Holy Cross College (Autonomous), Nagercoil-629004

Kanyakumari District, TamilNadu.

Nationally Re-Accredited with A^+ by NAAC IV cycle – CGPA 3.35

Affiliated to

Manonmaniam Sundaranar University, Tirunelveli

DEPARTMENT OF MATHEMATICS

SYLLABUS FOR UNDERGRADUATE PROGRAMME

Issued from the Deans Office

(With effect from the Academic year 2020– 2021)

DEPARTMENT OF MATHEMATICS

Vision

To empower women globally competent with human values and ethics acquiring academic and entrepreneurship skills through holistic education.

Mission

1. To create opportunities which will ensure academic excellence in critical thinking, humanistic and scientific inquiry.
2. To develop application oriented courses with the necessary input of values.
3. To create a possible environment for innovation, team spirit and entrepreneurial leadership.
4. To form young women of competence, commitment and compassion.

Programme Educational Objectives (PEO)

PEO 1	The graduates will apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.
PEO 2	The graduates pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.
PEO 3	The graduates will demonstrate the ability to utilize effectively the variety of teaching techniques and class room strategies and develop confidence to appear for competitive examinations and occupy higher levels of academic and administrative fields.

Programme Outcomes (PO)

PO	**Upon completion of the B.Sc. Degree Programme, the graduates will be able to:**
PO - 1	equip students with hands on training through various courses to enhance entrepreneurship skills.
PO - 2	impart communicative skills and ethical values.
PO - 3	face challenging competitive examinations that offer rewarding careers in science and education.
PO - 4	apply the acquired scientific knowledge to face day to day needs and reflect upon green initiatives to build a sustainable environment.

Programme Specific Outcomes (PSO)

PSO	Upon completion of the B.Sc. Degree Programme, the graduates will be able to:	PO addressed
PSO - 1	acquire a strong foundation in various branches of mathematics to formulate real life problems into mathematical models	PO 4
PSO - 2	apply the mathematical knowledge and skills to develop problem solving skills cultivating logical thinking and face competitive examinations with confidence.	PO 3, 4
PSO - 3	develop entrepreneurial skills based on ethical values, become empowered and self-dependent in society.	PO 1,2
PSO - 4	enhance numerical ability and address problems in interdisciplinary areas which would help in project and field works.	PO 1
PSO - 5	pursue scientific research and develop new findings with global impact using latest technologies.	PO 4

Eligibility Norms for Admission

Those who seek admission to B.Sc. Mathematics must have passed the Higher Secondary Examinations conducted by the Board of Higher Secondary Examination, Tamil Nadu with Mathematics as one of the subjects or any other examination recognized and approved by the Syndicate of Manonmaniam Sundaranar University, Tirunelveli.

Duration of the Programme : 3 Years

Medium of Instruction : English

Passing Minimum

A minimum of 40% in the external examination and an aggregate of minimum 40% is required. There is no minimum pass mark for Continuous Internal Assessment (CIA).

Components of the B.Sc. Mathematics Programme

Part III - Major and Allied

Major	Core – Theory	(13 x 100)	1300
	Project	(1x100)	100
	Elective	(2x100)	200
Allied (I &II)	Theory	(4 x100)	400
	Practical	(1x 100)	100
		Total Courses	21
	Total Marks	(21x100)	2100

Course Structure

Distribution of Hours and Credits

Course	**Sem. I**	**Sem. II**	**Sem. III**	**Sem. IV**	**Sem. V**	**Sem. VI**	**Total**	
							Hours	**Credits**
Part I–Language	6 (4)	6 (4)	6 (4)	6 (4)	-	-	24	16
Part II-English	6 (4)	6 (4)	6 (4)	6 (4)	-	-	24	16
Part-III								
Major Core	6(4)	6(4)	6(4)+ 5(4)	6(5)+ 5(4)	6 (5) + 6 (5) + 6 (4)	6 (5) + 6 (5) + 5 (4) + 5 (4)	74	57
Major Elective	-	-	-	-	5 (4)	6 (4)	11	8
Major Project	-	-	-	-	5 (5)	-	5	5
Allied	6 (4)	6(4)	5(5)	5(5)	-	-	24	16
Part IV								
Add-on Course (Professional English)	2 (2)	2 (2)	2 (2)	2 (2)	-	-	8	8
NME (Non-Major Elective)	2 (2)	2 (2)	-	-	-	-	4	4
SEC (Skill Enhancement Course)	2 (2)	2 (2)	-	-	-	2 (2)	6	6
AEC (Ability Enhancement Course)	-	-	-	-	2 (2)	-	2	2

Total	**30 (22)**	**30 (22)**	**30 (23)**	**30 (24)**	**30 (25)**	**30 (24)**	**180**	**140**
Non-Academic Course								
Part V								
FC – I (Values for Life)	-	(1)	-	-	-	-	-	1
FC – II (Personality Development)	-	-	-	(1)	-	-	-	1
FC–III (Human Rights Education)	-	-	-	-	(1)	-	-	1
FC –IV (Gender Equity Studies)	-	-	-	-	-	(1)	-	1
SLP-Community Engagement Course	-	(1)	(1)	-	-	-	-	2
SLP-Extension activity (RUN)	-	-	(1)	(1)	-	-	-	2
STP - Clubs & Committees / NSS	-	(1)	-	(1)	-	-	-	2

Total number of Hours = 180

Total number of Compulsory Credits = 140+10

Non-Academic Courses are mandatory and conducted outside the regular working hours. Skill Development Programme (Mandatory Certificate Course - 30 hours) is offered to all I year students.

Courses Offered

Semester	Course	Course Code	Title of the Course	Hours/ Week	Credits
I	Part I	TL2011 FL2011	Language:Tamil / French	6	4
	Part II	GE2012/ GE2111	General English	6	4
	Part III	MC2011	Major Core I: Differential Calculus and Trigonometry.	6	4
		MA2011	Allied I: Algebra and Calculus (for Physics and Chemistry)	6	4
	Part IV	APS201	Add-on Course : Professional English for Physical Sciences I	2	2
		MNM201	Non Major Elective Course (NME): Quantitative Aptitude - I	2	2
		SEC201/ SEC202	Skill Enhancement Course (SEC):Meditation and Exercise / Computer Literacy	2	2
	Part V	FCV201	Foundation Course I:Values for Life	-	-
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	-
II	Part I	TL2021 FL2021	LanguageTamil French	6	4
	Part II	GE2022 / GE2121	General English	6	4
	Part III	MC2021	Major Core II: Classical Algebra and Integral Calculus	6	4
		MA2021	Allied II: Vector Calculus and Differential Equations (for Physics and Chemistry)	6	4
	Part IV	APS202	Add-on Course - Professional English for Physical Sciences II	2	2
		MNM202	Non Major Elective Course (NME):Quantitative Aptitude II	2	2

		SEC201/ SEC202	Skill Enhancement Course (SEC):Meditation and Exercise / Computer Literacy	2	2
	Part V	FCV201	Foundation Course I - Values for Life	-	1
		SLP201	Service Learning Programme(SLP): Community Engagement Course	-	-
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	-
III	**Part I**	TL2031 FL2031	Language: Tamil French	6	4
	Part II	GE2031 / GE2131	General English	6	4
	Part III	MC2031	Major Core III: Differential Equations and Vector Calculus	6	4
		MC2032	Major Core IV: Real Analysis I	5	4
		MA2031	Allied III: Probability Theory and Distributions	5	5
	Part IV	APS203	Add-on Course - Professional English for Physical Sciences III	2	2
	Part V	FCV202	Foundation Course II: Personality Development	-	-
		SLP201	Service Learning Programme (SLP): Community Engagement Course	-	2
		SLP202	Service Learning Programme (SLP): Extension Activity (RUN)	-	-
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	-
	Part I	TL2041/ FL2041	Language: Tamil French	6	4
	Part II	GE2041/ GE 2141	General English	6	4
		MC2041	Major Core V:Groups and Rings	6	5

IV	**Part III**	MC2042	Major Core VI: Analytical Geometry of 3 Dimensions	5	4
		MA2041	Allied IV: Applied Statistics	5	5
	Part IV	APS204	Add-on Course : Professional English for Physical Sciences IV	2	2
	Part V	FCV202	Foundation Course II: Personality Development	-	1
		SLP202	Service Learning Programme (SLP): Extension Activity (RUN)	-	2
		STP201	Student Training Programme (STP): Clubs & Committees / NSS	-	2
V	**Part III**	MC2051	Major Core VII: Linear Algebra	6	5
		MC2052	Major Core VIII: Real Analysis II	6	5
		MC2053	Major Core IX: Computer Oriented Numerical Methods	6	4
		MC20PR	Major - Project	5	5
		MC2055 MC2056 MC2057	Elective I (a) Graph Theory (b) Fuzzy Mathematics (c) Object Oriented Programmingwith C++	5	4
	Part IV	AEC201	AEC - Ability Enhancement Course: Environmental Studies	2	2
	Part V	FCV203	Foundation Course III: Human Rights Education (HRE)	-	1
VI	**Part III**	MC2061	Major Core X:Complex Analysis	6	5
		MC2062	Major Core XI: Mechanics	6	5
		MC2063	Major Core XII: Number Theory	5	4
		MC2064	Major Core XIII: Linear Programming	5	4
		MC2065 MC2066 MC2067	Elective II: (a) Astronomy (b) Boolean Algebra (c) Web Designing with HTML	6	4

	Part IV	SEM203	Skill Enhancement Course (*SEC) : Mathematics for Competitive Examination	2	2
	Part V	FCV204	Foundation Course IV: Gender Equity Studies	-	1
			TOTAL	**180**	**140+10**

***SEC (Mathematics for Competitive Examination)** for the VI semester is offered for the students of the Department of Mathematics, to trigger their interest in quantitative aptitude and prepare them for Competitive Examinations.

NME (Quantitative Aptitude - I & II) for the I & II semesters is offered to the students of other departments to develop the quantitative aptitude needed for various Competitive Examinations. Students must have studied Mathematics as one subject in Higher Secondary to opt for this.

Project:

Project is introduced in the V Semester as one of the core subjects to make the students learn different mathematical concepts independently in teams and present the report with confidence.

Self-Learning - Extra Credit Courses

Semester	Course code	Title of the Course	Hours/week	Credit
III / V	MC20S1	Discrete Mathematics - I	-	2
IV/ VI	MC20S2	Discrete Mathematics - II	-	2
III -VI	-	Online Courses	-	1

Value Added Courses

Sl.No.	Course Code	Title of the Course	Total Hours
1	VAM201	Quick Arithmetic for Competitive Examinations	30
2	VAM202	Training for TNPSC and other Government Examinations	30

Instruction for Course Transaction

Distribution of Total Hours - Major Core

Components	Sem. I	Sem. II	Sem. III	Sem. IV	Sem. V	Sem. VI
Lecture hours	75	75	75/60	75/60	75/60	75/60
Continuous Internal Assessment (2)	5	5	5	5	5	5
Quiz (2)	1	1	1	1	1	1
Class Test (3)	3	3	3	3	3	3
Assignment / Group discussion / Problem Solving	6	6	6	6	6	6
Total Hours	**90**	**90**	**90/75**	**90/75**	**90/75**	**90/75**

Distribution of Total Hours - Elective/ Allied

Components	Elective		Allied	
	Sem. V	Sem. VI	Sem. I/II	Sem. III /IV
Lecture hours	60	75	75	60
Continuous Internal Assessment (2)	5	5	5	5
Quiz	1	1	1	1
Class Test	3	3	3	3
Problem Solving / Assignment/ Group discussion	6	6	6	6
Total Hours	**75**	**90**	**90**	**75**

Examination Pattern

Part III (Major/ Elective/ Allied)
Ratio of Internal and External= 30:70

Internal Components and Distribution of Marks

Components	Marks
Continuous Internal Assessment (2)	15
Quiz (2 quizzes)	4
Class Test (3)	6
Class assignment/ Home assignment/ Field assignment/ Article review/ Group discussion/ Problem solving	5
Total	**30**

Question Pattern – External Examination

Internal Test	Marks	External Exam	Marks
Part A 4 x 1	4	Part A 10 x 1 (No choice)	10
Part B 3 x 4	12	Part B 5 x 4 (Internal choice)	20
Part C 3 x 8	24	Part C 5 x 8 (Internal choice)	40
Total	**40**	**Total**	**70**

Project

Distribution of marks for project

Internal : External = 40:60

Internal Components

Internal Viva = 20 marks

Regularity and Systematic work = 20 marks

External Components

Dissertation = 30 marks

Innovation = 10 marks

Presentation and Viva = 20 marks

Part IV (Add-on Course/ Non Major Elective (NME)/ SEC/ AECC)

Ratio of Internal and External – 50:50

a) Add-on Course- Professional English

Internal Components and Distribution of Marks

Internal Components	Marks
Listening	25
Speaking and Reading	25
Total	**50**

Question pattern for External Examination

External Exam	Marks
Part A 5 x 1 (No Choice)	5
Part B 5 x 3 (Internal Choice)	15
Part C 5 x 6 (Internal Choice)	30
Total	**50**

b) Non – major Elective (NME)

Internal Components and Distribution of Marks

Internal Components	Marks
Continuous Internal Assessment (2)	20
Quiz (2 quizzes)	15
Home assignment / Group discussion / Problem solving	15
Total	**50**

Question Pattern for Internal & External Examination

Internal Test	Marks	External Exam	Marks
Part A 4 x 1 (No Choice)	4	Part A 5 x 1 (No Choice)	5
Part B 3 x 4 (Internal Choice)	12	Part B 5 x 3 (Internal Choice)	15
Part C 3 x 8 (Internal Choice)	24	Part C 5 x 6 (Internal Choice)	30
Total	**40**	**Total**	**50**

c) Skill Enhancement Course (SEC)

Computer Literacy

Internal Component

Component	Marks
Objective type questions (30x1)	30
Exercise (Book) compulsory (2x10)	20
Total	**50**

External Component

Component	Marks
Exercise 1	20
Exercise 2	10
Procedures for both Exercises	20
Total	**50**

Meditation and Exercise
Internal Component

Component	Marks
Objective type questions (20x1)	20
Exercise (2x10)	20
Assignment	10
Total	**50**

External Component

Component	Marks
Quiz	20
Written assessment (Questions are of open choice 15 questions 3 marks each – answer any 10 (10x3)	30
Total	**50**

d) Ability Enhancement Course (AEC)

Environmental Studies
Internal Component

Component	Marks
Project Report	30
Viva voce	20
Total	**50**

External Component

Component	Marks
Quiz	20
Written Test (Questions are of open choice 15 questions 3 marks each – answer any 10 (10x3)	30
Total	**50**

Part V

Foundation course

Ratio of Internal and External = 50: 50

a) Value Education I

Internal Component

Component	Marks
Song, Mime, Skit	20
Book Activities	20
A Kind Action	10
Total	**50**

External Component

Component	Marks
Quiz	20
Written Test Part A 5x2 = 10 Part B 5x4 = 20	30
Total	**50**

b) Value Education II

Internal Component

Component	Marks
Exercise from book	20
Skit	10
Group Album	20
Total	**50**

External Component

Component	Marks
Quiz	20
Written Test Part A 5x2 = 10 Part B 5x4 = 20	30
Total	**50**

c) Human Rights Education / Gender Equity Studies

Internal Component

Component	Marks
Album on current issues	20
Group Song, Mime, Skit	10
Open book test	20
Total	**50**

External Component

Component	Marks
Quiz	20
Written Test (Questions are of open choice 15 questions 3 marks each – answer any 10 (10x3)	30
Total	**50**

d) SLP -Community Engagement Course (CEC) /Unnath Bharath Abhiyan(UBA)

Field Work – 15 hrs; Class Hours – 15 hrs

Internal Component

Component	Marks
Assignment	10
Group Discussion	10
Attendance	30
Total	**50**

External Component

Component	Marks
Project Report / Case Study(10-15 pages in print)	50
Total	**50**

e) SLP – Service Learning Programme: Reaching the unreached Neighbourhood

- 60 Hours programme – Reaching the unreached Neighbourhood (RUN) Programme with one credit - included in the curriculum.
- If a student fails, she is not eligible to get the degree.

f) STP – Student's Training Programme

- Compulsory for all I & II year students.
- Clubs and Committees – Eco Club, YRC, Rotaract Club, NSS/ RRC, AICUF, Consumer Club, Legal Literacy and Women's Cell.
- Each student can opt for one of the clubs/ committees.

Semester I

Major Core I- Differential Calculus and Trigonometry

Course Code: MC2011

No. of Hours per Week	Credits	Total No. of Hours	Marks
6	4	90	100

Objectives

1. To impart knowledge on applications of Differential Calculus and important conceptsof Trigonometry.
2. To enhance problem solving skills.

Course Outcomes

Cos	Upon completion of this course the studentswill be ableto:	PSO Addressed	CL
CO – 1	recall the idea of derivative, rules of differentiation and understand the concept of p-r equation.	PSO - 1	R
CO – 2	learn the concepts of curvature, circle of curvature, evolute and apply the concepts to solve problems.	PSO - 2	U, Ap
CO – 3	recognize the rules of identifying asymptotes and employ the same to different curves.	PSO - 3	Ap, U
CO – 4	acquire the knowledge about hyperbolic functions and compare it with circular functions, trigonometric functions, inverse trigonometric functions and their properties.	PSO - 5	U, E
CO – 5	categorize the methods of finding the sum of trigonometric series.	PSO - 4	An

Unit I

Curvature - Radius of curvature in Cartesian, parametric and polar co-ordinates - $p - r$ equation of a curve - Formula for radius of curvature in $p - r$ co-ordinates.

Unit II

Co-ordinates of the centre of curvature - Circle of curvature - Evolute.

Unit III

Linear asymptotes - Asymptotes parallel to co-ordinate axes and inclined asymptotes - Intersection of a curve with its asymptotes - Asymptotes of polar curves.

Unit IV

Hyperbolic functions - Relations between hyperbolic functions - Inverse hyperbolic functions, Logarithm of complex quantities.

Unit V

Summation of trigonometric series - Method of differences - Sum of sines of n angles in A.P - Sum of cosines of n angles in A.P - Summation of series by using complex quantities.

Text Books:

1. Arumugam, S., &Issac, A. (2014). Calculus. Palayamkottai: New Gamma PublishingHouse.
Chapter 3 : Sections 3.3 - 3.5, 3.11 of Part - I
2.Narayanan, S., &Manicavachagom Pillay, T. K. (2012). Trigonometry.
S. V. Publications.
Chapters : 4; Chapter 5 : Section 5; Chapter 6 (except sections 3.1, 3.2 and related Problems).

Reference Books:

1. Narayanan, S. &Manicavachagom Pillay, T. K. (2007). Calculus. (Volume I).Viswanathan Printers & Publishers.
2. Arumugam, S. &ThangaPandi Issac, A. (2014). Sequences and Series & Trigonometry.New Gamma Publishing House.
3. Rawat,K. S. (2005). Trigonometry. Sarup& Sons.
4. Duraipandian, P. &KayalalPachaiappa. (2009). Trigonometry, Muhil Publishers.
Joseph A. Mangaladoss. (2005). Calculus. Presi - Persi Public

Semester I

Allied I- Algebra and Calculus (Allied for Physics & Chemistry)

Course Code: MA2011

No. of Hours per Week	Credits	Total No. of Hours	Marks
6	4	90	100

Objectives

1. To impart knowledge in concepts related to Algebra.
2. To solve problems in Physical Science.

Course Outcomes

Cos	Upon completion of this course the studentswill be able to:	PSO Addressed	CL
CO – 1	recall the fundamentals of algebraic equations, matrices and rules of integration.	PSO - 1	R
CO – 2	practice the formation of equations and compute symmetric functions of roots in terms of coefficients.	PSO - 2, 3	Ap
CO – 3	revise the properties of eigen values of the matrices.	PSO - 1	E
CO – 4	learn Beta, Gamma functions and evaluate integrals using them.	PSO - 4	E, U
CO – 5	practice the expansion of Fourier series and utilize the same for higher studies.	PSO - 4	Ap

Unit I

Theory of equations - Formation of equations - Polynomial equations with real coefficients - Rational roots - Irrational roots - Complex roots - Relation between roots and coefficients - Symmetric functions of the roots in terms of coefficients.

Unit II

Transformation of equations - Formation of equation whose roots are multiplied by k and diminished by h - Approximate solutions of Numerical Equations - Newton's method and Horner's method to find a root approximately.

Unit III

Matrices - Characteristic matrix - Characteristic equation of a matrix - Eigen values and Eigen vectors - Properties of Eigen values - Cayley Hamilton theorem (Statement only) - Verification computation of inverse matrix using Cayley Hamilton theorem.

Unit IV

Beta and Gamma functions - Properties and results - Evaluation of integrals using Beta and Gamma Functions - Relation between Beta and Gamma functions.

Unit V

Fourier series Expansion - Fourier coefficients - Half range Expansion - SineSeries, Cosine Series. (Simple problems only)

Text Books:

1.Arumugam, S., &ThangapandiIssac, A. (2012). Allied Mathematics (Paper - I). Palayamkottai, New Gamma Publishing House.

Chapter 1 : Sections 1.1, 1.2, 1.4 and 1.5; Chapter 2 : Sections 2.3 and 2.4.

2. Arumugam, S., &Thangapandi Issac, A. (2014). Calculus. Palayamkottai, New Gamma Publishing House.

Part II: Chapters 4 and 5.

Reference Books:

1. Manicavachagom Pillay, T. K. & Natarajan, T., & Ganapathy, K. S. (2007). Algebra. (Volume I). Viswanathan Printers & Publishers.

2. Paul. K. Rees., & Fred W. Sparks. (1967). College Algebra. McGraw - Hill Book Company.

3. Narayanan, S., & Manicavachagom Pillay, T. K. (2007). Calculus. (Volume I). Viswanathan Printers & Publishers.

4. Joseph A. Mangaladoss. (2005). Calculus. Presi - Persi Publications.

5. Narayanan, S., &Manicavachagom Pillay, T. K.(2007). Calculus. (Volume II). S.Viswanathan Printers & Publishers PVT. Ltd.

Semester I

Part IV

Add on Course- Professional English for Physical Sciences-I
Course Code: APS201

Hours/ Week	Credit	Total Hours	Marks
2	2	30	100

Objectives

1. To develop the language skills of students by offering adequate practice in professional contexts
2. To develop strategic competence that will help in efficient communication

Course Outcomes

CO	Upon completion of this course, students will be able to:	PSO addressed	CL
CO - 1	recognise their own ability to improve their own competence in using the language	**PSO - 1**	U
CO - 2	use language for speaking with confidence in an intelligible and acceptable manner	**PSO - 6**	E
CO - 3	understand the importance of reading for life	**PSO - 1**	U
CO - 4	Understand the importance of writing in academic life	**PSO - 1**	U
CO - 5	Write simple sentences without committing error of spelling or grammar	**PSO - 7**	An

Unit I

Communication:

1.Listening to Audio Text & answering Questions
2.Pair Walk
3.Comprehension passage
4.Developing a story with pictures
5.Vocabulary

Unit II Description:

1.Listening to Process Description – Online shopping
2.Speaking – Role play – sample 1
3.Reading Passages on Products
4.Process Description – Compare & Contrast
5.Vocabulary

Unit III

Negotiation Strategies:

1.Listening to interviews of specialists
2.Brain Storming (Mind mapping)
3.Economic System (Longer Reading Text)
4.Why learn the skill of writing an essay
5.Vocabulary

Unit IV

Presentation Skill:

1.Listening to Lecture – I
2.Short Talks – I
3.Reading comprehension – passage I
4.Writing Recommendations
5.Vocabulary

Unit V

Critical Thinking Skills:

1.Listening Comprehension
2.Speaking – Making Presentation – Task 1 & 2
3.Reading – Comprehension Passages, Note making
4.Writing - Problem & Solution Essays, Creative writing
5.Vocabulary

Reference Book

1. TANSCHE (2020).Professional English for Physical Sciences, *First* edition

Semester I

Quantitative Aptitude - I (NME)
Course Code: MNM201

Hours/ Week	Credit	Total Hours	Marks
4	3	60	100

Objectives

1. To develop the quantitative aptitude of the students.

2.To solve problems required for various competitive examinations.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	apply BODMAS rule for simplification and determine missing numbers in a sequence	PSO - 1	R
CO - 2	express numbers in the base of a fraction of 100.	PSO - 2	U
CO - 3	employ the problems related to the division of profit and loss of a business.	PSO - 4	Ap
CO - 4	measure the relative magnitude of two quantities in an effective way.	PSO - 2	C
CO - 5	construct and develop mathematical solutions to simple real life problems.	PSO - 1	Ap
CO - 6	learn ratio and proportion and practice duplication and triplication of ratios	PSO - 4	U, Ap

Unit I

Simplification - BODMAS rule - Modulus of a real number - Missing numbers in the expression.

Unit II

Percentage - Concepts of Percentage – Results on Population .

Unit III

Profit and Loss – Cost price – Selling Price – Profit or Gain – Loss – gain percentage - loss percentage.

Unit IV

Ratio and proportion – Fourth, third and mean proportionals – comparison of ratios, compound ratio – duplicate and subduplicate ratio- triplicate and subtriplicate ratio – variation.

Unit V

Partnership – Ratio of Division of Gains - Working and Sleeping partners – Chain Rule - Direct proportion – Indirect proportion.

Text Book

Aggarwal, R.S. (2014). Quantitative Aptitude. S. Chand and Company LTD.

Chapter : 4 (Examples 1- 20).
Chapter : 10 (Examples 1- 17).
Chapter : 11 (Examples 1- 15).
Chapters 12, and 13

Reference Books:

1. Abhijit Guha. (2006). Quantitative Aptitude for Competitive Examination. (4%& Edition). Tata McGraw - Hill Education Private Limited.
2. Immaculate, M. (2009). Mathematics for Life. Nanjil offset Printers.
3. Arun Sharma. (2008). Objective Mathematics. (2#$ Edition). Tata McGraw - Hill Publishing Company Limited.
4. Chauhan, R.S. Objective Mathematics. (2011). Unique Publishers.
5. Goyal, J. K., & Gupta K. P. (2011). Objective Mathematics. (6%& Revised Edition). Pragati Prakashan Educational Publishers.

Semester I
Skill Enhancement Course (SEC): Computer Literacy
Course Code: SEC202

Hours/Week	Credits	Total no. of hours	Total marks
2	2	30	100

Objective
To enable students to understand the basic working of ms office which includes ms word, excel and powerpoint.

Unit I
Microsoft Word: Starting MS-Word – Introduction to word 2007 user interface – Understanding document views – Creating a new document – Saving a file – Printing a document – Opening an existing file – Microsoft word 2007 basic features.

Unit II
Formatting text – Formatting paragraphs – Graphics – Tables – Page Setup – Bullets and Numbering – Columns and Ordering – Text Boxes – Mail Merge.

Unit III
Microsoft Excel: Starting MS- Excel – Introduction to Excel 2007 user interface – Creating a New workbook – Saving a workbook – Opening an Existing workbook – Entering data into a cell – Selecting cells – Entering data using autofill – Using merge & center – Sorting data – Creating a table – Formatting a table.

Unit IV
Adjusting cell data alignment – Changing cell data orientation - Adding borders to cell – Basic operations on worksheet – Advanced operations on worksheets – Resizing columns and rows in a worksheet – Using formulas and functions – Charts.

Unit V
Microsoft PowerPoint: The PowerPoint window – PowerPoint views – Create a new presentation - Changing a slide layout – Inserting text on a new slide – Inserting a new slide –

Rearrange the order of slides – Delete a slide – Save a presentation – Applying themes to a presentation – Change background style – Creating a textbox – Format textboxes – Add an image – Format an image – WordArt – Slide transitions – Slide animation - Setup slide show.

Text Book

1. J. Anto Hepzie Bai & S. J. Jenepha Mary, “Step Into Microsoft Office 2007”.

LAB EXERCISES

MS WORD

1. Design an Invitation
2. Design a Book Cover
3. Prepare a Calender
4. Mail Merge

MS EXCEL

1. Mark Sheet Preparation
2. Chart
3. Macro
4. Built-in Functions

MS POWERPOINT

1. Creating Resume
2. Birthday Greeting Card

Semester I & II
Foundation Course I - Values for Life
Course Code: FCV201

No. of hours per week	Credit	Total no. of hours	Marks
1	1	30	100

Objectives:

1. To inculcate the importance of values among the students.
2. To instill personal, family, social and religious values among the learners.
3. To equip them as responsible human beings.

Course Outcomes (COs)

CO No.	*Upon completion of this course, the students will be able to:*	PSO Addressed	Cognitive Level
CO-1	understand the human values, its importance and components	PSO-	U
CO-2	applythe values learnt in real life situation	PSO-	Ap
CO-3	comprehend the different personal values and its components	PSO-	U
CO-4	realize the personal values and to practice them	PSO -	Ap
CO - 5	understand the family values	PSO -	U

Unit I

Values – meaning- definition –value education - importance – objectives – essence – components- process - issues to be taught – benefits – significance of values in the present scenario - core value concerns – role of educators

Unit II

Personal Values – importance – purpose – factors that form personal values – components - assistance, truth, hard work, perseverance, respect for elders and teachers.

Unit III

Family Values - types – selfless love and service, sacrifice, Affection, gratitude, sharing humanity, kindness, peace, obedience

Infatuation – love – marriage – relationship

Familial love – brotherly love – sisterly love – parental love – definition – quotes from title

Unit IV

Social values – function – benefits - Components – honesty, integrity, compassion, empathy, commitment, responsibility, discipline, punctuality, respect, courtesy, dedication, attitude.

Unit V

Religious values – faith, belief, forgiveness, surrender.
Prayer – definition – components – types, benefits
God's love and protection – relevant quotes and reflections.

Text Book

Ed. Jansi, Mary, Jeyaseeli, Mary Helen Stella and AnithaMalby.Values for Life.Saras Publication.Nagercoil.

Semester II

Major Core II- Classical Algebra and Integral Calculus

Course Code: MC2021

No. of Hours perWeek	Credits	Total No. of Hours	Marks
6	4	90	100

Objectives: 1**.** To give a sound knowledge in Classical Algebra.

2. To solve problems in applications of Integral Calculus.

Course Outcomes

COs	Upon completion of this course the students will be able to:	PSO Addressed	CL
CO – 1	recall the fundamentals of algebraic equations and rules of integration.	PSO - 1	R
CO – 2	apply fundamental theorem of algebra in framing and solving equations	PSO - 2	U
CO – 3	choose appropriate method for transformation of equations	PSO - 4	Ap
CO – 4	develop the skill of evaluation of double and triple integrals over different regions	PSO - 3	Ap
CO – 5	identify Beta, Gamma functions and utilize them for the evaluation of definite integrals	PSO - 5	Ap,E
CO – 6	develop the Fourier Series expansion in any interval and apply the same for solving technical and physical problems	PSO - 4	Ap, An

Unit I

Preliminaries - Fundamental theorem of Algebra - Relations between roots and coefficients - Symmetric functions of the roots - Sum of r^{th} powers of the roots - Newton's theorem on the sum of the powers of the roots.

Unit II

Transformation of Equations - Roots with sign changed - Roots multiplied by a givennumber - Reciprocal equations - Increasing or decreasing the roots of a given equation by a given quantity - Removal of terms - Horner's method.

Unit III

Double integrals - Evaluation of double integrals - Changing the order of integration -Triple integrals.

Unit IV

Beta and Gamma functions - Definition and properties - Relation between Beta andGamma functions - Evaluation of integrals using Beta and Gamma functions.

Unit V

Fourier series expansion - Fourier coefficients, Half range series expansion - Sine andcosine series - Fourier series and half range series expansion in an arbitrary interval.

Text Books:

1. Manicavachagom Pillay, T. K., & Natarajan, T., & Ganapathy, K. S. (2007). Algebra. (Volume I). S. Viswanathan Printers & Publishers.
Chapter 6: Sections 6.1 to 6. 17, 6.19, 6.20, 6.30.
2. Arumuga, S., &Issac, A. (2014). Calculus. Palayamkottai, New Gamma PublishingHouse.
Chapter 3 : Sections 3.1 to 3.3; Chapters 4 & 5 of Part - II

Reference Books:

1. Arumugam, S., &Issac, A. (2003). Classical Algebra. Palayamkottai, New Gamma Publishing House,
2. Narayanan, S., &Manicavachagom Pillay, T. K. (2007). Calculus. (Volume II). S.Viswanathan Printers & Publishers PVT. Ltd.
3. Paul. K. Rees., & Fred W. Sparks. (1967). College Algebra. McGraw - Hill BookCompany.
4. Sharma, A. K. (2005). Text Bok of Multiple Integrals. Discovery Publishing House.
5. Dhami, H. S. (2009). Integral Calculus. New Age International Publishers.

Semester II

Allied II-Vector Calculus and Differential Equations (Allied for Physics & Chemistry)

Course Code: MA2021

No. of Hours per Week	Credits	Total No. of Hours	Marks
6	4	90	100

Objectives: 1. To introduce the concept of vector operators.

2. To impart the mathematical knowledge essential for solving problems inPhysical Science.

Course Outcomes

COs	Upon completion of this course the students will be able to:	PSO Addressed	CL
CO - 1	explain the physical meaning and properties of curl and divergence.	**PSO - 1**	**U**
CO - 2	practice the computation of line integrals, surface integrals.	**PSO - 4**	**Ap**
CO - 3	find the complementary function and particular integral of a differential equation by using appropriate methods.	**PSO - 2**	**Ap**
CO - 4	use computational tools to solve problems and applications of partial differential equations of first order.	**PSO - 5**	**E**
CO - 5	use Laplace transform and their inverse to solve differential equations.	**PSO - 4**	**Ap**

Unit I

Vector differentiation - Gradient - Divergence and curl - Directional Derivative - Normal to a surface - Solenoidal, irrotational and harmonic vectors.

Unit II

Vector integration - Work done by a force - Evaluation of line integrals andsurface integrals - Green's and Stokes theorems (Statement only) with problems

Unit III

Linear differential equation with constant coefficients - Particular integrals of theform e^{ax}, sin ax, cos ax, x^n, (x), $x^n(x)$ - Homogeneous linear equations.

Unit IV

Partial differential equations of first order - Formation - Methods of solving the firstorder differential equation - Lagrange's Equation.

Unit V

Laplace Transform of standard functions and simple properties - Inverse Laplace transform of standard functions and simple properties - Solution of differential equation using Laplace Transform (excluding the solution of simultaneous differential equations).

Text Books:

1. Arumugam.S., &ThangapandiI ssac, A. (2014). Analytical Geometry 3D and Vector Calculus. Palayamkottai, New Gamma Publishing House.

Chapter 5; Chapter 7: Sections 7.1 and 7.3.

2. Arumugam. S., & Thangapandi Issac, A. (2011). Differential Equations and Applications. Palayamkottai, New Gamma Publishing House.

Chapter 2: Sections 2.1 to 2.4; Chapter 3; Chapter 4: Sections 4.1 to 4.3.

Reference Books:

1. Narayanan., &Manicavachagam Pillai, K(1980). Vector Algebra & Analysis. S.Viswanathan Printers & Publishers PVT. Ltd.

2. Gupta, P. P., Malik, G. S,Gupta, R. K. (1985). Vector Analysis. RastogiPublications.

3. Durai Pandian, P., &LaxmiDurai Pandian. (1986). Vector Analysis. EmeraldPublishers.

4. Sankaranarayanan and others. (2006). Differential Equations and Applications. PRESI - PERSI Publishers.

5. Venkatachalapathy, S. G. (2012). Ordinary Differential Equations, Margham Publications.

Semester II
Part IV

Add on Course- Professional English for Physical Sciences-II

Course Code: APS202

Hours/ Week	Credit	Total Hours	Marks
2	2	30	100

Objectives

1.To develop the language skills of students by offering adequate practice in professional contexts
2.To develop strategic competence that will help in efficient communication

Course Outcomes

CO	Upon completion of this course, students will be able to:	PSO addressed	CL
CO - 1	recognise their own ability to improve their own competence in using the language	**PSO - 1**	U
CO - 2	use language for speaking with confidence in an intelligible and acceptable manner	**PSO - 6**	Ap
CO - 3	understand the importance of reading for life	**PSO - 1**	U
CO - 4	Understand the importance of writing in academic life	**PSO - 1**	U
CO - 5	Write simple sentences without committing error of spelling or grammar	**PSO - 7**	An

Unit I
Communication:

1.Listening to instruction
2.Small Group Work
3.Comprehension- Difference between facts & opinions
4.Developing a short poem with pictures
5.Vocabulary

Unit II Description:

1.Listening to Process Description - Cartographic Process
2.Speaking – Role play – sample 2
3.Reading Passages on Equipments & gadgets

4.Paragraph: Sentence Definition & Extended Definition, Free writing
5.Vocabulary

Unit III
Negotiation Strategies:

1.Listening to interviews of inventors in fields
2.Small Group Discussion – Specific
3.Longer reading text –The Art of Loving
4.Essay Writing – Solidarity
5.Vocabulary

Unit IV
Presentation Skill:

1.Listening to Lecture – 2
2.Short Talks – Poverty and the need to alleviate it
3.Reading comprehension – passage 2
4.Interpreting Visual Inputs
5.Vocabulary

Unit V
Critical Thinking Skills:

1.Listening for Information
2.Making Presentation task 3& 4
3.Motivational Articles on Professional Competence, Professional Ethics & Life Skill
4.Problem & Solution Essays, Summary Writing
5.Vocabulary

Reference Book

1. TANSCHE (2020).Professional English for Physical Sciences, *First* edition

Semester II
Quantitative Aptitude - II (NME)
Course Code: MNM202

Hours/ Week	Credit	Total Hours	Marks
4	2	60	100

Objectives

1.To develop the quantitative aptitude of the students
2.To solve problems needed for various competitive examinations.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO - 1	frame equations and solve problems involving ratios and fractions.	PSO - 2	Ap
CO - 2	calculate the area and compare the objects on the basis of their size and area.	PSO - 1	Ap
CO - 3	change the form of the number using lograthim and make tedious and confusing calculations simple.	PSO - 4	An
CO - 4	have sufficient knowledge about the basis of calculation.	PSO - 2	U, Ap
CO - 5	study the concept related to time, speed and distance.	PSO - 4	Ap

Unit I

Problems on Numbers - Framing and solving equations involving unknown numbers.

Unit II

Problems on Trains - time taken by a train to cover l metres, $l + b$metres – relation between a train and stationary/moving body.

Unit III

Compound Interest - interest compounded annually, half yearly and quarterly, different rates for different years.

Unit IV

Logarithms - properties of Logarithms - common Logarithms.

Unit V

Area - Results on Triangles- Pythagoras theorem, median, centroid, area of a triangle and rectangle.

Text Book

Aggarwal, R.S. (2014). Quantitative Aptitude. (Revised Edition). S. Chand and Company LTD.

Chapter 7 :(Examples 1-7 and 10)

Chapter 18: (Examples 1-5, 8 and 9)

Chapter 22: (Examples 1-10, except 22B)

Chapter 23: (Examples 1-6)

Chapter 24: (Examples 1 – 7 and 13-20).

Reference Books

1. Abhijit Guha. (2006). Quantitative Aptitude for Competitive Examination. (4%& Edition). Tata McGraw - Hill Education Private Limited.
2. Immaculate, M. (2009). Mathematics for Life. Nanjil offset Printers.
3. Arun Sharma. (2008). Objective Mathematics. (Second Edition). Tata McGraw - Hill Publishing Company Limited.
4. Chauhan, R.S. (2011). Objective Mathematics. Unique Publishers.
5. Goyal, J. K., & Gupta, K. P. (2011). Objective Mathematics. (6%& Revised Edition). PragatiPrakashan Educational Publishers

Semester II
Skill Enhancement Course (SEC): Meditation and Exercise
Course Code: SEC 201

No. of hours per week	Credit	Total No. of hours	Marks
2	2	30	100

Objectives

1. To promote good - health and emotional stability among students.
2. To increase relaxation of body and mind.
3. To equip the students with traditional understanding of yogasanas and meditation.
4. To prevent stress-related health problems.

Unit I: Physical Health

Physical Structure of Human Body- Five Factors to Balance in Life- Nadisuthi- Neuro- Muscular Breathing Exercises - Eye exercises - Kapalabathi.

Unit II: Yogasanas

Surya Namaskar- Eka Pada Asana **(**Viruchchasana**)** - Chakrasana (sideways) - Uthkadasana - Padmasana- Vajrasana- Pachi Mothasana- Navasana- Pavana Mukthasana- Salabhasana- Dhanurasana- Makkarasana.

Unit III: Mind

Mind-Mental frequency- Meditation- Benefits of Meditation.

Unit IV: Personality Development

Analysis of Thought - Six roots for thought – Introspection for analysis of thought - Practical technique for analysis of thought - Moralization of desire - Analysis of desire - Practical technique for moralization of desire.

Unit V: Human Resources Development

Eradication of worries- Analyse your problems and eradicate worry - Practical exercise to eradicate worries- Benefits of Blessings - Effect of good vibrations - practicing blessing a daily habit.

Text Book:

Value Education - Vision for Wisdom World Community Service Centre , Aliyar.

Reference books:

1. Handbook on Yoga-N.C. Narayanan
2. Simplified Physical Exercises - ThathuvagnaniVethathiri Maharishi
3. Mind - ThathuvagnaniVethathiri Maharishi
4. Yoga for modern age - ThathuvagnaniVethathiri Maharishi.
5. Yogasanas-- Vision for Wisdom World Community Service centre , Aliyar.

Semester II & III
Service Learning Programme (SLP): Community Engagement Course
Course Code: SLP201

Credits	Total no. of hours	Total marks
2	30 (15 classroom + 15 field)	100 (50 + 50)

Objectives

- To develop an appreciation of rural culture, life-style and wisdom among students
- To learn about the status of various agricultural and rural development programme
- To understand causes for rural distress and poverty and explore solutions for the same
- To apply classroom knowledge of courses to field realities and there by improve quality of learning

Learning Outcomes

After completing this course, student will be able to

- Gain an understanding of rural life, culture and social realities
- Develop a sense of empathy and bond so mutuality with local community
- Appreciate significant contributions of local communities to Indian society and economy
- Learn to value the local knowledge and wisdom of the community
- Identify opportunities for contributing to community's socio-economic improvements

Credit: 2credits, 30hours, atleast 50% in field, compulsory for all students.

Contents:

Course Structure:

2 Credits Course (1Credit for Classroom and Tutorials and 1 Credit for Field Engagement)

S. No.	Module Title	Module Content	Assignment	Teaching/ Learning Methodology	No.of Classes

1	**Appreciation of Rural Society**	Rural lifestyle, rural society, caste and gender relations, rural values with respect to community, nature and resources, elaboration of "soul of India lies in villages'(Gandhi), rural infrastructure	Prepare a map (physical, visual or digital) of the village you visited and write an essay about inter-family relations in that village.	- Class room discussions - Field visit** - Assignment Map	2 4 2
2	**Understanding rural economy & livelihood**	Agriculture, farming, land ownership, water management, animal husbandry, non-farm livelihoods and artisans, rural entrepreneurs, rural markets	Rural household economy, its challenges and possible pathways to address them	- Field visit** - Group discussions in class -Assignment	3 4 1
3	**Rural Institutions**	Traditional rural organisations, Self-help Groups, Panchayatiraj institutions (GramSabha, GramPanchayat, Standing Committees), local civil society, local administration	How effectively are Panchayatiraj institutions functioning in the village? What would you suggest to improve their effectiveness? Present a case study (written or audio-visual)	Classroom - Field visit** - Group presentation of assignment	2 4 2
4	**Rural Development Programmes**	History of rural development in India, current national programmes: Sarva Shiksha Abhiyan, Beti Bachao, Beti Padhao, Ayushman Bharat, Swatchh Bharat, PM Awaas Yojana ,Skill India, Gram Panchayat Decentralised Planning, NRLM, MNREGA etc.	Describe the benefits received and challenges faced in the delivery of one of these programmes in the rural community; give suggestions about improving implementation of the programme for the rural poor.	- Classroom - Each studentselect soneprogram for fieldvisit** Written assignment	2 4 2

****Recommended** field-based practical activities:

- Interaction with SHG women members, and study of their functions and challenges; planning for their skill building and livelihood activities
- Visit MGNREGS project sites, interact with beneficiaries and interview functionaries at the worksite
- Field visit to Swachh Bharat project sites, conduct analysis and initiate

problem solving measures

- Conduct Mission Antyodaya surveys to support under Gram Panchayat Development Plan(GPDP)
- Interactive community exercise with local leaders, panchayat functionaries, grass-root officials and local institutions regarding village development plan preparation and resource mobilization
- Visit Rural Schools/ mid-day meal centres, study Academic and infrastructural resources and gaps
- Participate in Gram Sabha meetings, and study community participation
- Associate with Social audit exercises at the Gram Panchayat level, and interact with programme beneficiaries
- Attend Parent Teacher Association meetings and interview school dropouts
- Visit local Anganwadi Centre and observe the services being provided
- Visit local NGOs, civil society organisations and interact with their staff and beneficiaries,
- Organize awareness programmes, health camps, Disability camps and cleanliness camps
- Conducts oil health test, drinking water analysis, energy use and fuel efficiency surveys
- Raise understanding of people's impacts of climate change, building up community's disaster preparedness
- Organise orientation programmes for farmers regarding organic cultivation,rational use of irrigation and fertilizers and promotion of traditional species of crops and plants
- Formation of committees for common property resource management, village pond maintenance and fishing

Teaching & Learning Methods

A large variety of methods of teaching must be deployed:
UGC will prepare an ICT based MOOC for self-paced learning by students for the1 credit to be conducted in the classroom.
Reading & classroom discussions, Participatory Research Methods & Tools, Community dialogues, Oral history, social and institutional mapping, interactions with elected panchayat leaders and government functionaries, Observation of Gram Sabha, Field visits to various village institutions.

Recommended Readings

Books:

1. Singh, Katar, Rural Development: Principles, Policies and Management, Sage Publications, NewDelhi,2015.
2. A Hand book on Village Panchayat Administration, Rajiv Gandhi Chair for Panchayati Raj Studies, 2002.
3. United Nations, Sustainable Development Goals, 2015 un.org/sdgs/
4. M.P. Boraian, Best Practices in Rural Development**,** Shanlax Publishers, 2016.

Journals:

1. Journals of Rural development, (published by NIRD & PR Hyderabad)
2. Indian Journal of Social Work, (byTISS,Bombay)
3. Indian Journal of Extension Education (by Indian Society of Extension Education)
4. Journal of Extension Education (by Extension Education Society)
5. Kurukshetra (Ministry of Rural Development, GoI)
6. Yojana (Ministry of Information and Broadcasting, GoI)

VALUE ADDED COURSE

Quick Arithmetic for Competitive Examinations

Course Code: VAM201

Unit-1

Simplification, Number system, surfs and indices, cube root, squareroot, HCF and LCM.

Unit-2

Average, ratio and proportion, percentage, problem on ages, partnership.

Unit-3

Men and work, time and work, time and distance.

Unit-4

Mensuration, area, surface area and volume.

Unit-5

Simple interest, compound interest, profit and loss, basic algebra.

Book : "Quantitative Aptitude" By Agarwal.

Semester III

Major Core III - Differential Equations and Vector Calculus

Course Code: MC2031

Hours/ Week	Credit	Total Hours	Marks
6	4	90	100

Objectives

1. To gain deeper knowledge in differential equations, differentiation and integration of vector functions.
2. To apply the concepts in higher mathematics and physical sciences.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO – 1	distinguish linear, nonlinear, ordinary and partial differential equations	PSO - 4	An
CO – 2	solve linear differential equations with constant and variable coefficients	PSO - 2	U
CO – 3	explain the basic properties of Laplace Transforms and Inverse Laplace Transforms.	PSO - 1	U
CO – 4	use the Laplace transform to find the solution of linear differential equations	PSO - 2	Ap
CO – 5	learn methods of forming and solving partial differential equations	PSO - 3	U
CO – 6	learn differentiation and integration of vector valued functions	PSO - 4	U
CO – 7	evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence theorem	PSO - 2	Ap,E
CO – 8	apply the concepts to solve problems in physical sciences and engineering	PSO - 3	Ap

Unit I

Linear differential equation with constant coefficients - Particular integrals of functions of the form $e^{!"}$,sin ax,cos ax,$x^{\#}$, $e^{!"}f(x)$,$x^{\#}f(x)$, Homogeneous Linear equations.

Unit II

Laplace Transformation - Properties, Inverse Laplace transform - Properties - Solving linear differential equations and simultaneous equations of first order using Laplace transform.

Unit III

Formation of partial differential equations - First order partial differential equation - Methods of solving the first order partial differential equations - Lagrange's Equation. Charpit's method.

Unit IV

Vector differentiation - Gradient - Equation of tangent plane and normal line - Unit normal - divergence and curl - Solenoidal, irrotational and harmonic vectors.

Unit V

Vector integration - Line integrals & Surface integrals, Green's, Stoke's and Gauss divergence theorems (statement only).Verification of Green's, Stoke's and Gauss divergence theorems.

Text Books

1. Arumugam, S., & Issac. (2011). Differential equations and applications. New Gamma Publishing House.
   Chapter 2: Sections 2.1 to 2.4, Chapter 3, Chapter 4: Sections 4.1 to 4.3 & 4.5.
2. Arumugam, S., & ThangapandiIssac. (2014). Analytical Geometry 3D and Vector calculus. Palayamkottai: New Gamma Publishing House. Chapters 5 and 7.

Reference Books

1. Sankaranarayanan. & others. (2006). Differential equations and applications. PRESIPERSI Publishers.
2. Narayanan &Manicavachagampillai. (2009). Differential Equations. Vishwanathan S. Printers & Publishers Pvt. Ltd.
3. Venkatachalapathy, S. G. (2012). Ordinary Differential Equations. Margham Publications.
4. Narayanan, &Manicavachagampillai, K. (1980). Vector Algebra & Analysis. Viswanathan, S. Printers & Publishers Pvt. Ltd.
5. DuraiPandian, P., &LaxmiDuraiPandian. (1986). Vector Analysis. Emerald Publishers.

Semester III

Major Core IV - Real Analysis I

Course Code: MC2032

Hours/ Week	Credits	Total Hours	Marks
5	4	75	100

Objectives

1. To introduce the primary concepts of sequences and series of real numbers.
2. To develop problem solving skills.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the basic concepts of real numbers	PSO - 1	U
CO - 2	explain and analyse the primary concepts of sequences and series of real numbers.	PSO – 1,2	An
CO - 3	define convergence and divergence of sequences and series.	PSO – 1	R
CO - 4	calculate the limit points, upper and lower limits of the sequences.	PSO – 4	Ap
CO - 5	evaluate the convergence of series using different types of tests.	PSO – 4,5	E
CO - 6	develop the skill of analyzing various sequence and series.	PSO – 4,5	C

Unit I

Preliminaries – Mathematical Induction, Finite and Infinite Sets. The Real Numbers – The algebraic and order properties of R, Absolute value and the real line.

Unit II

The Real Numbers – The Completeness property of R, Applications of the supremum property, Intervals.

Unit III

Sequences - Range of a sequence - Bounded, monotonic, convergent, divergent and oscillating sequences – The Algebra of Limits - Behaviour of monotonic sequences.

Unit IV

Sequences – Some theorems on limits, Subsequences, Limit points, Cauchy sequences, The upper and lower limits of a sequence.

Unit V

Series of Positive Terms – Infinite series, Comparison test, Kummer's test, Root test and condensation test.

Text Books

1. Robert G. Bartle, Donald R. Sherbert (Fourth Edition), Introduction to Real Analysis, John Wiley & Sons, Inc.

   Chapter 1: Sections 1.2, 1.3

   Chapter 2: Sections 2.1 – 2.5
2. Arumugam, S., & Issac. (2010). Sequences and series, New Gamma Publishing House.

   Chapter 3: Sections 3.1 to 3.7, 3.9 - 3.11.

   Chapter 4: Sections 4.1, 4.2, problems related to ratio and root tests from sections 4.3 and 4.4.

Reference Books

1. Goldberg. R. - Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (2000).
2. Malik S.C and Savitha Arora (1991) - Mathematical Analysis, Wiley Eastern Limited New Delhi.
3. Bali, N. B. (2005). Real Analysis. Laxmi Publications.
4. Somasundaram, D., &Choudhary, B. (2010). A first course in Mathematical Analysis. Narosa Publishing House Pvt. Ltd.
5. Gupta, S. L., & Nisha Rani. (2008). Fundamental Real Analysis. Vikas Publishing House Pvt. Ltd.

Semester III

Allied III - Probability Theory and Distributions

Course Code: MA2031

Hours/ Week	Credit	Total Hours	Marks
5	5	75	100

Objectives

1. To impart knowledge on the basic concepts of Probability theory and Probability distributions.
2. To apply the theory in real life situations.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	recall the definition of probability and set functions	PSO – 1	R
CO - 2	differentiate between probability and conditional probability and compute according to the requirement	PSO –2	An
CO - 3	understand the definition of random variables, their types and related concepts	PSO – 1	U
CO - 4	detect the different probability distributions which are widely used	PSO –3	An
CO - 5	apply the techniques to prove the properties of probability and related distributions	PSO –4	Ap
CO - 6	choose the suitable probability distribution corresponding to a given data	PSO – 5	E
CO - 7	test the validity of a given data	PSO - 5	E

Unit I

Probability - Experiment - Sample space - Events - Conditional probability - Properties - independent events - Multiplication rule of probability - Baye's Theorem.

Unit II

Random Variables - Discrete and continuous random variables - Probability density function - Distribution function - Mathematical expectations - Mean and variance.

Unit III

Moment generating function - Properties - Cumulant generating function - Characteristic function - Poisson distribution - Recurrence formula for moments - Fitting of Poisson distribution.

Unit IV

Binomial distribution - Moment generating function about origin and mean Recurrence formula for moments - Mode of Binomial distribution - Fitting of Binomial distribution.

Unit V

Normal Distribution - Properties of Normal curve - Moment generating function about origin and mean - Moments - Standard Normal distribution - Fitting of Normal distribution by area method and ordinate method.

Text Book

Arumugam, S., & others. (2006). Statistics. New Gamma Publishing House.

Chapter 11 : 11.1 - 11.2; Chapter 12 : 12.1 - 12.6; Chapter 13: 13.1 - 13.3.

Reference Books

1. Kapur, J.N., & Saxena. (1986). Mathematical Statistics. (12th Edition). Chand & Company.
2. Pillai, R.S.N., & Bagavathi, V. (1989). Statistics. (12th Edition). Chand & Company.
3. Mangaladoss., & others. (1994). Statistics and its application. Suja Publishing House.
4. Sharma, J.N., & Goyal, J. K. (1987). Mathematical Statistics. (11th Edition). Krishna Bakashar Mandir.
5. Gupta, S.P. (2012). Statistical Methods. (42#$ Edition). Sultan Chand and Sons.

Semester III
Part IV

Add on Course- Professional English for Physical Sciences-III
Course Code: APS203

Hours/ Week	Credit	Total Hours	Marks
2	2	30	100

Objectives

1. To develop the language skills of students by offering adequate practice in professional contexts
2. To develop strategic competence that will help in efficient communication

Course Outcomes

CO	Upon completion of this course, students will be able to:	PSO addressed	CL
CO - 1	recognise their own ability to improve their own competence in using the language	**PSO - 1**	U
CO - 2	use language for speaking with confidence in an intelligible and acceptable manner	**PSO - 6**	Ap
CO - 3	understand the importance of reading for life	**PSO - 1**	U
CO - 4	Understand the importance of writing in academic life	**PSO - 1**	U
CO - 5	Write simple sentences without committing error of spelling or grammar	**PSO - 7**	An

Unit I

Listening – Answering comprehension exercises
Speaking – Reading passages – open ended questions
Reading – One subject based reading of text followed by comprehension activities / exercises
Writing – Summary writing based on the reading passages (semi-guided)

Unit II

Listening – Announcement
Speaking – Just a minute activities
Reading – Analyzing Ads
Writing –Dialogue writing

Unit III

Listening – Listening to interviews (subject based)

Speaking – Interview with subject teachers / professionals (using video conferencing skills)
Reading – Selected sample of web page
Writing – Creating web pages
Reading Comprehension – Essay on Digital competence for academic and professional life

Unit IV

Listening – General videos (lifestyle and values)
Speaking –Movie review, book review
Writing – Poster making – writing slogans / captions (subject based) Reading – Essay on creativity and imagination

Unit V

Speaking – Presentation using Power Point
Reading / Writing – Circulars, minutes of meeting, paraphrasing

Reference Book

1. TANSCHE (2020).Professional English for Physical Sciences, *First* edition.

Semester III & IV
Foundation Course II - Personality Development
Course Code: FCV202

No. of hours per week	Credit	Total no. of hours	Marks
1	1	30	100

Objectives

1. To practice personal and professional responsibility.
2. To develop and nurture a deep understanding of personal motivation.

Course Outcome

CO No.	*Upon completion of this course, the students will be able to:*	PSO Addressed	Cognitive Level
CO-1	identify various dimensions and importance of effective personality	PSO-	A
CO-2	apply the models of positive thinking in real life situations	PSO-	A
CO-3	To overcome shyness and loneliness and cope up with the society.	PSO-	Y

Unit I

Personality – Factors influencing personality – Theories on personality – Types of personality. Self acceptance – self awareness–self concept – elements - self esteem – types of self esteem – impact of self esteem – importance – low self esteem.

Unit II

Self actualization– characteristics – Positive thinking – The profile of a positive thinker – Positive attitude – Models of positive thinking. Worry – Why to worry – ways to overcome – ways to turn negative thinking into positive.

Unit III

Motivation – Sources of motivation – Types of motivation – Factors determining motivation – characteristics of motivation. Goal setting – Types of goals – ways to achieve goals. Decision making – Steps for decision making.

Unit IV

Time Management – Definition – Controversies regarding time management – importance – Ways to manage time – controlling interruption – Leisure. Leadership and team building – types –qualities of a good leader – group formation – types- responsibilities of group members –

instructions to form groups. Communication – classification – verbal and non verbal – rules – hindrance to communication.

Unit V

Process of coping or adjustments – coping – mal adjustment – frustration – types – techniques to overcome frustration. Mental stress – types – mechanism of coping – positive and negative mechanism –steps for adjustment in life – coping with shyness – loneliness – techniques to overcome shyness and loneliness.

Textbook

AazhumaiVazhampera– Dr. Sr. Mary Jhonsy, Dr. M. Mary Helen Stella and Dr.AnithaMalbi

Reference books

1. Personality Development (1999). Selvaraj, Palayamkottai Community College, V.M. Chattram, Tirunelveli.
2. Resource book for Value Education (2002). Mani Jacob, Institute of Value Education, New Delhi
3. You can win (1998).Shiv Kheera, published by Rajive Beri, Macmillan India Ltd, New Delhi.
4. The seven habits of highly effective people (1990). Covey Stephen, R. Simon and Schuster, New York.
5. Change or be changed (2008). Dr. Xavier Alphonse, S. published by ICRDCE, Chennai.

Self-Learning Course
Discrete Mathematics– I
Sub. Code: MS20S1

No. of Credits	Marks
2	100

Objective

To develop the interest of self learning in subject oriented courses.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the basic principles of relations and its examples	PSO - 2	U
CO - 2	analyze various basic logical laws in Calculus and its properties	PSO – 3,4	An
CO - 3	develop the ability to solve problems in functions	PSO - 2	Ap
CO - 4	analyze real life problems using graph theory both quantitatively and qualitatively	PSO - 4	An

Unit I

Graph – Undirected Graph - Directed Graph – Multi Graph – Pseudo Graph – Simple Graph – General Graph – Degree of a vertex – Theorems – Finite Graph – Order of a Graph – Size of a Graph – Null Graph – Isolated Graph – Regular Graph – Isomorphic Graphs

Unit II

Matrix Representation of a Graph – Adjacency matrices – Incidence Matrix – Examples – Subgraph – Walks – Closed walk – Open walk – Path – Length of a path - Circuit – Connected Graphs – Euler Graph – Hamiltonian Graph – Subgraph .

Unit III

Propositional Calculus – Connectives – Tautology and contradiction – Examples – Equivalence Formulae – Implication – Laws of Implication and Equivalence – Basic Logical Laws – Procedure for proving Tautological Implications – Duality Law

Unit IV

Relations – Complementary Relation - Inverse Relation - Union and intersection of two Relations - Symmetric Relation -Anti Symmetric Relation- Reflexive

Relation - Transitive Relation - Equivalence Relation - Partially ordering Relation- Domain and Range of a Relation - Composition of Relations – Examples.

Unit V

Functions – Definition and Examples of Functions – Types of Functions - Classification of Functions -Algebraic Functions Transcendental Functions - Composition of functions –Identity Function -Inverse of a Function- Problems.

Text Book

Geetha,P. Discrete Mathematics. (2011)
SCITECH Publications.Chennai Chapter I ; Sections 1.1 to 1.9; Chapter 3 : Sections 3.23 to 3.33
Chapter 5 : Sections 5.1 to 5.8; Chapter 11 Sections 11.1 ,11.2 and 11.3 (11.3.1 to 11.3.6 only)

Reference Book

1. Vatsa, B.S.,&SuchiVatsa (2009). Discrete Mathematics. (IV Edition). New Age International Publications.
2. Mallik, D.S.,&Sen, M.K. (2010). Discrete Mathematics Theory and Applications. (Revised Edition).Cengage Learning India Pvt Ltd.
3. Chauhan, J.P.(2015). Discrete Structures and Graph Theory.(VI Edition). Krishna Prakashan Media Pvt Ltd.
4. Bernard Kolman., RobertC.Busby.,&Sharon Cutler Ross.(2009).Discrete Mathematical Structures. (VI Edition). PHI Learning Pvt Ltd.
5. Lovasz, L., Pelikan, J., &Vesztergombi, K.(2008). Discrete Mathematics Elementary and Beyond. (V Edition) Springer International Edition.

Semester IV

Major Core V - Groups and Rings

Course Code: MC2041

Hours/ Week	Credit	Total Hours	Marks
6	5	90	100

Objectives

1. To introduce the concepts of Group theory and Ring theory.
2. To gain more knowledge essential for higher studies in Abstract Algebra.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	Recall the definitions of groups ,rings, functions and also examples of groups and rings	PSO - 1	R
CO - 2	Explain the properties of groups, rings and different types of groups and rings	PSO - 1	U
CO - 3	Develop proofs of results on Permutation groups ,Cyclic groups, Quotient group, Subgroups, sub rings , quotient rings	PSO - 2	C
CO - 4	Examine the properties of Ideals-Maximal and Prime ideals-Cosets-order of an element	PSO -5	E
CO - 5	Test the homomorphic and isomorphic properties of groups and rings	PSO - 4	An
CO - 6	Develop the concepts of ordered integral domains and Unique Factorization Domains	PSO - 5	E
CO - 7	Apply the theory of Groups and Rings and solve problems	PSO - 2	Ap

Unit I

Groups - Definition and examples - Permutations - subgroups - cyclic groups.

Unit II

Order of an element - Normal subgroups - Cosets and Lagrange's theorem.

Unit III

Quotient groups - Isomorphism - Fundamental theorem of homomorphism.

Unit IV

Rings - Definition and examples - Elementary properties of rings.

Isomorphism of rings - Types of rings - Characteristic of a ring.

Unit V

Subrings - Ideals - Ordered integral domain - Unique factorization domain.

Text Book

Arumugam, S., & Thangapandi Issac, A. (2011). Modern Algebra. Scitech Publications.

Chapter 3: Sections 3.1, 3.4 - 3.11

Chapter 4 : Sections 4.1 to 4.10, 4.12, 4.13

Reference Books

1. Surjeet Singh., & Qazi Zameeruddeen. (2006). Modern Algebra. (8%& Edition). Vikas Publishing House.
2. Santiago, M.C. (2011). Modern Algebra. (1'% Edition). Tata McGraw Publishing Company Limited.
3. Gopalakrishnan, N. S. (2015). University Algebra. (3($ Edition). New Age International Publishers.
4. Vatsa, B. S., & Suchi Vatsa. (2010). Modern Algebra. (2#$ Edition). New Age International Publishers.
5. Joseph A. Gallian. (1999). Contemporary Abstract Algebra. (4%& Edition). Narosa Publishing House Pvt. Ltd.

Semester IV

Major Core VI - Analytical Geometry - 3 Dimensions

Course Code: MC2042

Hours/ Week	Credit	Total Hours	Marks
5	4	75	100

Objectives

1. To gain deeper knowledge in three dimensional Analytical Geometry. 2.

To develop creative thinking, innovation and synthesis of information.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	recall the basic definitions and concepts of planes and lines	PSO – 1	R
CO - 2	demonstrate the projection of the line joining two points, cosines of the line joining two points and will be able to solve problems	PSO – 3	C
CO - 3	calculate the distance between points, planes and the angles between lines and planes	PSO – 2	An
CO - 4	draw three dimensional surfaces from the given information	PSO – 4	An
CO - 5	discuss the characteristics and properties of 3 - dimensional objects like sphere, cube, cone etc	PSO – 1	U
CO - 6	develop the skill in 3 - dimensional geometry to gain mastery in related courses	PSO – 5	Ap

Unit I

Distance between points - Angle between two lines - Projection on a line - Direction cosines - Direction ratios of the join of two points - Projection of the line joining two points - Cosines of the line joining the points - Conditions for perpendicularity and parallelism.

Unit II

Equation of a plane in different forms - Intercept form - normal form - Angle between the planes -The ratio in which the plane divides the line joining the points - A plane through the line of intersection of two given planes - length of perpendicular - Planes bisecting the angle between two planes.

Unit III

Equation of a line in different forms - The plane and the straight line - Angle between the lines-image of a line - plane and a line - Line of intersection of two planes - Angle between a line and a plane - Co-planarity of two lines.

Unit IV

Equation of the sphere in its general form - Determination of the centre and radius of a sphere - The length of the tangent from the point to the sphere - Section of sphere by a plane - Intersection of two spheres - Tangent plane.

Unit V

The equation of a surface – Cone – Right circular cone – Intersection of a straight line and a quadric cone – Tangent plane and normal – Condition for a plane to touch the quadric cone – The angle between the lines in which a plane cuts the cone –Condition that the cone has three mutually perpendicular generators.

Text Book

Manicavachagom Pillay, T. K., & Natarajan. (2007). Analytical Geometry (Part IIThree dimensions).Viswanathan S. Printers & Publishers Pvt. Ltd.
Chapters : 1 - 4 (Except sections 8, 9 in Chapter 3)
Chapter : 5, Sections : 1-7

Reference Books

1. Arumugam, S., & Thangapandi Issac, A. (2014). Analytical Geometry 3D and Vector Calculus. New Gamma Publishing House.
2. Kar, B.K. (2012). Advanced Analytical Geometry and Vector Calculus. (Revised Edition). Books and Allied (p) Ltd.
3. Chatterjee, D. (2009). Analytical Geometry Two and Three Dimensions. New Delhi: Narosa Publishing House Pvt.Ltd.
4. Jain, P. K., Khalil Ahmad. (1999). Textbook of Analytical Geometry of Three Dimensions. ($2^{\#\$}$ Edition). New Age International (p) Limited Publishers.
5. Arup Mukherjee., &Naba Kumar Bej. (2015). Analytical Geometry of Two and Three Dimensions. (Advanced Level). Books and Allied (p) Ltd.
6. Kandasamy. P. and K. Thilagavathi – Mathematics for B.Sc., Vol IV – 2004, S.Chand and Co., New Delhi.
7. Thomas, G.B. and R.L. Finney, Calculus, 9^{th} Ed., Pearson Education, Delhi, 2005.
8. Bell, R.J.T. Elementary Treatise on Coordinate Geometry of Three Dimensions, McMillan India Ltd., 1994.

Semester IV

Allied IV - Applied Statistics

Course Code: MA2041

Hours/ Week	Credit	Total Hours	Marks
5	5	75	100

Objectives

1. To acquire the knowledge of correlation theory and testing hypothesis.
2. To solve research and application oriented problems.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	identify and demonstrate appropriate sampling processes	PSO –2	Ap
CO - 2	recall the methods of classifying and analyzing data relative to single variable	PSO –4	R
CO - 3	describe the χ^2 distribution in statistics	PSO –3	U
CO - 4	distinguish between the practical purposes of a large and a small sample	PSO –1	An
CO - 5	understand that correlation coefficient is independent of the change of origin and scale	PSO –5	U

Unit I

Correlation - Properties of correlation coefficient -Rank correlation - Regression - Equation of regression lines - Angle between regression lines.

Unit II

Test of significance -Sampling - Sampling distribution - Testing of hypothesis - Procedure for testing of hypothesis for large samples - Test of significance for proportions and percentages.

Unit III

Test of significance for means, difference of sample means, standard deviation and correlation coefficient.

Unit IV

Test of significance for small samples - Test of significance based on t-distribution - Test of significance based on F-test - Test of significance of an observed sample correlation.

Unit V

Test based on χ^2-distribution - χ^2test for population variance, goodness of fit and independence of attributes - Yate's Correction.

Text Book

Arumugam, S., & Thangapandi Isaac, A. (2006). Statistics. New Gamma Publishing House. Palayamkotai.

Chapters: 6, 14, 15, 16.

Reference Books

1. Kapur, J. N., &Saxena. (1986). Mathematical Statistics. (12%& Edition). Chand & Company.
2. Pillai, R. S. N., &Bagavathi, V. (1989). Statistics. (12%& Edition). Chand & Company.
3. Mangaladoss.,& Others. (1994). Statistics and its Application. Suja Publishing House.
4. Sharma, J. N., & J. K.Goyal. (1987). Mathematical Statistics. (11%& Edition).Krishna Bakashar Mandir.
5. Robert,V., Hogg., Joseph., Mckean, W., Allen., & Craig, T.(2013). Introduction to Mathematical Statistics. (6%& Edition).Dorling Kindersley (India) Pvt. Ltd.

Semester IV
Part IV

Add on Course- Professional English for Physical Sciences-IV

Course Code: APS204

Hours/ Week	Credit	Total Hours	Marks
2	2	30	100

Objectives

1. To develop the language skills of students by offering adequate practice in professional contexts
2. To develop strategic competence that will help in efficient communication

Course Outcomes

CO	Upon completion of this course, students will be able to:	PSO addressed	CL
CO - 1	recognise their own ability to improve their own competence in using the language	**PSO - 1**	U
CO - 2	use language for speaking with confidence in an intelligible and acceptable manner	**PSO - 6**	Ap
CO - 3	understand the importance of reading for life	**PSO - 1**	U
CO - 4	Understand the importance of writing in academic life	**PSO - 1**	U
CO - 5	Write simple sentences without committing error of spelling or grammar	**PSO - 7**	An

Unit I:

Listening – Listening to two talks / Lectures by specialists on selected subjects

Speaking – Small Group Discussions

Reading – One Subject Based Reading text followed by comprehension activities / exercises

Writing – Summary writing based on the reading passages (Free Writing)

Unit II:

Listening – Product Launch

Speaking – Debates

Reading – Reading Texts on advertisements (On products relevant to the subject areas) and answering inferential questions

Writing – Writing an argumentative / persuasive essay

Unit III:

Listening – Interview by a famous celebrity

Speaking –Interviewing any professional / Creating Vlogs (How to become vloger and use vloging to nurture interest – subject related)

Reading – Blog

Writing – Blog Creation

Unit IV:

Listening – Listening academic videos (Prepared by EMRC Other MOOC videos on Indian academic sites)

Speaking – Making oral presentations through short films – subject based

Reading – How is creativity possible in Science (Continuation of essay in semester III)
Writing – Creating flyers and Brochures (Subject Based)

Unit V:

Speaking – Presentation (Without Aids)

Reading & Writing – Product Profiles / Writing an Introduction.

Reference Book

1. TANSCHE (2020).Professional English for Physical Sciences, *First* edition

Self-Learning Course

Discrete Mathematics – II
Sub. Code: MS20S2

No. of Credits	Marks
2	100

Objective

To develop the interest of self learning in subject oriented courses.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	Know various types of lattices and analyze its properties	PSO – 3,4	An
CO - 2	Understand the basic principles of Boolean Algebra	PSO - 2	U
CO - 3	Interpret matrices and apply these concepts to find solutions of a system of linear equations	PSO - 4	Ap
CO - 4	Use combinatorics for suitable applications	PSO - 3	Ap

Unit I

Lattices – Introduction - Hasse Diagram - Examples and Problems - Properties of a Lattice with proof – Distributive Lattice - Complimented Lattice - Sublattice - Definition -Isotonicity property – Modular iequality in a Lattice.

Unit II

Boolean Algebra – Definition - Basic Boolean Algebra laws – Principle of Duality – Chain – Properties – Direct product of lattices – Problems.

Unit III

Matrices – Definition – Rank of a matrix – Elementary transformations – Solutions of a system of linear equations

Unit IV

Eigen values and Eigen vectors – Singular and Non singular matrices – Inverse of a square matrix – Adjoint of a square matrix – Cayley Hamilton Theorem.

Unit V

Combinatorics – The basics of counting – Product Rule – The Sum Rule – Pigeonhole Principle – Permutation – combination - Circular Permutation-Problems.

Text Book

P. Geetha. (2011) Discrete Mathematics,
SCITECH Publications, Chennai. Chapter 4 :Sections 4.1 to 4.10 ;
Chapter 7 : 7.1 to 7.10
Chapter 10 : Sections 10.1 to 10.11

Reference Books

1. Vatsa, B. S., &SuchimVatsa. (2009). Discrete Mathematics.(IV Edition) New Age International Publications.
2. Mallik, D. S., &Sen, M. K.(2010). Discrete Mathematics Theory and Applications. (Revised Edition).Cengage Learning India Pvt Ltd.
3. Chauhan, P. (2015). Discrete Structures and Graph Theory. (VI Edition) Krishna Prakashan Media Pvt Ltd.
4. BernardKolman., RobertC. Busby., & Sharon Cutler Ross. (2009) Discrete Mathematical Structures.(VI Edition). PHI Learning Pvt Ltd.
5. Lovasz, L., Pelikan,J., &Vesztergombi, K.(2008). Discrete Mathematics Elementary and Beyond.(V Edition). Springer International Edition.

VALUE ADDED COURSE

Training for TNPSC and other Government Examinations

Course Code: VAM202

Objective

To face TNPSC group exams, other competitive examinations like SSE etc.

Unit I: General Science Physics:

Universe- general scientific laws - scientific instruments – inventions and discoveries,national scientific laborations – science glossary - mechanics and properties of matter – physical quantities, standards and units – force, motion and energy – electricity andmagnetism - heat, light and sound.

Basic Chemistry:

Elements and compounds – bases & salts fertilizers – pestilisers – pesticides ,insecticides

Botany:

Main concept of life science.

Zoology:

Blood & Blood circulation- human diseases preventions – communicable diseases

Unit II: Geography

Earth -universe – solar system – sivers in India- forest, wild life – minerals –population density.

Unit III: History & Culture Of India

Indian history – culture & heritage of Tamil people – effect of British rule on socioeconomic factors – social reforms & religious moments – Indian national movement.

Unit IV: Indian Polity & Indian Exonomy

Constitution of India – preamble – salient features of constitutions- parts.

Nature of Indian economy – t year plan models – land reform – agriculture – financecommission – planning commission.

Unit V: Mental Ability

Simplification – numbers – ratio and proportion – percentages – profit and loss – averages and mixtures – time and work – simple interest and compound interest- geometry and mensuration – statistics – data interpretation - alpha numeric reasoning – visual reasoning.

Books

1.Manorama Year Book

2.Samacheer school books.

Semester V

Major Core VII- Linear Algebra

Course Code: MC2051

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives: 1. To introduce the algebraic system of Vector Spaces, inner product spaces.

2. To use the related study in various physical applications.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	recall and define Groups ,Fields and their properties	PSO - 1	R
CO - 2	cite examples of vector spaces ,subspaces and linear transformations	PSO - 1	U
CO - 3	determine the concepts of linear independence, linear dependence , basis and dimension of vector spaces	PSO - 1	U
CO - 4	correlate rank and nullity ,Linear transformation and matrix of a Linear transformation	PSO - 2	Ap
CO - 5	examine whether a given space is an inner product space and the orthonormality of sets	PSO - 3	Ap

Unit I

Vector spaces - Definition and Examples - Subspaces - Linear transformation.

Unit II

Span of a Set - Linear Independence - Basis and Dimension- Rank and Nullity - Matrix of a Linear Transformation.

Unit III

Characteristic Equation and Cayley-Hamilton Theorem -Eigen values and Eigen vectors- Properties of Eigen values.

Unit IV

Inner Product Spaces - Definition and examples - Orthogonality - Orthogonal complement.

Unit V

Bilinear forms - Quadratic forms - Reduction of a quadratic form to the diagonal form- Partially ordered set-Lattices-Distributive Lattices-Modular Lattices-Boolean Algebra.

Text Book:

Arumugam, S., &ThangapandiIssac, A. (2011). Modern Algebra. Scitech Publications (India) Pvt. Ltd.

Chapter 5 : 5.1 t o 5.8; Chapter 6 : 6.1 to 6.3; Chapter 7: 7.7 & 7.8; Chapter 8 : 8.1 & 8.2; Chapter 9 : 9.1 to 9.5.

Reference Books:

1. Santiago, M. L. (2001). Modern Algebra. New Delhi: Tata McGraw Hill Publishing Company Ltd.
2. Krishnamoorthy, V., &Mainra, V. P. (1976). An Introduction to Linear Algebra.
3. New Delhi: Affiliated East West Press Pvt. Ltd.
4. Gopalakrishnan, N. S. (2015). University Algebra. (3^{rd}Edition). New Age International Publishers.
5. Vatsa, B. S., &SuchiVatsa. (2010). Modern Algebra. (2^{nd} Edition). New Age International Publishers.
6. Aloknath Chakrabarti. (2006). A First Course in Linear Algebra. Vijay Nicole Imprints Pvt .Ltd.

Semester V

Major Core VIII-Real Analysis II

Course Code: MC2052

No. of hours per week	Credit	Total No. of hours	Marks
6	5	90	100

Objectives: 1. To introduce Metric Spaces and the concepts of completeness, continuity, connectedness and compactness

2. To use these concepts in higher studies.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the concepts of completeness, continuity and discontinuity of metric spaces	PSO - 1	U
CO - 2	apply the metric space theorems to real life situations	PSO - 4	Ap
CO - 3	distinguish between continuous functions and uniform continuous functions	PSO - 5	An
CO - 4	use basic concepts in the development of real analysis results	PSO - 1	C
CO - 5	Understand the concepts of metric space, connectedness and compactness of metric spaces	PSO - 3	U
CO- 6	Develop the ability to reflect on problems that are quite significant in the field of analysis	PSO -2	Ap

Unit I

Metric Space - definition and examples - Bounded sets - Open ball - Opens sets – Subspace- Interior of a set - Closed sets - Closure - Limit point - Dense sets.

Unit II

Complete metric space - Cantor's intersection theorem - Baire's Category theorem, Contraction mapping- Definition and examples-Contraction mapping theorem.

Unit III

Continuity of functions - Composition of continuous functions - Equivalent conditions for continuity - Homeomorphism - Uniform continuity - Discontinuous functions on R.

Unit IV

Connectedness - Definition and examples - Connected subsets of R - Connectedness and continuity - Intermediate value theorem.

Unit V

Compactness - Compact space - Compact subsets of R - Equivalent Characterisations for Compactness - Compactness and continuity.

Text Book:

S. Arumugam., & Issac. (2013). Modern Analysis. New Gamma Publishing House.

Unit I- Chapter 2: Sections 2.0 to 2.10

Unit I- Chapter 3: Sections 3.0 to 3.2, Chapter 8: Section 8.1 (Upto theorem 8.2)

Unit III- Chapter: Sections 4.0 to 4.4

Unit IV- Chapter: Sections 5.0 to 5.3

Unit V- Chapter: Sections 6.0 to 6

Reference Books:

1. Bali, N. P. (2005). Real Analysis. Lakshmi Publications.
2. Richard., R. & Goldberg. (1973). Methods of Real Analysis. Oxford & IBH Publishing Co.
3. Sudhir., Ghorpade, R., Balmohan., & Limaye, V. (2006). A Course in Calculus and Real Analysis. Springer International Edition.
4. Protter, M. H., & Morrey, C. B. (1991). A First Course in Real Analysis. (2^{nd} Edition). Springer International Edition.
5. Norman., Haaser, B., & Joseph A. Sullivan. (1971). Real Analysis. Van Nostrand Reinhold Company.

Semester V

Major Core IX- Computer Oriented Numerical Methods

Course Code: MC2053

No. of hours per week	Credits	Total No. of hours	Marks
6	**4**	90	100

Objectives:

1. To provide suitable and effective numerical methods, for computing approximate numerical values of certain raw data.
2. To lay foundation of programming techniques to solve mathematical problems.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the elementary programming language and its structure	PSO - 4	U
CO - 2	develop computer programmes for the solution of various numerical problems	PSO - 5	C
CO - 3	apply numerical methods to obtain approximate solutions to mathematical problems	PSO - 3	Ap
CO - 4	employ different methods of constructing a polynomial using various methods	PSO - 2	A
CO - 5	compare the rate of convergence of different numerical formula	PSO - 4	An
CO - 6	distinguish the advantages and disadvantages of various numerical methods	PSO - 4	An

Unit I

Basis structure of C programs – C Tokens – Keywords and Identifiers - Constants – Variables – Data Types – Operations and Expressions – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators - Bitwise Operators - Special Operators – Managing Input and Output Operations – Formatted Input [Excluding Inputting Integer Numbers] - Formatted Output [Excluding Output of Integer Numbers] .

Unit II

Decision making and Branching – Decision making with IF statement – Simple IF statement – The IF…. Else statements – Nesting of IF... Else statements- The GOTO statement - Decision making and Looping – The WHILE Statement – The DO Statement – The FOR Statement.

Unit III

Solutions of algebraic and transcendental equations. Iteration method - Newton Raphson method – *programs in C for Newton Raphson method*- Interpolation - Newton's Interpolation formulae –*programs in C for Newton's Forward Interpolation and Backward Interpolation*- Lagrange's Interpolation formula.

Unit IV

Numerical differentiation - derivatives using Newton's forward difference formula - Newton'sbackward difference formula - Numerical integration - Newton cote's - quadrature formula - Trapezoidal rule - *programs in C for Trapezoidal rule*.

Unit V

Simpson's $(1/3)^{rd}$ rule - *programs in C for Simpson's one - third rule*- Simpson's $(3/8)^{th}$ rule- Numerical solution of differential equation - Taylor's series method - Picard's method.

Text Book:

1. Programming in ANSI C, E. Balagurusamy, McGraw Hill Education (India) private Limited.(Eighth Edition)

Chapter: 2; page: 28
Chapter: 3; pages: 41-42, 45-47
Chapter: 4; pages: 68-77
Chapter: 5; pages: 105, 113-114
Chapter: 6; pages: 131-133,135-140, 153-154,
Chapter: 7; pages: 173-179
In all the chapters worked –out problems are excluded.

2. Arumugam, S.,Thangapandi Issac, A., &Somasundaram, A. (2002). Numerical

Methods. Scitech Publications Pvt. Ltd.
Chapter 3: Sections 3.0, 3.2 & 3.5;
Chapter 7: Sections 7.1, 7.3;
Chapter 8: Sections 8.1, 8.2 & 8.5 (except Weddle's rule, Boole's rule & Romberg's method) & Chapter 10: Sections 10.1 &10.2.
Chapter 12: Sections 12.6, 12.13, 12.14, 12.19, 12.20
Practical: Topics in Italics from Unit III to Unit V.

Reference Books:

1. Sastry, S.S. (2003). Introduction methods of numerical analysis. (3^{rd} Edition). Prentice Hall of India.
2. Scar Borough, J.N. (1966). Numerical mathematical analysis. (6^{th} Edition). Oxford and IBH Publishing Co.
3. Gupta, P. P., G.S.Malik., & Sanjay Gupta. (1992). Calculus of finite differences and numerical analysis. (16^{th} Edition). KRISHNA Prakashan Mandir.
4. Devi Prasad. (2010). An Introduction to Numerical Anaysis. Narosa Publishing House.
5. Bhupendra Singh. (2012). Numerical Analysis. (2^{nd} Edition). Pragati Prakashan Educational Publishers.

Semester V
Project
Course Code : MC20PR

No. of hours per week	Credits	Total No. of hours	Marks
5	**5**	75	100

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	choose a new topic of their interest	PSO - 1	U
CO - 2	develop the attitude of studying a topic in depth independently	PSO - 4	An
CO - 3	express their views with confidence in a group	PSO - 1	U
CO - 4	relate with the group members and reap the best harvest	PSO - 3	Ap
CO - 5	develop communication skills through oral presentation	PSO - 4	An
CO - 6	create a taste for research in mathematics	PSO - 5	C
CO - 7	develop confidence to face interviews	PSO - 5	C
CO - 8	Interpret and analyze data mathematically	PSO - 4	An

Project framework

1. The Project format should be in:

o **Font - Times New Roman**

o **Heading - Font size 14 (Bold) - Uppercase**

o **Sub headings - Font size 12 (Bold) — Lowercase; should be numbered.(Eg: Introduction 1; Subheading 1.1; 1.2)**

o **Text, the content of the dissertation — Font size -12 (Normal).**

o Citation - Any works of other researchers, if used either directly or indirectly should be indicated at appropriate places in the text.

The citation may assume any one of the following forms:

i) A paper, a monograph or a book with single author may be designated by the name of the *fast* author followed by the year of publication, placed inside brackets at the appropriate places in the text.

ii) A paper, a monograph or a book with two authors may be designated by the name of the first and second author followed by the year of publication, placed inside brackets at the appropriate places in the text.

iii) A paper, a monograph or a book with more than two authors may be designated by the name of the first author followed by et al, and the year of publication, placed inside brackets at the appropriate places in the text.

o **Line space - 1.5**

o **Margin - 2" on the left and 1" on the right, Gutter -0.5.**

o **Page Numbering — Bottom middle alignment; excluding initial pages and reference** o **Total number of pages - Minimum 30 - Maximum 50 (excluding initial pages andreference).**

o **The Tables and Figures should be included subsequently after referring them in thetext of the Thesis.**

o **The thesis from Chapters should be printed on both sides.**

II. Project Report must be completed within the stipulated

time .

III Submission of Project Report:

o one soft copy (PDF format in CD)

o three hard copies (soft binding) duly signed and endorsed by the Supervisor and the Head.

The Project Report **will have three main parts:**

I. Initial Pages - in the following sequence

i.Title Page

ii.Certificate from the Supervisor

iii.Declaration by the candidate endorsed by the Supervisor and HOD.

iv.Acknowledgement (within one page - signed by the candidate).

v. Table of Contents

vi. List of abbreviations

vii.Abstract

II. Main body of the dissertation

i.Introduction with Literature review and Objectives

ii.Methodology

iii. Results

iv.Discussion

v.Summary

vi.References

III Reference

The guidelines for reference

Journal Article : with Single Author

Waldron, S 2008, "Generalized Welch bound equality sequences are tight frames", IEEE Transactions on Information Theory, vol. 49, no. 9, pp. 2307-2309.

Journal Article : with Two Authors

Conley, TG & Galeson, DW 1998, "Nativity and wealth in mid-nineteenth century cities", Journal of Economic History, vol. 58, no. 2, pp. 468-493. **Journal Article : with more than two Authors**

Alishahi, K, Marvasti, F, Aref, VA & Pad, P 2009, „Bounds on the sum capacity of synchronous binary CDMA channels", Journal of Chemical Education, vol. 55, no. 8, pp. 3577-3593.

Books

Holt, DH 1997, Management Principles and Practices, Prentice-Hall, Sydney. Centre forResearch, M S University - Ph.D. Revised Guidelines Page | 39 / 41

E-book

Aghion, P &Durlauf, S (eds.) 2005, Handbook of Economic Growth, Elsevier, Amsterdam.Available from: Elsevier books. [4 November 2004]. **Conference Proceeding Paper with editors**

Riley, D 1992, „Industrial relations in Australian education", in Contemporary Australasian industrial relations: proceedings of the sixth AIRAANZ conference, ed. D. Blackmur, AIRAANZ, Sydney, pp. 124-140. **Conference Proceeding Paper without editors**

Fan, W, Gordon, MD & Pathak, R 2000, "Personalization of search engine services for effective retrieval and knowledge management", Proceedings of the twenty-first internationalconference on information systems, pp. 20-34. **Website**

Australian Securities Exchange 2009, Market Information. Available from: . [5 July 2009].

Thesis

Unpublished Hos, JP 2005, Mechano chemically synthesized nano materials for intermediatetemperature solid oxide fuel cell membranes. Ph.D. thesis, University of Western Australia.

Newspaper Print Ionesco, J 2001, 'Federal election: new Chip in politics', The Advertiser 23October, p. 10.

Semester V

Elective I: (a) Graph Theory

Course Code: MC2055

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives: 1. To introduce graphs and the concepts of connectedness, matchings, planarity and domination.

2. To apply these concepts in research.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the basic definitions to write the proofs of simple theorems	PSO - 1	U
CO - 2	employ the definitions to write the proofs of simple theorems	PSO - 2	Ap
CO - 3	relate real life situations with mathematical graphs	PSO - 3	Ap
CO - 4	develop the ability to solve problems in graph theory	PSO - 4	An
CO - 5	analyze real life problems using graph theory both quantitatively and qualitatively	PSO - 4	An

Unit I

Basics - Graphs - Pictorial representation - Subgraphs - Isomorphism and degrees Walks and connected graphs - Cycles in graphs - Cut-vertices and cut-edges.

Unit II

Eulerian and Hamiltonian graphs - Eulerian graphs - Fleury's algorithm (omitting theorem 2.5) - Hamiltonian graphs - Weighted graphs - Chinese Post-man Problem - Travelling Sales-man Problem Bipartite graphs - Trees.

Unit III

Planar graphs - Euler formula - Platonic solids - Dual of a plane graph - Characterization of planar graphs - Colourings - Vertex colouring - Edge colouring - An algorithm for vertex colouring.

Unit IV

Directed Graphs - Connectivity in digraphs - Strong orientation of graphs - Eulerian digraphs - Tournament.

Unit V

Theory of Domination in Graphs - Dominating Sets, Relationship between independent sets and dominating sets, Irredundant sets, Upper Bounds and Lower Bounds for the Domination Number $\gamma(G)$.

Text Books:

1. S. A. Choudum, A First Course in Graph Theory, Macmillan India Ltd., 2011.
   Chapter 1: Sections 1.1 – 1.7;
   Chapter 2: Sections 2.1, 2.2 (omitting theorem 2.5), 2.3 & 2.4;
   Chapter 3: Sections 3.1 & 3.3;
   Chapter 5: Sections 5.1 – 5.5;
   Chapter 6: Sections 6.1 – 6.3;
   Chapter 7: Sections 7.1 – 7.5.

2. V. R. Kulli, (2010). Theory of Domination in Graphs. Vishwa International Publications, Gulbarga.
   Chapter 2: 2.1 – 2.4.

Reference Books:

1. Arumugam, S., & Ramachandran, S. (2017). Invitation to Graph Theory. Scitech Publications Pvt. Ltd.
2. Kumaravelu, S., & Susheela Kumaravelu. (1999). Graph Theory. (1^{st} Edition). Printers Janki calendar corporation, Sivakasi.
3. Harary F. (1988). Graph Theory. Narosa Publishing House.
4. Gary Chartrand., & Ping Zhang. (2006). Introduction to Graph Theory. McGraw-Hill Edition Pvt. Ltd.
5. Suresh Singh, G. (2010). Graph Theory. PHI Learning Private Limited, New Delhi.

Semester V

Elective I: (b) Fuzzy Mathematics

Course Code: MC2056

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives: 1. To understand Fuzzy concepts of sets and operations.

2. To apply the Fuzzy concepts in image processing, machine learning and artificial intelligence.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the basic mathematical operations carried out on fuzzy sets	PSO - 1	U
CO - 2	compare fuzzy sets with crisp sets	PSO - 4	An
CO - 3	explain classical logic and fuzzy logic	PSO - 1	U
CO - 4	describe the significance of fuzzy systems and genetic algorithms	PSO - 1	U
CO - 5	solve problems that are appropriately solved by neural networks , fuzzy logic and genetic algorithms	PSO - 3	Ap
CO - 6	apply the concepts fuzzy systems and neural networks in various fields like machine intelligence and robotics	PSO - 2	Ap
CO - 7	differentiate between Possibility theory and Probability theory	PSO - 4	An

Unit I

Crisp set - Operations on Crisp Set - Fuzzy Set -Types of Fuzzy set - Operations on Fuzzy Sets - Properties of operation on Fuzzy Sets - Product on Fuzzy Sets. Fuzzy Numbers Linguistic Variables - Fuzzy Arithmetic.

Unit II

Operation On Fuzzy Numbers, Fuzzy Equations - Lattice of Fuzzy Numbers - Classical Logic - Logical Connectives - Truth Values and Truth Tables - Algebra of Statements - Logical Identies and implications - Fuzzy Logic - Fuzzy Logic Truth Tables -Fuzzy Connectives. Fuzzy Grammar - Properties of Modifier - Inference Rules.

Unit III

Relations on Fuzzy set - Composition of Fuzzy Relation - Fuzzy Equivalence Relation - Fuzzy ordering relation - operations on fuzzy Relation - Role of Fuzzy Relation Equation.

Unit IV

Fuzzy Data Mining - Fuzzy Systems Neural Network - Fuzzy Automata - Fuzzy Systems and Genetic Algorithm.

Unit V

Fuzzy Measure, Evidence Theory - Dempster Rule of Combination - Marginal Basic Assignment - Possibility Theory - Possibility Theory versus Probability Theory.

Text Book:

HoodaVivekRaich, D.S. (2015). Fuzzy Set Theory and Fuzzy Controller. Narosa Publishing House.
Chapter 1: 1.2 - 1.6; Chapter 2: 2.2 - 2.7; Chapter 3: 3.2 - 3.12;
Chapter 4 : 4.2 - 4.7; Chapter 5: 5.2- 5.6 & Chapter 6: 6.2 - 6.7.

Reference Books:

1. Zimmermann, H. J. (2001). Fuzzy Set Theory And Its Applications. (4^{th} Edition). Springer International Edition.
2. Bhargava, A. (2013). Fuzzy Set Theory Fuzzy logic and their Application. S.Chand Publishing.
3. Ganesh, M. (2006). Fuzzy sets and Fuzzy logic. Prentice Hall India learning private limited.
4. Shinghal. (2012). Introduction to Fuzzy logic. Prentice Hall India learning private Limited.
5. Nanda, S.,& Das, N. R. (2015). Fuzzy Mathematical Concepts. Narosa Publishing House Pvt. Ltd.

Semester V
Elective I: (c) Object Oriented Programming with C++
Course Code: MC2057

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives: 1. To learn and write programmes in C++ Language.

2. To enhance job opportunities.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	apply C++ features to program design and implementation	PSO - 3	Ap
CO - 2	explain object oriented concepts and describe how they are supported by C++	PSO - 1	U
CO - 3	use C++ to demonstrate practical experience in developing object oriented solutions	PSO - 2	Ap
CO - 4	design and implement programs using C++	PSO - 3	Ap
CO - 5	analyze a problem description and design object oriented software using good coding practices and techniques	PSO - 4	An
CO - 6	implement an achievable practical applications and analyze issues related to object oriented techniques in the C++ programming language	PSO - 5	C
CO – 7	use common software patterns in object oriented design and recognize their applicability to other software development contexts	PSO – 1	U
CO - 8	create application using C++ programming language	PSO - 5	C
CO - 9	write algorithm for programs	PSO - 1	U

Unit I

Basic concepts of object - oriented programming - benefits of OOP - applications of C++ - simple program - more statements - structure of C++ program - creating the source file - compiling and linking.

Unit II

Tokens - keywords - identifiers and constants - basic data types - user defined data types - derived data types - symbolic constants - variables - operators - manipulators - expressions and their types - operator overloading - operator precedence - control structures.

Functions in C++ - main function - function prototyping - call by reference - return by reference - in line functions - default argument - function overloading - math library functions.

Unit III

Classes and objects - defining member functions - C++ program with class - member functions - arrays within a class - arrays of objects - objects as function arguments - returning objects - constant member functions - pointer to members.

Unit IV

Constructors - parametrized constructors - multiple constructors - constructors with default arguments - dynamic initialization - copy constructor - dynamic constructor - constructing two dimensionl arrays - destructors. Defining operator overloading - overloading unary operators - manipulation of string using operators.

Unit V

Defining derived class - single inheritance - multilevel inheritance - hierarchial inheritance - hybrid inheritance - virtual base classes - abstract classes - nesting classes - basic concepts in pointers.

Text Book:

Balagurusamy, E. (2011). Object oriented programming with C++. (5^{th} Edition). (TMH).TataMaGraw Hill Publication.

Chapter 1: Sections 1.5 - 1.8 ; Chapters 2 to 8 and Chapter 9: Sections 9.1, 9.2.

Reference Books:

1. Ravichandran, D. (2002). Programming with C^{++} .Tata MaGraw Hill Publication.
2. Paul Deitel.,& Harvey Deitel. (2013). C++ How to program. (8^{th} Edition).PHI Learning Private Limited Publication.
3. Stanley Hoffman. (2015). C++: For Beginners. Addison - Wesley professional.
4. BjarneStroustrup. (2014). Programming: Principles and practice using C++. (2^{nd} Edition).Addison - Wesley professional.
5. Scott Meyers, (2014). Effective C++. (1^{st} Edition). O 'Reilly Media.

Semester V

Part IV

Ability Enhancement Course

Environmental Studies

Course Code: AEC201

Hours per Week	Credits	Total Hours	Marks
2	2	30	100

Objectives

- To understand the ecosystem, biodiversity and their conservation
- To make them identify the impact of pollution , disaster and population

Course outcomes

CO	Upon completion of this course the students will be able to:	CL
CO - 1	understand the multidisciplinary nature of environmental studies	U
CO - 2	recall the components of different ecosystems	R
CO - 3	interpret the levels of diversity and its conservation	A
CO - 4	analyze the impact of population, pollution and disasters	An

Unit I Multidisciplinary nature and Natural Resources (6 hrs)

Multidisciplinary nature of environmental studies – scope of environmental studies- natural resources - renewable and non renewable resources – land, water, forest and energy resources.

Unit II Eco system (6 hrs)

Ecosystem – components –types – structure and function – food chain – food web – major ecosystems- forest, grass land, desert and aquatic - pond, marine and river ecosystems.

Unit III Biodiversity and conservation (6 hrs)

Definition – magnitude of biodiversity - levels of diversity – biogeographical classification of India – Biodiversity hotspots in India – Himalayas, Indo Burma, Western Ghat and Sunderland, Endemic, Endangered Red Data Book - Insitu and Exsitu conservation.

Unit IV Environmental Pollution (6 hrs)

Pollution – types, sources and effects of air, water, soil, noise, radioactive and plastic pollutions - Role of an individual in prevention of pollution.

Unit V Social Issues and Environment (6 hrs)

Disaster - cyclone, flood, drought, earthquake and management - Population explosion – impact of population, growth on environment and social environment.

Reference books

1. Sharma R.C, Gurbir sangha, (2018). Environmental Studies. New Delhi: Kalyani Publishers,
2. Murugeshan. R, (2014).Environmental studies, Madurai: Millennium publishers and distributors,
3. Arumugam.N, Kumaresan.V, (2012). Environmental Studies. Nagercoil: SARAS Publication.
4. Dr.Asthana.D.K., Dr.Meera Asthana, (2010). Environmental Studies. New Delhi: S.Chand & Company Ltd.,
5. Beny Joseph, (2018). Perspectives in Environmental Studies. New Age International Publishers.

Semester V
Part V
Foundation Course Ill - Human Rights Education (HRE)
Course. Code: FCV203

Objectives

1. Make them to identify issues, problems and violation of human rights.
2. Resolve the problems of human rights in their own life and society.

Course outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	explains the historical growth of the idea of human rights.		U
CO - 2	interpret the problems of human rights and find solution.		A
CO - 3	analyze the importance of women and child rights		An
CO - 4	evaluate concepts and ideas of human rights		E

Unit I

Social Justice - Need for Social Justice, Parameters of Social justice. Untouchability - problems, causes, casteism. Social reformers - contributions of Dr. B.R. Ambedkar and E.V. Ramasamy. Role of Mandal commissions in Social justice - Social, educational, economic indicators and recommendations

Unit II

Human Rights - approaches and concept of human rights. United Nations - UN commission on Human rights, other UN bodieson Human rights. Fundamental rights of Indian Citizen.Fundamental duties of Indian Citizen. Political rights of Indian Citizen. Human rights concern in India.

Unit III

Women Rights - History and need of women rights. United Nation on women rights - issues by identified United Nation. Women and climate change. Women rights and problems. Problem faced by women during medieval and modern India.

Unit IV

Gender inequality - seven types of inequality. Constitutional and legal provision for women in India. Special initiatives for women. Women struggle and reforms. Women today.

Unit V

Child Rights: History and declaration of rights of children. Convention on rights of child, Child rights in India. National commission on women rights. Issues faced by women. Constitutional and Legal provision in India. Child rights in Indian Constitution.

Reference Book

Dr. Arymugam, N., Dr. Mohana., & Lr. Palkani. (2017). Value Based Education. (4th ed.). TamilNadu, Saras Publication

Semester VI

Major Core X- Complex Analysis

Course Code: MC2061

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives: 1. To introduce the basic concepts of differentiation and integration of Complex functions.

2. To apply the related concepts in higher studies.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	understand the geometric representation of mappings	PSO - 1	U
CO - 2	use differentiation rules to compute derivatives and express complex- differentiable functions as power series	PSO - 4	E
CO - 3	compute line integrals by using Cauchy's integral theorem and formula	PSO - 3	E
CO - 4	identify the isolated singularities of a function and determine whether they are removable, poles or essential	PSO - 1	U
CO - 5	evaluate definite integrals by using residues theorem	PSO - 5	C

Unit I

Analytic functions - Differentiability, Cauchy Riemann equations, sufficient conditions, complex form of Cauchy Riemann equations, polar form of Cauchy Riemann equations analytic functions, harmonic function.

Unit II

Bilinear transformations - Elementary transformations (Definitions only), Bilinear transformations, Cross ratio, fixed points of Bilinear transformations, Mapping by elementary Functions- Mappings $w = z^2$, e^z, Sinz, Cosz, Coshz.

Unit III

Complex integration - Definite Integral, Cauchy's theorem, Cauchy's integral formula, Maximum modulus theorem.

Unit IV

Series Expansions - Taylor Series, Laurent's Series, Zeros of Analytic Functions, Singularities. (Definitions & examples only).

Unit V

Calculus of Residues - Residues, Cauchy's Residue theorem, Argument theorem, Rouche's theorem, Fundamental theorem of algebra, Evaluation of definite integrals (Type 1only).

Text Book:

Arumugam, S., ThangapandiIssac, A., &Somasundaram, A. (2018). Complex

Analysis.Scitech publications.
Chapter 2: Sections 2.5 - 2.8;Chapter 3: Sections 3.1 - 3.4;
Chapter 5: Sections 5.1 - 5.6;Chapter 6: Sections 6.1 - 6.3;
Chapter 7: Sections 7.1- 7.4 & Chapter 8: Sections 8.1 - 8.3 (Type 1 only)

Reference Books:

1. Goyal., Gupta., &Pundir. (2012). Complex Analysis. (1^{st} Edition). Pragati Prakashan Educational Publishers.
2. DuraiPandian, P.,LaxmiDuraiPandian., &Muhilan, D. (2001). Complex Analysis. Emerald Publishers.
3. Duraipandian, P., &KayalalPachaiyappa. (2014). Complex Analysis. (1^{st} Edition). S. Chand and Company Pvt. Ltd.
4. Ruel V. Churchill.,& James Ward Brown. (1990). Complex Variables and Applications. McGraw-Hill International Edition.
5. Anuradha Gupta.(2011). Complex Analysis. Ane Books Pvt. Ltd.

Semester VI

Major Core XI- Mechanics

Course Code: MC2062

No. of hours per week	Credits	Total No. of hours	Marks
6	5	90	100

Objectives: 1. To visualize the application of Mathematics in Physical Sciences.

2.To develop the capacity to predict the effects of force and motion

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	calculate the reactions necessary to ensure static equilibrium	PSO - 2	U
CO - 2	apply the principles of static equilibrium to particles and rigid bodies	PSO - 4	Ap
CO - 3	understand the ways of distributing loads	PSO - 5	C
CO - 4	identify internal forces and moments of a rigid body	PSO - 3	Ap
CO - 5	apply the basic principles of projectiles into real world problems	PSO - 2	Ap
CO - 6	classify the laws of friction	PSO - 4	An

Unit I

Forces Acting at a Point: Resultant and Components - Sample cases of finding the resultant – Analytical expression for the resultant of two forces acting at a point – Triangle forces – Perperndicular Triangular forces – Converse of the Trigangle of Forces- The Polygon of Forces -Lami's Theorem - Parallel Forces, like and unlike parallel forces - Equilibrium of three coplanar forces - Centre of two parallel forces - Moments - Varignon's theorem of moments - Generalised theorem of moments.

Unit II

Couples – Equilibrium of two couples –Representation of a couple by a vector – Resultant of coplanar couples – Resultant of couple and a force - Coplanar Forces - Reduction of any number of coplanar forces - Conditions for a system of forces to reduce to a single force or a couple - Change of the base point - Equation to the line of action of the resultant - Solution of problems.

Unit III

Friction: Introduction – Experimental Results - Statical, Dynamical and Limiting friction - Laws of friction - Coefficient of friction - Angle of friction - Cone of friction –

Numerical values - Equilibrium of a body on a rough inclined plane - Problems on friction.

Unit IV

Projectiles - Equation of path - Characteristics of the motion of the projectile - Maximum horizontal range - Two directions of projection for a given velocity - Velocity of the projectile.

Unit V

Motion under the action of central forces – Velocity and Acceleration in Polar Coordinates – Equation of Motion in Polar Coordinates – Note on the equiangular spiral – Motion under a central force – Differential Equation of central orbits – Perpendicular from the pole on the tangent – Pedal equation of the central orbit – Pedal equation of some of the well-known curves – Velocities in a central orbit – Two – fold problems in central orbits

Text Books:

1. Venkataraman, M. K. (2012). Statics. (15^{th} Edition). Agasthiar Publications.
   Chapter 2 : Sections 2.1- 2.9;
   Chapter 3: Sections 3.1 to 3.13;
   Chapter 4 : Sections: 4.1,4.2,4.5- 4.10
   Chapter 6: Sections 6.1 to 6.3(Analytical proof only), 6.5, 6.7, 6.8 &
   Chapter 7 : Sections 7.1 to 7.13 (upto example 15).
2. Venkataraman, M. K. (2012). Dynamics. (15^{th} Edition). Agasthiar Publications.
   Chapter 6 : Sections 6.1 to 6.10
   Chapter 11 : Sections 11.1 to 11.11

Reference Books:

1. Durai Pandian, P., Lexmi Durai Pandian.,& Muthamizh Jayapragasam. (2011). Mechanics. Chand S. & Company Ltd.
2. Rajeshwari, I. (2016). Mechanics. (1^{st} Edition). Saras Publication.
3. Chaudhry, K. R., & Aggarwal, A. C. (1983). Elements of Mechanics. Chand, S.& Company Ltd.
4. Mathur, D. S. (1985). Mechanics. S.Chand & Company Ltd.
5. John., Synge, L., Byron., & Griffith, A. (1970). Principles of Mechanics. (International Student Edition). McGraw - Hill Kogakusha Ltd.

Semester VI

Major Core XII- Number Theory

Course Code: MC2063

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives: 1. To introduce the fundamental principles and concepts in Number Theory.

2. To apply these principles in other branches of Mathematics.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	express the concepts and results of divisibility of integers effectively	PSO - 1	U
CO - 2	construct mathematical proofs of theorems and find counter examples for false statements	PSO - 2	Ap
CO - 3	collect and use numerical data to form conjectures about the integers	PSO - 5	Ap
CO - 4	understand the logic and methods behind the major proofs in Number Theory	PSO - 4	An
CO - 5	solve challenging problems related to Chinese remainder theorem effectively	PSO - 3	E
CO - 6	build up the basic theory of the integers from a list of axioms	PSO - 1	U

Unit I

Divisibility Theory in the Integers - The Division Algorithm -The greatest common divisor - The Euclidean Algorithm.

Unit II

The Diophantine Equation $ax + by = c$ - Primes and Their Distribution -The fundamental theorem of arithmetic - The Sieve of Eratosthenes.

Unit III

The Theory of Congruences - Basic properties of congruence - Linear congruences and the Chinese remainder theorem.

Unit IV

Fermat's Little theorem and Pseudo primes - Absolute pseudo primes - Wilsons theorem - Quadratic Congruence.

Unit V

Number Theoretic Functions - The sum and number of divisors -The Mobius Inversion formula - The greatest integer function.

Text Book:

David .M. Burton. (2017). Elementary Number Theory. (7^{th} Edition). McGraw Hill Education (India) Private Limited.

Chapter 2: Sections 2.2 - 2.5 ; Chapter 3: Section 3.1 & 3.2

Chapter 4: Sections 4.2, 4.4; Chapter 5: Sections 5.2, 5.3
Chapter 6: Sections 6.1- 6.3

Reference Books:

1. Ivan Niven., & Herbert S. Zucker man. (1976). An Introduction to the Theory of Numbers. Wiley Eastern limited.
2. Kumaravelu., & Sucheela Kumaravelu. (2002). Elements of Number Theory. Raja Sankar Offset Printers.
3. Hardy, G.H., & Wright, E.M. (1975). An introduction to the theory of Numbers. (4^{th} Edition). Oxford at the Clarendon Press.
4. Tom M. Apostel. (1998). Introduction to Analytic Number Theory. Narosa Publishing House.
5. John Sitillwell. (2009). Elements of Number Theory. Springer International Student Edition.

Semester VI

Major Core XIII- Linear Programming

Course Code: MC2064

No. of hours per week	Credits	Total No. of hours	Marks
5	4	75	100

Objectives: 1. To formulate real life problems into mathematical problems.

2. To solve life oriented and decision making problems by optimizing the objective function.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSOs addressed	CL
CO – 1	understand the methods of optimization and to solve the problems	PSO - 1	U
CO – 2	explain what is an LPP	PSO - 1	U
CO – 3	define how to formulate an LPP with linear constraints	PSO - 1	R
CO – 4	maximize the profit, minimize the cost, minimize the time in transportation problem , Travelling salesman problem, Assignment problem	PSO - 3	Ap
CO – 5	identify a problem in your locality, formulate it as an LPP and solve	PSO - 4	C

Unit I

Formulation of L.P.P - Mathematical Formulation of L.P.P - Solution of L.P.P - Graphical method - Simplex method - Big-M Method - Algorithm for Big-M Method -

Unit II

Two phase method - Phase I: Solving auxiliary LPP using Simplex method - Phase II: finding optimal basic feasible solution- Duality in L.P.P - Primal - Formation of dual L.P.P - Matrix form of primal and its dual - Fundamental theorem of duality - Dual simplex method - Dual Simplex Algorithm -Degeneracy and cycling in L.P.P.

Unit III

Transportation problems - Mathematical formulation of Transportation Problems - Dual of a Transportation Problem - Solution of a Transportation Problem - North-West corner rule - Row Minima method - Column Minima method - Least Cost method - Vogel Approximation Method – Degeneracy in Transportation Problems

Unit IV

Assignment Problems - Mathematical formulation - Solution to Assignment Problems - Hungarian Algorithm for solving Assignment Problems -Travelling Salesman Problem.

Unit V

Sequencing of Jobs- Introduction- Processing n jobs in two machines- Processing n jobs in m machines- Processing two jobs in m machines

Text book:

Arumugam, S., &Thangapandi Issac, A. (2015). Operations Research (Linear Programming). (1^{st} Edition). New Gamma Publishing house.

Chapter 3: 3.1 - 3.7, 3.9, 3.10 & 3.11; Chapter 4 : 4.1 & 4.2

Chapter 5: 5.1, 5.2 ; Chapter 8: 8.0 to 8.3

Reference Books:

1. Gupta, P.K., & Hira, D.S. (1997). Operations Research. S.Chand and Co. Ltd.
2. Sankara Narayanan, T., & Joseph A. Mangaladoss. (2004). Operations Research. (5^{th} Edition). Persi - Persi Publications.
3. Handy, A. Taha. (1989). Operations Research - An Introduction. (3^{rd}Edition). Mac Millan Publishing Co. Inc.
4. Vittal, P. R., & Malini, V. (2013). Operations Research. Margham Publications.
5. Sharma, J. K. (2013). Operations Research – Theory and Applications. (5^{th} Edition). Macmillan Publishers India Ltd.

Semester VI

Elective II: (a) Astronomy

Course Code: MC2065

No. of hours per week	Credits	Total No. of hours	Marks
6	4	90	100

Objectives: 1. To introduce space science and to familiarize the important features of the planets, sun, moon and stellar universe.

2. To predict lunar and solar eclipses and study the seasonal changes.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO – 1	define the spherical trigonometry of the celestial sphere	PSO - 1	U
CO – 2	discuss the Kepler's laws	PSO - 1	U
CO – 3	calculate the motion of two particles relative to the common mass centre	PSO - 2	Ap
CO – 4	interpret latitude and longitude and apply this to find the latitude and longitude of a particular place	PSO - 4	E
CO – 5	distinguish between Geometric Parallax and Horizontal Parallax	PSO - 4	An

Unit I

Spherical trigonometry (only the four formulae) - Celestial sphere - Four systems of coordinates - Diurnal motion - Sidereal Time - Hour angle and Azimuth at rising - Morning and Evening stars - Circumpolar stars.

Unit II

The Earth - Zones of the earth - Perpetual Day and Perpetual night - Terrestrial latitude and longitude - Dip of Horizon - Twilight, Duration of Twilight, Twilight throughout night, Shortest Twilight.

Unit III

Geocentric parallax - Parallax - Effects of Geocentric parallax – Changes in R.A and Declination of a body due to Geocentric Parallax - Angular diameter – Equatorial horizontal Parallax - Heliocentric Parallax – Effect of Heliocentric Parallax – To find the effect of Parallax on the Longitude and Latitude of a Star - Parsec

Unit IV

Kepler's laws - Eccentricity of Earth's orbit –Verification of Kepler's Laws (1) and (2) - Newton's deductions from Kepler's laws – To derive Kepler's Third Law from Newton's law of Gravitation –To find the mass of a planet – To fix the position of a planet in it's elliptic orbit – Geocentric and Heliocentric latitudes and longitudes – To prove that the Heliocentric longitude of the Earth and Geocentric longitude of the Sun differ by 180^{o}

Unit V

Two Body Problem -Introduction – Newton's Fundamental equation of Motion – Motion of one particle relative to another- The motion of the common centre of mass- Motion of two particles relative to the common mass centre – Motion of a planet with respect to the Sun

Text Book:

Kumaravelu, S., & Susheela Kumaravelu. (2012). Astronomy. (10^{th}Edition).

Chapter 2: art 39 to Art 83; Chapter 3: Art 93 & Art 106 to 116;

Chapter 5: Art 135 to143 & 145; Chapter 6: Art 146 to 156, 164 &165;
Chapter 8: Art 190 to 194; Chapter 16: Art 321 to 326

Reference Books:

1. Subramanian, K., Subramanian, L. V.,Venkataraman., & Brothers. (1965). A text book of Astronomy. (1^{st} Edition). Educational Publishers.
2. Ramachandran, G. V. (1970). A text book of Astronomy. (7^{th} Edition). Theni Printers.
3. Daniel Fleish., Julia Kregenow. (2013). Mathematics of Astronomy. (1^{st} Edition). Cambridge University Press. NewYork.
4. Smart, W. M. (1949). Spherical Astronomy. (4^{th} Edition). Cambridge university press.
5. Jean Meeus. (2002). More Mathematical Astronomy morsels. (1^{st} Edition). Willmann Bell Publishing

Semester VI

Elective II: (b) Boolean Algebra

Course Code: MC2066

No. of hours per week	Credits	Total No. of hours	Marks
6	4	90	100

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Objectives: 1. To introduce the algebraic structures like lattices and Boolean algebra.

2. To apply these concepts in various branches of Mathematics.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	discuss the primary concepts of Lattices and Boolean algebra	PSO - 1	U
CO - 2	recognize upper bound, lower bound, greatest lower bound	PSO - 1	R
CO - 3	differentiate between lattices and complete lattices	PSO - 1	U
CO - 4	relate the concepts of lattice homomorphism and isomorphism	PSO - 2	Ap
CO - 5	formulate problems in Lattices and Boolean Algebra	PSO - 5	C

Unit I

Partially ordered sets - Chain - Upper and lower bounds - Least upper bound and greatest lower bound - Problems.

Unit II

Lattices - Complete lattice - Principle of duality - Sub lattices - Problems.

Unit III

Lattice homomorphism - Isomorphism theorem - Modular lattice - The chain conditions - Schreier's theorem - Problems.

Unit IV

Decomposition theory for lattices with Ascending chain conditions - Independence - Complemented modular lattice - Problems.

Unit V

Boolean Algebras - elementary properties of complements in Boolean Algebras -Stone's theorem - problems.

Text Books:

1. Jacobson, N. (1965). Lectures in Abstract Algebra. (1^{st} Edition). New Delhi:

   Affliated East- West Press Private Ltd.

   Chapter 7.

2. Arumugam, S. (2008). Modern Algebra. Scitech publications.

   Problems only.

Reference Books:

1. Vijay Khanna, K., Bhambri, S. K. (1994). Lattices and Boolean Algebra. Vikas Publishing House.
2. Sharma, J. K. (2011). Discrete Mathematics. (3^{rd} Edition). Macmillan Publishers India Ltd.
3. Goodstein, R.L. (2007). Boolean Algebra. Dover Publications Inc.
4. Bradford Henry Arnold. (2011). Logic and Boolean Algebra. Dover Publications Inc.
5. Steven Givant., & Paul halmos. (2009). Introduction to Boolean Algebras. Springer.

Semester VI

Elective II: (c) Web Designing with HTML

Course Code: MC2067

No. of hours per week	Credits	Total No. of hours	Marks
6	4	90	100

Objectives: 1. To understand the importance of the web as a medium of communication.

2. To create an effective web page with graphic design principles.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO - 1	define modern protocols and systems used on the web(such as HTML,HTTP)	PSO - 1	U
CO - 2	employ fundamental knowledge on web designing with makeup language	PSO - 2	Ap
CO - 3	gain strong knowledge in HTML	PSO - 1	U
CO - 4	use critical thinking skills to design and implement an interactive websites with regard to issues of usability, accessibility and internationalism	PSO - 4	An
CO - 5	to pursue future courses in website development and design	PSO - 2	Ap

Unit I

Introduction to HTML - Designing a Home Page - History of HTML - HTML Generations - HTML Documents - Anchor Tag - Hyper Links - Sample HTML Documents .

Unit II

Head and Body Sections - Header Sections - Title - Prologue - Links - Colorful Web Page - Comment Lines - Some Sample HTML Documents .

Unit III

Designing the Body Section - Heading Printing - Aligning the Headings - Horizontal Rule - Paragraph - Tab Setting - Images and Pictures - Embedding PNG Format Images.

Unit IV

Ordered and Unorded Lists - Lists - Unordered Lists - Headings in a List - Ordered Lists - Nested Lists.

Unit V

Table Handling - Tables -Table Creation in HTML - Width of the Table And Cells - Cells Spanning Multiple Row/Columns Coloring Cells - Column Specification - Some Sample Tables.

Text Book:

Xavier, C. World Wide Web Design with HTML. Tata Mcgram Hill Publishing Company Limited.
Chapters 4: Sections 4.1 – 4.7 ; 5: 5.1 – 5.7; 6 : 6.1 - 6.7; 7: 7.1 – 7.5 ; 8 : 8.1 – 8.7

Reference Books:

1. Castro., Elizabeth., & Hyslop. (2013). HTML5, And CSS: Visual Quickstart Guide. (Eight Edition). Peachpit Press.
2. Devlin., & Ian. (2011). HTML5 Multimedia : Develop And Design. Peachpit Press.
3. Felke., & Morris. (2013). Basics of Web Design : HTML5 & CSS3. (2^{nd} Edition). Addition -Wesley.
4. Felke.,& Morris. (2014). -Web Development & Design Foundations With HTML5. (7^{th} Edition). Addition - Wesley.
5. John Duckett. (2011). HTML and CSS : Design and Build Website. (1^{st} Edition). John wiley and sons.

Semester VI

Part IV

Skill Enhancement Course

Mathematics for Competitive Examinations

Course Code: SEM203

No. of hours per week	Credits	Total No. of hours	Marks
2	2	30	100

Objectives: 1. To develop the quantitative aptitude of the students.

2**.** To solve problems needed for various competitive examinations.

Course Outcome

CO	Upon completion of this course the students will be able to:	PSOs addressed	CL
CO - 1	recall the problems on ages	PSO - 1	R
CO - 2	discuss the problems on profit and loss	PSO - 1	U
CO - 3	conversion of ratio into proportion and vice versa	PSO - 2	Ap
CO - 4	analyze the problems related to chain rule	PSO - 4	An
CO - 5	evaluate time and work related problems	PSO - 4	E

Unit I

Problems on Ages.

Unit II

Profit and Loss.

Unit III

Ratio and Proportion.

Unit IV

Chain Rule.

Unit V

Time and Work.

Text Book:

Agarwal, R.S. (2014). Quantitative Aptitude.(Revised Edition). S. Chand & Company Pvt. Ltd.

Chapters **:**8, 11, 12, 14 and 15.

Reference Books:

1. Guha, A. (2011). Quantitative Aptitude for Competitive Examinations. (4^{th}Edition). McGraw Hill Education. (India) Pvt. Ltd.
2. Immaculate, M. (2009). Mathematics for Life. Nanjil offset Printers.
3. Arun Sharma. (2008). Objective Mathematics. (2^{nd} Edition). Tata McGraw-Hill Publishing Company Limited.

4. Chauhan, R.S. (2011). Objective Mathematics. Unique Publisher.
5. Goyal, J. K., & Gupta, K. P. (2011). Objective Mathematics. (6^{th} Revised Edition). Pragati Prakashan Educational Publish

Semester VI
Part V
Foundation Course IV- Gender Equity Studies
Course Code: FCV204

No. of Hours per Week	Credits	Total No. of Hours	Marks
1	**1**	**15**	**100**

Objectives:

1. To understand the historical background and trace the position of women down the ages.
2. To make the students aware of the legitimate rights and laws that aid women to march towards emancipation and empowerment.

Course outcome

CO	Upon completion of this course the students will be able to :	PSOs addressed	CL
CO-1	develop a critical judgment regarding the views of religions, epics and literary imagination about women	PSO-4	U
CO-2	analyze the socio-cultural and religious practices that subjugate women	PSO-4	An
CO-3	probe deep into the root cause of marginalization of women	PSO- 4	U
CO-4	understand the implementation of feministic concepts in practical life	PSO- 3	U
CO-5	examine how women are exploited as commercial commodities in advertisements and media	PSO-4	An

Unit I

Women in Historical Background

Women through the Ages

Unit II

Feminism – An Explanation

Feminist Thoughts in Practical Life

Unit III

As Religions see Women

Women in Christianity

Women in Islam

Unit IV

The Rights of Women

Women and the Constitution

Unit V

The Portrayal of Women in Advertisements

The End of Enslavement of Women

Empowerment of Women: Need of the Hour

Reference Book

1. *Women in My Perspective.* (2012). Nagercoil: HCC Women's Study Centre.