3: use the process of accounts for preparing the books of accounts. [K3]

CO4: distinguish between   accounting and book-keeping, journal and Ledger and

     trial balance and balance sheet. [K4]

CO5: summarise the books of accounts and integrate the trial balance and balance
      sheet. [K4]

Course Code 20UMTS21N	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	**H**	**H**	**-**	**-**	**-**	**-**	**-**
CO2	**H**	**H**	**-**	**-**	**-**	**-**	**L**
CO3	**H**	**H**	**L**	**L**	**-**	**-**	**L**
CO4	**H**	**H**	**L**	**L**	**-**	**-**	**L**
CO5	**H**	**H**	**L**	**L**	**-**	**L**	**L**

Semester III	STATICS	Hours/Week:3	
Core Course-5		Credits:3	
Course Code 20UMTC31		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain the basic concepts in finding the resultant of any number of forces acting at a point, resolution of a force, equilibrium of forces, parallel forces, and moments. [K1]

CO2: derive expressions for the resultant of any number of forces acting at a point, parallel forces, the moment of a force about an axis. [K2]

CO3: apply various laws of forces in solving problems. [K3]

CO4: analyze the techniques to solve static problems in real-life situations. [K4]

CO5: evaluate the resultant of any number of forces acting at a point, like and unlike parallel forces, condition for the equilibrium of forces, the moment of a force. [K5]

Course Code 20UMTC31	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	H	M	H	-
CO2	H	H	H	H	H	M	H	M	H	-
CO3	H	H	H	H	H	M	H	M	H	-
CO4	H	H	H	H	H	M	H	M	H	-
CO5	H	H	H	H	H	M	H	M	H	-

Semester III		Hours/Week:4	
Core Course-6	SEQUENCES AND SERIES	Credits:3	
Course Code 20UMTC32		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define sequence, series and its properties. [K1]

CO2: explain the basic concepts in sequences and series with examples. [K2]

CO3: apply the logical arguments for proving characterization, equivalence criterions in \
Sequences and series. [K3]

CO4: analyze the behavior of sequences and series using various results and tests. [K4]

CO5: assess the convergence and divergence of sequences and series. [K5]

Course Code 20UMTC32	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	H	L	M	L	L	M	L	-	-
CO2	M	H	L	L	M	L	M	L	-	-
CO3	M	H	M	M	M	L	H	L	L	-
CO4	M	H	M	H	M	L	H	M	L	-
CO5	M	H	L	L	M	L	H	L	L	-

Semester III		Hours/Week:4	
Core Course-6	**SEQUENCES AND SERIES**	**Credits:3**	
Course Code 20UMTC32N		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define sequence, series and its properties. [K1]

CO2: explain the basic concepts in sequences and series with examples. [K2]

CO3: apply the logical arguments for proving characterization, equivalence criterions in

sequences and series. [K3]

CO4: analyze the behavior of sequences and series using various results and tests. [K4]

CO5: assess the convergence and divergence of sequences and series. [K5]

Course Code 20UMTC32N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	H	L	M	L	L	M	L	-	-
CO2	M	H	L	L	M	L	M	L	-	-
CO3	M	H	M	M	M	L	H	L	L	-
CO4	M	H	M	H	M	L	H	M	L	-
CO5	M	H	L	L	M	L	H	L	L	-

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester III	OPERATIONS RESEARCH	Hours/Week:6	
Allied Course–II		Credits:4	
Course Code 20UAMA31		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain LPP, its canonical form, standard forms and special classes. [K1]

CO2: express real life problems into mathematical models. [K2]

CO3: apply efficient computational techniques and algorithms that are needed to solve optimization problems. [K3]

CO4: analyze the real life situation and find solutions to the problems through O.R techniques. [K4]

CO5: predict the optimality in some real life situations. [K5]

Course Code 20UAMA31	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	L	L	-	M	M	L	-	M	-
CO2	M	L	M	-	H	H	M	-	M	-
CO3	M	L	M	-	H	H	M	-	M	-
CO4	M	L	M	-	H	H	M	M	M	-
CO5	M	L	M	-	H	H	M	M	M	-

Semester III	OPERATIONS RESEARCH WITH EXCEL SOLVER	Hours/Week:6	
Allied Course–II		Credits:4	
Course Code 20UAMA31N		Internal 25	External 75

COURSE OUTCOMES

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

CO1: explain LPP, its canonical form, standard forms and special classes. [K1]

CO2: express real life problems into mathematical models. [K2]

CO3: apply efficient computational techniques and algorithms that are needed to solve optimization problems. [K3]

CO4: analyze the real life situation and find solutions to the problems through O.R Techniques [K4]

CO5: predict the optimality in some real life situations. [K5]

Course Code 20UAMA31N	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	L	L	-	M	M	L	-	M	-
CO2	M	L	M	-	H	H	M	-	M	-
CO3	M	L	M	-	H	H	M	-	M	-
CO4	M	L	M	-	H	H	M	M	M	-
CO5	M	L	M	-	H	H	M	M	M	-

Semester III		MATLAB -PRACTICAL	Hours/Week:2	
SEC 2			Credits:2	
Course Code 20UMTS31P			Internal 40	External 60

COURSE OUTCOMES

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

CO1: execute the technical coding for efficient usage of MATLAB software. [K3]

CO2: interpret the usage of various syntax in MATLAB. [K3]

CO3: apply MATLAB for solving mathematical problems and for constructing

     bardiagram. [K3]

CO4: solve set of linear equations and perform operations on matrices. [K3]

CO5: determine the values of statistical constants, sum of the series, characteristic

     polynomial of a matrix, polynomial differentiation and polynomial integration. [K4]

Course Code 20UMTS31P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	L	L	H	M	-	-	H	-	-
CO2	M	L	L	M	M	-	-	H	-	-
CO3	M	L	M	M	H	L	H	H	L	L
CO4	H	M	H	H	H	M	L	H	-	-
CO5	H	M	M	M	H	M	M	H	L	-

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester III		QUANTITATIVE APTITUDE	Hours/Week: 2	
Non Major Elective Course - 1			Credits: 2	
Course Code 20UMTN31			Internal 40	External 60

COURSE OUTCOMES

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

CO1: relate the real life situations in the field of aptitude problems. [K1]

CO2: explain the concepts of problems on numbers, ages, ratio and proportion, calendar and permutation & combination. [K2]

CO3: express the practical problem using the principle of mathematics and interpret the results. [K2]

CO4: apply the knowledge gained in Aptitude to find solution of day to day problems. [K3]

CO5: solve the numerical aptitude problem using analytical ability and computational skills. [K3]

Course Code 20UMTN31	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	H	H	L	-	-
CO2	H	M	M	H	L	-	-
CO3	H	L	H	H	L	-	-
CO4	H	M	H	H	L	-	-
CO5	H	M	H	H	M	-	-

Semester III		Hours/Week: 2	
Non Major Elective Course - 1	QUANTITATIVE APTITUDE I	Credits: 2	
Course Code 22UMTN31		Internal 40	External 60

COURSE OUTCOMES

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

CO1: define the basic concepts needed for arithmetic calculations. [K1]

CO2: explain various techniques involved in aptitude problems. [K2]

CO3: explain the real life situations in the field of aptitude problems. [K2]

CO4: apply the acquired computational skills in solving problems. [K3]

CO5: find solutions to problems using shortcut methods. [K3]

Course Code 22UMTN31	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	M	H	H	L	-	-	-
CO2	H	M	M	H	L	-	-	-
CO3	H	L	H	H	L	-	-	-
CO4	H	M	H	H	L	-	-	-
CO5	H	M	H	H	M	-	-	-

Semester III		Hours/Week: 2	
Non Major Elective Course - 2	BASIC STATISTICS	Credits: 2	
Course Code 22UMTN32		Internal 40	External 60

COURSE OUTCOMES

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

CO1: define the basic concepts in statistics. [K1]

CO 2: understand the notion of statistical constants, principle of least squares & coefficient of correlation. [K2]

CO 3: explain various statistical methods and techniques in solving problems. [K2]

CO 4: apply statistical methods to solve the real life problems. [K3]

CO 5: apply statistical techniques and interpret the results. [K3]

Course Code 22UMTN32	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	H	H	H	H	M	L	L
CO2	H	H	M	H	H	H	H	M	L	L
CO3	H	H	M	H	H	H	H	M	L	L
CO4	H	H	M	H	H	H	H	M	L	L
CO5	H	M	H	H	H	H	H	M	L	L

Semester III	WOMEN STUDIES	Hours/Week: 1
Generic Elective Course-1		**Credit : 1**
Course Code 20UGEW32		**Internal 100**

COURSE OUTCOMES

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

CO 1: state the significance of Women Studies in establishing Gender Justice. [K1]

CO 2: identify the multi-faceted role of Women in the Current Scenario. [K1]

CO 3: summarise their knowledge on Women Studies and Women Rights. [K2]

CO 4: illustrate the challenges and strategies in upholding Women Empowerment. [K2]

CO 5: manipulate awareness on policies, schemes, atrocities and legal protection for Women. [K3]

Course Code 20UGEW32	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	-	-	M
CO2	H	M	-	-	-	M	-
CO3	H	M	-	-	L	L	M
CO4	H	M	-	-	L	-	-
CO5	H	M	-	-	L	M	M

Semester IV		Hours/Week: 3	
CoreCourse-7	DYNAMICS	Credits:3	
Course Code 20UMTC41		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts in the description of the motion of particles. [K1]

CO2: explain the characteristics of the motion of projectiles, simple harmonic
   motion, and motion under the action of central forces. [K2]

CO3: solve the problems in projectiles, simple harmonic and central orbital motions. [K3]

CO4: analyze the path of the projectile, its range, the motion of a particle executing simple
   harmonic motion, and motion in the plane under central forces. [K4]

CO5: evaluate the parameters in projectiles on an inclined plane, composition of two
   simple Harmonic motions, pedal equations of some well known curves. [K5]

Course Code 20UMTC41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	H	M	H	-
CO2	H	H	H	H	H	M	H	M	H	-
CO3	H	H	H	H	H	M	H	M	H	-
CO4	H	H	H	H	H	M	H	M	H	-
CO5	H	H	H	H	H	M	H	M	H	-

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester IV	TRIGONOMETRY AND VECTOR CALCULUS	Hours/Week:4	
Core Course-8		Credits:3	
Course Code 20UMTC42		Internal 25	External 75

COURSEOUTCOMES

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

CO1: define various trigonometric functions, logarithms of a complex number and vector valued functions. [K1]

CO2: explain the concept of De Moivre's theorem, hyperbolic function, gradient, curl and surface integrals. [K2]

CO3: apply the knowledge gained in trigonometry and vector calculus to solve the real life problems. [K3]

CO4: Analyze the practical problems and enhance their knowledge for a successful career. [K4]

CO5: evaluate the trigonometric functions, vector valued functions in all domains. [K5]

Course Code 20UMTC42	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	H	L	M	L	-	-
CO2	H	H	M	M	H	L	M	L	-	-
CO3	H	H	M	M	H	L	M	L	-	-
CO4	H	H	M	M	H	L	M	L	-	-
CO5	H	H	M	M	H	L	M	L	-	-

Semester IV		Hours/Week: 4	
Allied Course-II	**PROGRAMMING IN C**	Credits:4	
Course Code 20UAMA41		Internal 25	External 75

COURSE OUTCOMES

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

CO1: describe the fundamentals of C-programming language. [K1]

CO2: explain the concept of operators, decision making statements, arrays, functions, structures, unions and file management in C. [K2]

CO3: use appropriate syntax for operators, decision making statements, strings, structures and unions. [K3]

CO4: analyze the role of data types, decision making statements, user defined functions and file managements in C. [K4]

CO5: conclude the solution of many real life problems easily by using C programming language. [K5]

Course Code 20UAMA41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	-	M	M	L	L	H	L	-
CO2	M	M	-	M	M	L	L	H	L	-
CO3	M	M	-	M	M	L	L	H	L	-
CO4	M	M	-	M	M	L	L	H	L	-
CO5	M	M	-	M	M	L	L	H	L	-

Semester IV		Hours/Week:2	
Allied Course-II	**C- PRACTICAL**	Credits:2	
Course Code 20UAMA41P		Internal 40	External 60

COURSE OUTCOMES

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

CO1: interpret the basic principles of C Programming. [K3]

CO2: apply the concept of operators, decision making statements, functions and file management in Programming. [K3]

CO3: acquire programming skills. [K3]

CO4: develop programs using the basic elements like control statements, Arrays and Strings. [K3]

CO5: analyze the programming structure of C language. [K4]

Course Code 20UAMA41P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	M	M	M	M	M	L	L	H	L	-
CO2	M	M	L	M	M	L	L	H	L	-
CO3	M	M	M	M	M	L	L	H	L	-
CO4	M	M	L	M	M	L	L	H	L	-
CO5	M	M	M	M	M	L	L	H	L	-

Semester IV		Hours/Week:2	
SEC-3	**INTEGRAL TRANSFORMS**	Credits:2	
Course Code 20UMTS41		Internal 40	External 60

COURSE OUTCOMES

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

CO1: define Laplace transforms, Fourier transforms, Fourier sine and cosine transforms. [K1]

CO2: explain the concepts of Laplace transforms, Fourier transforms, Fourier sine and cosine transforms and their properties. [K2]

CO3: apply Laplace transforms, Inverse Laplace transforms, Fourier transforms, Fourier sine and cosine transforms and their properties to get the solution of problems in other disciplines. [K3]

CO4: solve the integral, differential equations using Laplace transforms, Fourier transforms. [K3]

CO5: determine the Laplace transforms, Inverse Laplace transforms, Fourier transforms, Fourier sine and cosine transforms, for the given functions. [K4]

Course Code 20UMTS41	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	M	L	M	M	-	-
CO2	H	H	M	M	M	M	M	M	-	-
CO3	H	H	H	M	L	L	M	M	-	-
CO4	H	H	M	M	M	L	M	L	-	-
CO5	H	H	M	M	L	L	M	L	-	-

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester IV		Hours/Week: 0
PART IV	**Internship / Field Project (2020 -21 onwards)**	Credit: 1
Course Code 20UMTI41G		Internal 100

COURSE OUTCOMES

On completion of the Internship/Field Project, students will be able to

CO1: relate their theoretical insights with hands-on experience. [K3]

CO2: develop technical skills to their respective field of study. [K3]

CO3: demonstrate the attributes such as observational skills, team spirit and inter personal skills built through site visits. [K3]

CO4: exhibit the written communication skills acquired through internship/field project. [K3]

CO5: analyze the observations and results and communicate their academic and technological knowledge appropriately oral means. [K4]

Course Code 20UMTI41G	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	M	M	M	H	-
CO2	H	M	M	M	M	H	
CO3	H	M	-	-	-	H	
CO4	H	H	M	M	-	M	H
CO5	H	M	H	H	M	-	

Semester IV	STATISTICS AND OPERATIONS RESEARCH	Hours/Week:2	
Non Major Elective Course -2		Credits: 2	
Course Code 20UMTN41		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: identify the basic concepts of various measures of statistical problems and game theory and sequencing problems. [K1]

CO2: explain statistical datas using measures of central tendency, dispersion and index numbers. [K2]

CO3: illustrate their decision making skills in a competitive situation. [K2]

CO4: apply efficient computational techniques that are needed to solve real life problems. [K3]

CO5: estimate the value of the dependent variable for a given value of the independent variable using the fitted straight line. [K3]

Course Code 20UMTN41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	-	H	H	-	-	-
CO2	H	-	H	M	-	L	-
CO3	M	L	H	-	-	L	-
CO4	H	L	M	M	-	L	-
CO5	L	-	M	L	-	L	-

Semester IV		Hours/Week: 2	
Non Major Elective Course - 3	**QUANTITATIVE APTITUDE II**	**Credits: 2**	
Course Code 22UMTN41		**Internal 40**	**External 60**

COURSE OUTCOMES

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

CO1: retrieve the basic concepts in arithmetic problems. [K1]

CO2: explain the application of Mathematics in real life. [K2]

CO3: explain the various techniques involved in aptitude problems. [K2]

CO4: apply their analytical ability and computational skills in solving problems. [K3]

CO5: find solutions to problems using shortcut methods. [K3]

Course Code 22UMTN41	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	H	M	H	H	L	-	-	-
CO2	H	M	M	H	L	-	-	-
CO3	H	L	H	H	L	-	-	-
CO4	H	M	H	H	L	-	-	-
CO5	H	M	H	H	M	-	-	-

Semester IV	OPERATIONS	Hours/Week: 2	
Non Major Elective Course - 4	**RESEARCH**	**Credits: 2**	
Course Code 22UMTN42		**Internal 40**	**External 60**

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: explain the basic concepts in LPP, transportation and assignment problem, game theory and sequencing problem. [K1]

CO2: understand the techniques used to solve the problems in OR . [K2]

CO3: express real life problems into mathematical models. [K2]

CO4: apply efficient computational techniques and algorithms that are needed to solve optimization problems. [K3]

CO5: apply the OR concept to the real life situation and find solutions.[K3]

Course Code	PO1		PO2	PO3		PO4		PO5	PO6	PO7
22UMTN42	**PSO 1.a**	**PSO 1.b**	**PSO 2**	**PSO 3.a**	**PSO 3.b**	**PSO 4.a**	**PSO 4.b**	**PSO 5**	**PSO 6**	**PSO 7**
CO1	H	-	M	-	H	-	M	-	L	-
CO2	H	-	M	-	H	-	M	-	L	-
CO3	H	-	M	-	H	-	M	-	L	-
CO4	H	-	M	-	H	-	M	-	L	-
CO5	H	-	M	-	H	-	M	-	L	-

Semester IV		Hours/Week: 1
Generic Elective Course	**CONSTITUTION OF INDIA**	Credit : 1
Course Code 20UGEC41		Internal 100

COURSE OUTCOMES

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

CO1: identify the importance of Constitution in a State. [K1]

CO2: recognize the concepts and features of Indian constitutions. [K1]

CO3: discuss the forms and functions of Government and its political institutions. [K2]

CO4: trace the functions of legislative, executive and judiciary in the Constitution. [K2]

CO5: construct knowledge over the Indian Constitution. [K3]

Course Code 20UGEC41	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H	M	-	-	-	-	M
CO2	H	M	-	-	-	-	M
CO3	H	M	-	-	-	M	M
CO4	H	M	-	-	-	-	M
CO5	H	M	-	-	M	M	M

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3ʳᵈ Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester V		MODERN ALGEBRA	Hours/Week: 5	
Core Course-9			Credits: 4	
Course Code 20UMTC51			Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts in theory of Groups and Rings. [K1]

CO2: explain the fundamental concepts in permutation groups, cyclic groups, normal groups, isomorphism of groups, integral domains and characteristics of a ring. [K2]

CO3: apply the properties and results of groups and rings to solve problems. [K3]

CO4: analyze the equivalence criterions and characteristics of groups and rings of various types. [K4]

CO5: justify the statements in algebraic structure with illustrations. [K5]

Course Code 20UMTC51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	L	M	L	L	H	L	L
CO2	H	H	H	L	M	L	L	H	L	L
CO3	H	H	H	L	M	L	L	H	L	L
CO4	H	H	H	L	M	L	L	H	L	L
CO5	H	H	H	M	M	M	M	H	M	M

Semester V		Hours/Week: 5	
Core Course-10	**REAL ANALYSIS**	**Credits: 4**	
Course Code 20UMTC52		**Internal 25**	**External 75**

COURSE OUTCOMES

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

CO1: define the basic concepts in Real Analysis. [K1]

CO2: explain the properties of metric spaces, sequences, continuity, uniform continuity, connectedness and compactness. [K2]

CO3: solve the problems in Real Analysis. [K3]

CO4: analyse the proofs of various theorems in Real Analysis. [K4]

CO5: assess the concepts in various theorems and corollaries. [K5]

Course Code 20UMTC52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	L	-	-
CO2	H	H	H	H	H	L	M	L	-	-
CO3	H	H	M	M	M	L	H	L	L	-
CO4	H	H	M	M	M	M	M	L	L	-
CO5	H	H	M	M	M	L	H	L	L	-

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester V		Hours/Week: 5	
Core Course-11	**NUMERICAL METHODS**	Credits: 4	
Course Code 20UMTC53		Internal 25	External 75

COURSE OUTCOMES

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

CO1: identify the location of the roots of the equations, types of operators, finite differences and the suitable formula for solving numerical problems. [K1]

CO2: explain the various numerical methods in finding the solution of numerical problems. [K2]

CO3: solve the numerical problems in finding the approximate roots of the equations, interpolation, finite differences and numerical differentiation and integration. [K3]

CO4: analyze the given data and the solution of numerical problems. [K4]

CO5: assess the numerical problems with suitable techniques. [K5]

Course Code 20UMTC53	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	M	M	M	L	L	-
CO2	H	H	M	M	M	M	M	L	L	-
CO3	H	H	M	M	M	M	M	L	L	-
CO4	H	H	M	M	M	M	M	L	L	-
CO5	H	H	M	M	M	M	M	L	L	-

Semester V		Hours/Week: 4	
Core Course-12	STATISTICS - I	Credits: 4	
Course Code 20UMTC54		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts in statistics. [K1]

CO2: explain various statistical methods and techniques in solving problems. [K2]

CO3: apply statistical methods to solve the real life problems. [K3]

CO4: analyze the given data and interpret the results. [K4]

CO5: examine the data and draw conclusions. [K5]

Course Code 20UMTC54	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	M	H	M
CO2	H	H	H	H	H	M	H	M	H	M
CO3	H	H	H	H	H	H	H	M	H	M
CO4	H	H	M	H	H	M	H	M	H	L
CO5	H	H	M	H	H	M	H	M	H	L

Semester V		Hours/Week: 5	
DSEC -1	**GRAPH THEORY WITH GRIN**	Credits: 4	
Course Code 20UMTE51		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts in graph theory. [K1]

CO2: explain the concept of connectedness, Eulerian & Hamiltonian, Trees, Matchings,

Planarity and Colouring in graphs. [K2]

CO3: apply the graph theoretical knowledge in real life problems. [K3]

CO4: analyze the various parameters in graph theory. [K4]

CO5: assess the results in Graph Theory. [K5]

Course Code 20UMTE51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	M	M	M	M	M	M	L
CO2	H	H	H	M	M	M	M	M	M	L
CO3	H	H	H	H	H	H	H	M	M	M
CO4	H	H	H	H	H	H	H	M	M	M
CO5	H	H	H	H	H	H	H	M	M	M

Semester V		**AUTOMATA THEORY**	Hours/Week: 5	
DSEC-2			Credits: 4	
Course Code 20UMTE52			Internal 25	External 75

COURSE OUTCOMES

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

CO1: define various automata such as deterministic and non – deterministic finite state machines, turing machines. [K1]

CO2: explain programming skills and software development. [K2]

CO3: apply standard algorithms to transform automata and languages in various ways. [K3]

CO4: analyze formal languages of different kinds such as regular and context free languages. [K4]

CO5: justify connections between theoretical results and regular –expression libraries. [K5]

Course Code 20UMTE52	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	M	H	M
CO2	H	H	H	H	H	M	H	M	H	M
CO3	H	H	H	H	H	H	H	M	H	M
CO4	H	H	M	H	H	M	H	M	H	L
CO5	H	H	M	H	H	M	H	M	H	L

Semester V		Hours/Week: 5	
DSEC- 3	**MATHEMATICAL MODELLING**	Credits: 4	
Course Code 20UMTE53		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the procedure for solving problems through mathematical modelling. [K1]

CO2: explain the fundamental concept of mathematical modelling through different branches of mathematics [K2]

CO3: apply analytical techniques to solve mathematical problems in mathematical models. [K3]

CO4: analyze mathematical modelling problems in inter disciplinary level. [K4]

CO5: assess different types of mathematical models in real life situation. [K5]

Course Code 20UMTE53	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	M	H	H	H	M	M	M	H	H
CO2	H	H	H	H	H	H	M	H	H	H
CO3	H	M	H	H	H	M	M	M	H	H
CO4	H	M	H	H	H	M	H	H	H	H
CO5	H	H	H	H	H	H	H	H	H	H

Semester V		Hours/Week: 0	
Core Course-13	**PROJECT**	Credits: 1	
Course Code 20UMTC5PR		Internal 60	External 40

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the learned concepts to select projects in Mathematics and related fields. [K3]

CO2: apply the theoretical knowledge to model the real life problem to calculate the required parameters. [K3]

CO3: execute the technical skills in finding the solutions to the problems and exihibit written communication skills acquired in related project. [K3]

CO4: analyze the accuracy of the results obtained and communicate academic knowledge orally. [K4]

CO5: assess the project through viva-voce to meet the challenges at higher education level/society level. [K5]

Course Code 20UMTC5PR	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	H	H	M	M	L
CO2	H	H	H	H	H	M	H	M	M	L
CO3	H	H	H	H	H	M	H	M	M	L
CO4	H	H	H	H	H	M	H	M	M	L
CO5	H	H	H	H	H	M	H	M	M	L

Semester V		Hours/Week: 2	
SEC-4	**SUMMATION OF SERIES**	Credits: 2	
Course Code 20UMTS51		Internal 40	External 60

COURSE OUTCOMES

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

CO1: define the basic concepts in binomial expansion, exponential and logarithmic
   series. [K1]

CO2: explain the binomial theorem for rational index, results in exponential series,
   logarithmic series and some special cases. [K2]

CO3: apply the results in binomial expansion, exponential & logarithmic series, to find
   sum of the series, some constants and limits. [K3]

CO4: find a general term and expand the given expression, logarithm of a number using
   logarithmic series.[K3]

CO5: analyze the results in binomial expansion, exponential and logarithmic series. [K4]

Course Code 20UMTS51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	H	H	M	M	L	-	-
CO2	H	H	M	H	H	L	M	L	-	-
CO3	H	H	H	H	H	L	M	L	L	-
CO4	H	H	M	M	M	M	M	L	L	-
CO5	H	H	M	M	M	L	M	L	L	-

Semester V		Hours/Week: 2	
SEC-5	**NUMERICAL METHODS USING C**	**Credits: 2**	
Course Code 20UMTS52P		**Internal 40**	**External 60**

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: demonstrate C – Program to solve the algebraic & transcendental equations,
simultaneous linear equations, interpolations, numerical differentiation and numerical
integration. [K3]

CO2: use decision making, looping statements & functions to solve numerical problems
using C. [K3]

CO3: discuss user defined functions to solve the algebraic & transcendental equations,
simultaneous linear equations, interpolations, numerical differentiation and
numerical integration using C. [K3]

CO4: construct C programs to solve the problems in numerical methods. [K3]

CO5: explore C Programming to solve numerical problems. [K4]

Course Code 20UMTS52P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	M	L	L	H	M	-
CO2	H	H	M	M	M	L	L	H	M	-
CO3	H	H	M	M	M	L	L	H	M	-
CO4	H	H	M	M	M	L	L	H	M	-
CO5	H	H	M	M	M	L	L	H	M	-

Semester V		Hours: 0	
Extra credit course	**ARITHMETIC ABILITY**	**Credits: 2**	
Course Code 20UMTO51		**Internal 100**	**External ----**

COURSE OUTCOMES

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

CO1: understand the basic principles of mathematics. [K1]

CO2: enhance their analytical ability and computational skills. [K2]

CO3: use appropriate arithmetical methods. [K3]

CO4: appear for competitive examinations with more confidence. [K4]

CO5: solve mathematical problems within a limited timeframe. [K5]

Course Code 20UMTO51	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	H	M	M	H	H	L	L
CO2	H	H	M	H	M	M	H	H	L	L
CO3	H	H	M	H	M	M	H	H	L	L
CO4	H	H	M	H	M	M	H	H	L	L
CO5	H	H	M	H	M	M	H	H	L	L

Semester V		Hours/Week: 2	
PART IV	ENVIRONMENTAL STUDIES	Credits: 1	
Course Code 20UGES51		Internal 100	External -

COURSE OUTCOMES

On completion of the course, students will be able to

CO1 : State the social aspects of the environment, the present condition of the earth and
the impact of human activities locally and globally. [K1]

CO2 : Explain the biodiversity conservation, environmental hazards and current possible
disasters. [K2]

CO3 : Describe the need for sustainable development. [K2]

CO4 : Solve the environmental associated problems. [K3]

CO5 : Identify environmental legislations and management strategies. [K3]

Course Code 20UGES51	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	H	H	L	L	L	-	L
CO 2	H	H	L	L	L	-	-
CO 3	H	H	L	L	L	-	-
CO 4	H	H	H	H	L	-	-
CO 5	H	H	H	H	L	-	H

Semester VI	LINEAR ALGEBRA WITH SCILAB	Hours/Week: 6	
Core Course-14		Credits: 4	
Course Code 20UMTC61		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the concepts in vector spaces, inner product spaces and theory of matrices. [K1]

CO2: explain the fundamental concepts of Linear Algebra. [K2]

CO3: make use of properties of vector spaces, linear transformations, inner product

spaces and matrices to solve variety of problems. [K3]

CO4: analyze the characteristics and equivalence criterions of various concepts in Linear

Algebra. [K4]

CO5: compute dimension, rank, nullity, matrices from a linear transformation, inner

product of a vector space. [K5]

Course Code 20UMTC61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	L	M	L	L	H	L	L
CO2	H	H	H	L	M	L	L	H	L	L
CO3	H	H	H	L	M	L	L	H	L	L
CO4	H	H	H	L	M	L	L	H	L	L
CO5	H	H	H	M	M	M	M	H	M	M

Semester VI		Hours/Week: 6	
Core Course-15	**COMPLEX ANALYSIS**	Credits: 4	
Course Code 20UMTC62		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts of analytic functions, conformal mapping, definite integrals, power series, residues and poles. [K1]

CO2: explain the basic notions in continuity, bilinear transformations, complex integration, convergence of series, contour integration. [K2]

CO3: apply the results and theorems in complex analysis to other disciplines. [K3]

CO4: analyze the convergence of power series, analyticity of functions and its singularities to determine value of the given integral. [K4]

CO5: assess the region of integration, poles and residues in solving problems. [K5]

Course Code 20UMTC62	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	L	L	-
CO2	H	H	M	H	H	L	M	L	L	-
CO3	H	H	H	H	M	L	M	L	L	-
CO4	H	H	M	M	M	M	H	L	L	-
CO5	H	H	M	M	M	L	M	L	L	-

Semester VI	DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS WITH MATLAB	Hours/Week: 6	
Core Course-16		Credits: 4	
Course Code 20UMTC63 18UMTC63		Internal 25	External 75

COURSE OUTCOMES

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

CO1: convey the fundamental concepts in solving differential equations and in Laplace Transforms. [K1]

CO2: explain the method of solving differential equations of higher degree, partial differential equations and Laplace Transforms. [K2]

CO3: solve the problems choosing the most suitable methods and apply the techniques in the other fields. [K3]

CO4: analyse the special methods of solving ODE, PDE and the Laplace Transforms in solving ODE. [K4]

CO5: assess the solutions of ODE and PDE. [K5]

Course Code 20UMTC63	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	H	H	H	L	M	M	-
CO2	H	H	M	M	H	H	L	M	M	-
CO3	H	H	M	M	H	H	M	M	M	-
CO4	H	H	M	M	H	H	M	M	M	-
CO5	H	H	M	M	H	H	M	M	M	-

Semester VI		Hours/Week: 5	
Core Course-17	**STATISTICS – II**	Credits: 4	
Course Code 20UMTC64		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts in random variables, generating functions, some special distributions and sampling distributions. [K1]

CO2: explain the properties of special distributions and the theory of sampling distributions to find solutions of real life problems. [K2]

CO3: solve problems in random variables, generating functions, some special distributions and sampling distributions. [K3]

CO4: analyze the tests of hypothesis in the case of large and small samples to arrive at solid conclusion about the values of the population parameter. [K4]

CO5: examine the validity of the given statement about the values of population parameter and the homogeneity of several means using ANOVA techniques. [K5]

Course Code 20UMTC64	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	H	H	H	M	M	M	H	M
CO2	H	H	H	H	H	M	H	M	H	M
CO3	H	H	H	H	H	H	H	M	H	M
CO4	H	H	M	H	H	M	H	M	H	L
CO5	H	H	M	H	H	M	H	M	H	L

Semester VI		Hours/Week: 5	
DSEC -2	**BOOLEAN ALGEBRA AND LATTICES**	Credits: 4	
Course Code 20UMTE61		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the learners will be able to

CO1: define Posets, different types of Lattices and Boolean Algebra. [K1]

CO2: explain the fundamental concepts and results in Posets, Lattices and Boolean Algebra. [K2]

CO3: apply the basic ideas in proving theorems and lemmas in Boolean Algebra. [K3]

CO4: analyze the relationship between Posets, Lattices, Boolean Algebra and its properties. [K4]

CO5: assess the algebraic structure of Posets, Lattices and Boolean Algebra. [K5]

Course Code 20UMTE61	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	H	M	M	M	L	-	-
CO2	H	H	M	H	M	M	M	L	-	-
CO3	H	H	M	H	M	M	M	L	-	-
CO4	H	H	M	H	H	M	M	L	-	-
CO5	H	H	M	H	H	M	M	L	-	-

Semester VI	OPTIMIZATION TECHNIQUES USING MATLAB	Hours/Week: 5	
DSEC -2		Credits: 4	
Course Code 20UMTE62		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define the basic concepts in duality, integer programming, replacement

problems, Inventory control and Queueing theory. [K1]

CO2: explain the fundamental concepts in optimization techniques. [K2]

CO3: apply operation research techniques to solve contextual problems. [K3]

CO4: analyze various techniques, methods and algorithms in obtaining optimum solution

to the solutions. [K4]

CO5: evaluate the optimal solution to problems in real life situations. [K5]

Course Code 20UMTE62	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	L	H	M	H	H	H	H	L
CO2	H	H	L	H	M	H	H	H	H	L
CO3	H	H	L	H	M	H	H	H	H	L
CO4	H	H	L	H	M	H	H	H	H	L
CO5	H	H	L	H	M	H	H	H	H	L

V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR – 626 001

Semester VI		Hours/Week: 5	
DSEC -2	**ASTRONOMY**	Credits: 4	
Course Code 20UMTE63		Internal 25	External 75

COURSE OUTCOMES

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

CO1: define various trigonometric formulas for spherical triangles. [K1]

CO2: explain the Kepler's law of planetary motion, the motion of planets around the sun. [K2]

CO3: apply the acquired knowledge about the motion of celestial objects to the society. [K3]

CO4: analyze the effect of refraction takes place in celestial bodies. [K4]

CO5: determine astronomical distance using parallax technique. [K5]

Course Code 20UMTE63	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	L	L	M	L	M	H	L	H
CO2	H	H	L	L	M	L	M	H	L	H
CO3	H	H	L	L	M	L	M	H	L	H
CO4	H	H	L	L	M	L	M	H	L	H
CO5	H	H	L	L	M	L	M	H	L	H

Semester VI		Hours/Week: 2	
SEC-6	**STATISTICS USING R**	Credits: 2	
Course Code 20UMTS61P		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: illustrate the given data with the ggplot2 package in R. [K3]

CO2: demonstrate R Programme to calculate the Statistical parameters. [K3]

CO3: apply R Programming for Statistical perspectives. [K3]

CO4: calculate probability distributions to solve a wide variety of problems using R. [K3]

CO5: examine the various significance tests and ANOVA using R. [K4]

Course Code 20UMTS61P	PO1		PO2	PO3		PO4		PO5	PO6	PO7
	PSO 1.a	PSO 1.b	PSO 2	PSO 3.a	PSO 3.b	PSO 4.a	PSO 4.b	PSO 5	PSO 6	PSO 7
CO1	H	H	M	M	M	L	L	H	M	-
CO2	H	H	M	M	M	L	L	H	M	-
CO3	H	H	M	M	M	L	L	H	M	-
CO4	H	H	M	M	M	L	L	H	M	-
CO5	H	H	M	M	M	L	L	H	M	-