

**BACHELOR OF SCIENCE IN MATHEMATICS**  
*Thiruvalluvar University*

**PROGRAMME HAND BOOK**  
*(W.e.f. 2017-2018)*



*Guezou Nagar, Athanavoor, Yelagiri Hills,  
Vellore Dt, Tamilnadu*

## Content

1. DEPARTMENT OF MATHEMATICS	4
Program Overview	4
Objectives	4
Activities	5
Vocational Education and Value-added Programmes	5
Student Support & Progression	6
2. BACHELOR OF SCIENCE IN MATHEMATICS (B.Sc., Mathematics)	
Program Outcome (PO)	6
Programme Specific Outcomes (PSO)	6
Programme Educational Objectives (PEO)	7
Mapping of Institution objectives with PEOs	7
Mapping PEOs with POs / PSOs	7
Mapping Course outcomes with POs / PSOs	8
3. UNIVERSITY REGULATIONS	9
Definitions	9
Program Duration	9
Credits	9
Choice Based	9
Eligibility for Admission	9
Pattern of Study	10
PART-I	10
PART-II	10
PART-III	10
PART-IV	11
PART-V	13
Question Paper Pattern	16
Grading	16

4. PROGRAMME STRUCTURE	17
5. DETAILED SYLLABI	21
TEXT BOOK	21
REFERENCE BOOKS	21

**DON BOSCO COLLEGE (CO-ED)**

(Affiliated to Thiruvalluvar University)

**BACHELOR OF SCIENCE-MATHEMATICS**

**(B.SC-MATHEMATICS)**

**CURRICULUM AND SYLLABUS UNDER CBCS**

**WITH EFFECT FROM 2017-2018**

**PROGRAM OVERVIEW**

B.Sc in Mathematics is a three-year undergraduate programme that helps students to develop interpretive analytical and logical skills required to endeavour in the field of Mathematics. The programme trains students to handle concrete & abstract problems and solve them using their critical observations.

The coursework of the programme includes algebra trigonometry calculus vector calculus graph theory differential geometry complex analysis real analysis and differential equations. Students are also given hands-on training in practical sessions which enables them to learn the mathematical principles in depth.

Apart from Mathematics students will also become accustomed to Computers and English which will prepare them to excel in every field and industry. The curriculum is structured in a manner that it improves student's software computing mathematical experimental conceptual and communication skills for advanced professional academic and research careers.

It prepares students with the required knowledge to proceed for higher studies such as M.Sc (Mathematics), MCA, M.S.W, MBA and likewise.

The Department of Mathematics of Don Bosco College was started as one of the earliest departments in the year 2012. The B.Sc. Mathematics course was started in 2015-16 (Academic year).

**Objectives**

1. Encourage students to participate in the learning experience through participation in the classroom, student oriented seminars and other related activities.
2. Build and enhance computational skills necessary in today's society.
3. Develop the student's ability to critically interpret numerical and

graphical data.

4. Develop and enhance the student's problem solving skills.
5. Encourage and reinforce the critical thinking skills of the students.
6. Develop the student's ability to intelligently communicate Mathematical results in both a written and oral format.
7. Work closely with other Departments within the college to ensure that their student majors have the necessary Mathematical background to succeed in their discipline both academically and professionally.
8. Encourages staff members of the department to undertake professional development opportunities that make educational excellence possible.

### **Activities**

Bosco out Reach, Youth Clubs, Association Events, Mentoring

### **Vocational Education AND Value-added Programmes**

1. Mathematics for Competitive Examinations.
2. Road to UPSC.
3. General Mathematics for TNPSC.
4. Mastering in Excel.
5. Craft Work.

### **Student Support & Progression**

#### **1. Placement**

- Campus drives (Final Years)
- Career guidance Programs
- Soft Skills Programs

#### **2. Scholarships**

- SC/ST Scholarship
- Minority Scholarship
- Merit Scholarship
- Francisca Scholarship

## PROGRAM OUTCOMES (PO)

1. **Problem Solution:** Ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve problems to reach substantiated conclusions
2. **Individual and teamwork:** Ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.
3. **Communication skills:** Ability to communicate within the profession and with society at large. Such abilities include reading, writing, speaking, listening, the ability to comprehend and write effective reports and documents.
4. **Professionalism:** Understanding of the roles and responsibilities as professionals in society, especially the primary role of protection of the public and the public interest.
5. **Ethics and equity:** Ability to apply professional ethics, accountability, and equity.
6. **Life-long learning:** Ability to identify and to address one's educational needs in the changing world in ways sufficient to maintain one's competence and to allow him/her to contribute to the advancement of selected domains.

## Programme Specific Outcomes (PSO)

7. Develop critical thinking to resolve real-time problems using mathematical concepts
8. Construct a mathematical model for any open-ended problem
9. Identify the relation between multiple branches of mathematics
10. Convert a mathematical model or problem to a solution using C as a programming language
11. Acquire mathematical competency to be prepared for competitive examinations

## Programme Educational Objectives (PEO)

**OB1: EDUCATION-** Graduates gain basic knowledge and skills in mathematics to pursue higher studies in mathematics.

**OB2: COMPETENCY-** Graduates develop confidence to appear for Banking, Civil Services and related competitive exams and qualify in the same.

**OB3: -EMPLOYABILITY** Graduates can identify a career of their choice be it teaching, research, administration or engineering and pursue the same.

**OB4: ETHICAL AND PROFESSIONAL-** Graduates develop positive attitude and skills which form them as multi- facet personality shining in any chosen field and be an agent of positive transformation in the society.

### MAPPING OF INSTITUTION OBJECTIVES WITH PEOs

COLLEGE / PROGRAMME	EDUCATION	COMPETENCY	EMPLOYABILITY	ETHICAL AND PROFESSIONAL
OB1 : EDUCATION	√			
OB2 : RESEARCH		√		
OB3 : EMPLOYABILITY		√	√	
OB4 : COMM.SERVICE				√

### MAPPING PEOs WITH POs / PSOs

PEO	PO1	PO2	PO3	PO4	PO5	PO6	PSO7	PSO8	PSO9	PSO10	PSO11
1 : EDUCATION	√	√	√			√	√	√	√	√	√
2 : COMPETENCY	√	√		√		√		√			√
3 : TEACHING SKILL	√					√	√		√		√
4 : ETHICAL AND PROFESSIONAL		√		√	√	√				√	

## MAPPING COURSE OUTCOMES WITH POs / PSOs

S E M	COURSE CODE	COURSE	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
			1	2	3	4	5	6	7	8	9	10	11		
1	BLT10	Tamil-I			√	√									
	BLE10	English I			√	√									
	BMA11	Algebra	√						√						
	BMA12	Trigonometry	√						√						
	BAMA13A	Numerical Methods I	√						√	√					√
	BES10	Environmental Studies					√	√							
2	BLT20	Tamil II			√	√									
	BLE20	English II			√	√									
	BMA21	Calculus	√												
	BMA22	Analytical Geometry of three dimensions	√						√	√					
	BAMA23A	Numerical Methods II	√						√	√					√
	BPMA24	Practical: Numerical Methods								√					
	BGA20	Value Education		√			√	√							
	BSS20	Soft Skill			√										
3	BLT30	Tamil III			√	√									
	BLE30	English III			√	√									
	BMA31	Differential Equations	√												
	BAMA13B	Mathematical Statistics I	√						√	√					
	BSMA33	Linear Programming	√							√					
	BNCS34	Introduction To Information Technology												√	
4	BLT40	Tamil IV			√	√									
	BLE40	English IV			√	√									
	BMA41	Vector Analysis and Fourier Analysis	√						√	√					
	BAMA23B	Mathematical Statistics II	√						√	√					√
	BPMA26	Practical : Mathematical Statistics								√					
	BSMA43	Mathematics For Competitive Examinations I													√
	BNCS44	Internet And Its Applications													
5	BMA51	Abstract Algebra	√						√	√	√				
	BMA52	Real Analysis I	√						√	√	√				
	BMA53	Complex Analysis I	√						√	√	√				
	BMA54	Statics	√						√	√	√				
	BMA55	Dynamics	√						√	√	√				
	BEMA56A	Graph Theory	√						√	√	√				
	BSMA57	Mathematics For Competitive Examinations II	√						√	√	√				√
	BMA61	Linear Algebra	√						√	√	√				
	BMA62	Real Analysis II	√						√	√	√				



6	BMA63	Complex Analysis II	√						√	√	√	√	
	BMA64	Programming in C Language	√						√	√	√	√	
	BPMA 68	Practical In C Language	√						√	√	√		
	BEMA65A	Operations Research	√										
	BEMA66B	Fuzzy Mathematics	√										
	BSMA67	Mathematics For Competitive Examinations III											√
	BEA60	Extension Activities	√					√		√	√	√	√

## UNIVERSITY REGULATIONS

### Definitions

<b>Programme</b>	“Programme” means a course of study leading to the award of a degree in a discipline.
<b>Course</b>	“Course” refers to a paper / practical / subject offered under the degree programme.
	Each Course is to be designed variously under lectures / tutorials /
	Laboratory or field work / seminar / practical training / Assignments / Term paper or Report writing etc., to meet effective teaching and learning needs.

### Program Duration

It shall extend over a period of **three years comprising** of six semesters with two semesters in one academic year.

### Credits

The weightage given to each course of study (subject) by the experts of the Board of Studies concerned. The total minimum credits, required for completing a UG program is 140.

### Choice Based

All Undergraduate Programmes offered by Thiruvalluvar University are under Choice Based Credit System. This is to enhance the quality and mobility of the students within and between the Universities in the country and abroad.

### Eligibility for Admission

Candidate seeking admission to the first year of the UG Degree Course should have passed the Higher Secondary Course Examination (Academic

or Vocational) Conducted by the Govt. of Tamil Nadu with Mathematics as a subject or any other Examination accepted as equivalent thereto by the Syndicate subject to such other conditions as may be prescribed.

### **Pattern of Study**

The pattern of study for all UG Programs in Thiruvalluvar University consists of the following:

**PART-I:** Tamil or any one of the following modern/classical languages i.e. Telugu, Kannada, Malayalam, Hindi, Sanskrit, French, German, Arabic & Urdu.

The subject is offered during the **first four semesters** with one examination at the end of each semester (4 courses:  $4 \times 4 = 16$  credits).

### **PART-II:** English

The subject shall be offered during the **first four semesters** with one examination at the end of each semester (4 courses:  $4 \times 4 = 16$  credits).

### **PART-III**

Part III comprises of 3 categories namely, Core Courses, Allied Courses and Elective Courses

#### **Core Subjects**

“The Core Courses” related to the programme concerned including practicals offered under Part III of the programme”.

- 1) Algebra
- 2) Trigonometry
- 3) Calculus
- 4) Analytical Geometry of Three Dimensions
- 5) Differential Equations
- 6) Vector Analysis and Fourier Analysis
- 7) Abstract Algebra
- 8) Real Analysis I

- 9) Complex Analysis I
- 10) Statics
- 11) Dynamics
- 12) Linear Algebra
- 13) Real Analysis II
- 14) Complex Analysis II
- 15) Programming in C Language
- 16) Practical In C Language

### **Allied Subjects**

“Allied courses” offered under part-III of the programme, which is in nature but related to the programme concerned”.

1. Numerical Methods I
2. Numerical Methods II
3. Numerical Methods(Practical)
4. Mathematical Statistics I
5. Mathematical Statistics II
6. Mathematical Statistics (Practical)

### **Electives Courses**

“Elective courses” related to the core courses of the programme concerned, offered under Part III of the programme”.

1. Graph Theory
2. Operations Research
3. Fuzzy Mathematics

### **Part IV**

Part IV comprises of 3 categories namely, (i) Tamil / Advanced Tamil /Non-Major Electives, (ii) Skill Based Courses and (iii) Foundation Courses.

- (i)(a): **Tamil**

“Those who have not studied Tamil upto X std / XII std and taken a non-Tamil language under Part-I shall take Tamil comprising of two courses with 2 credits each ( $2 \times 2 = 4$  credits). The course content of which shall be equivalent to that prescribed for the 6th standard by the Board of Secondary Education and they shall be offered in the **third and fourth semesters**”.

(OR)

(i)(b): **Advanced Tamil**

“Those who have studied Tamil upto XII std and taken a non-Tamil language under Part-I shall take Advanced Tamil comprising of two courses with 2 credits each ( $2 \times 2 = 4$  credits) in the **third and fourth semesters**”.

(OR)

(i)(c) **Non-Major Electives**

“Others who do not come under a / b can choose the offered non-major electives comprising of two courses with 2 credits each ( $2 \times 2 = 4$  credits) in the **third and fourth semesters**”

(ii): **Skill based Courses**

“The courses offered as skill based courses under Part IV of the programme aimed at imparting Advanced Skill”. This is comprising of four courses with 3 credits each ( $4 \times 3 = 12$  credits) from 3<sup>rd</sup> to 6<sup>th</sup> semesters”

(iii): **Foundation Course**

There are 3 Foundation Courses offered.

- (a) Environmental Studies - offered in 1<sup>st</sup> Semester, under Part IV of the programme.
- (b) Value Education - offered in 2<sup>nd</sup> Semester under Part IV of the programme.
- (c) Soft Skill - offered in 2<sup>nd</sup> Semester under Part IV of the programme

## **Part V**

### **Extension Activities**

Part V comprises of only 1 category namely Extension Activity.

“All those activities under NSS/NCC/Sports/YRC programme and other co and extra- curricular activities offered under part V of the programme.

Every student shall participate compulsorily for a period of not less than two years (4 semesters) in any one of the following programmes Jesus Youth, Newman, Bosco Fine Arts, Digital Arts, NSS, Blue cross, Citizen’s Consumer, Rotaract, Red Ribbon, DB Music, Small Savings, Bosco Volunteers, Red Cross, Literacy, Green Hills, Creative Writing, AICUF, Bosco Theatre, Media Forum, Sports, Electoral Literacy Club.

A candidate shall be awarded a maximum of 1 credit for compulsory extension activity. The student’s performance shall be examined by the staff in-charge of extension activities along with the Head of the respective department and a class tutor in-charge, of the Department on the following parameters.

The marks shall be sent to the Controller of Examinations before the commencement of the final semester examinations.

- 20% of marks for Regularity of attendance.
- 60% of marks for Active Participation in classes/camps/games/special Camps/programmes in the college/ District/ State/ University activities.
- 10% of marks for Exemplary awards/Certificates/Prizes.
- 10% of marks for Other Social components such as Blood Donations, Fine Arts, etc.

The above activities shall be conducted outside the regular working hours of the college. The mark sheet shall carry the gradation relevant to the marks awarded to the candidates.

This grading shall be incorporated in the mark sheet to be issued at the end of the semester

### **PASSING MINIMUM**

1. A candidate shall be declared to have passed the whole examination, if the candidate passes in all the theory papers and practical wherever prescribed as per the scheme of examinations by

earning 140 credits in Part I, II, III, IV and V. He / She shall also fulfil the extension activity prescribed by earning 1 credit to qualify for the degree.

- A candidate should get **not less than 40% in the University (external) Examination**, compulsorily, in any course of Part I, II, III& IV papers. Also the candidate who secures **not less than 40% marks** in the external as well as internal (CIA) examinations put together in any course of Part I, II, III& IV shall be declared to have successfully passed the examination in the subject in theory as well as Practicals.

## DISTRIBUTION

**Table - 1(A):** The following are the distribution of marks for external and internal for University (external) examination and continuous internal assessment and passing minimum marks for **theory papers of UG Programmes.**

UNI. EXAM TOTAL (ESC)	PASSING MINIMUM FOR UNLEXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNLEXAM+CIA)
75	30	25	0	100	40

**Note:** ESE - End Semester Examination

**Table - 1(B):** The following are the Distribution of marks for the Continuous Internal Assessment in the theory papers of UG Programmes.

S.No	For Theory - UG courses	Distribution of Marks	
		Assignments	Tests
1	Assignment-1 (First 2 Units of the Syllabus)	10	-
2	Test-1 (First 2 Units of the Syllabus for 1 Hour duration)	-	50
3	Assignment-2 (3 <sup>rd</sup> & 4 <sup>th</sup> Units of the Syllabus)	10	
4	Test-2 (First 4 Units of the Syllabus for 2 Hours duration)	-	50

5	Assignment-2 ( 5 <sup>th</sup> Unit of the Syllabus)	10	-
6	Test-3 (Entire Syllabus for 3 Hours duration)	-	100
	<b>TOTAL MARKS</b>	30	200
	<b>Marks to be converted to</b>	5	20
	<b>Total Maximum Marks for CIA</b>	25	

**Table – 2(A):** The following are the distribution of marks for University (external) examinations and continuous internal assessments and passing minimum marks for the **practical courses of UG Programmes**.

UNL. EXAM TOTAL (ESC)	PASSING MINIMUM FOR UNLEXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNLEXAM+CIA)
75	30	25	0	100	40

**Table – 2(B):** The following are the distribution of marks for the Continuous Internal Assessment in UG practical courses.

S.N o.	For Practical - UG courses	Distribution of Marks	
		Assignments	Tests
1	Regular maintenance of the Observation note book-1 (Upto the end of I-Semester)	10	-
2	Test-1 (Upto the end of I-Semester for 2 Hours duration)	-	25
3	Regular maintenance of the Observation note book-2 (Upto the end of II-Semester)	10	
4	Test-2 (Upto the end of II-Semester for 2 Hours duration)	-	25
5	Regular maintenance & proper completion of the Record note book	10	-
6	Test-3 (Entire Syllabus following	-	25

	University examination pattern)		
	<b>TOTAL MARKS</b>	30	75
	<b>Marks to be converted to</b>	10	15
	<b>Total Maximum Marks for CIA</b>	25	

## QUESTION PAPER PATTERN

The following question paper patterns shall be followed for CBCS pattern syllabi for the candidates admitted from the academic year 2017-2018 onwards.

**External Maximum 75 Marks – wherever applicable**

**(Ext.75 + Int.25 = Total. 100)**

<b>Section A</b>	Very short answer questions	10X 2=20	10 questions – 2 from each unit
<b>Section B</b>	Short answer questions of either / or type (like 1a (or) 1b)	5X5=25	5 questions – 1 from each unit
<b>Section C</b>	Essay-type questions / Problem ( Answer any 3 out of 5)	3X10=30	5 questions – 1 from each unit

**NOTE:** In Section “C” one of the questions shall be application oriented or a problem, wherever applicable.

## GRADING

Once the marks of the CIA and end-semester examinations for each of the course are available, they shall be added. The mark thus obtained shall then be converted to the relevant letter grade, grade point as per the details given below:

**Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)**



RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Distinction
75-79	7.5-7.9	D	
70-74	7.0-7.4	A+	First Class
60-69	6.0-6.9	A	
50-59	5.0-5.9	B	Second Class
40-49	4.0-4.9	C	Third Class
00-39	0.0	U	Re-appear
Absent	0.0	AAA	Absent

### PROGRAMME STRUCTURE

Semester I									
S. No	Part	Hrs	Cr	Type	code	Title	INT	EXT	TOT
1	I	6	4	Language	BLT10	Tamil-I	25	75	100
2	II	6	4	English	BLE10	English I	25	75	100
3	III	5	3	Core	BMA11	Algebra	25	75	100
4	III	4	3	Core	BMA12	Trigonometry	25	75	100
5	III	7	4	Allied -I	BAMA13A	Numerical Methods I	25	75	100
6	IV	2	2	EVS	BES10	Environmental Studies	25	75	100
<b>TT</b>		<b>30</b>	<b>20</b>				<b>150</b>	<b>450</b>	<b>600</b>
Semester II									
7	I	6	4	Language	BLT20	Tamil II	25	75	100
8	II	4	4	English	BLE20	English II	25	75	100
9	III	5	3	Core	BMA21	Calculus	25	75	100
10	III	4	3	Core	BMA22	Analytical Geometry of three dimensions	25	75	100
11	III	4	4	Allied-I	BAMA23A	Numerical Methods II	25	75	100
12	III	3	2	Allied-I (Practical)	BPMA24	Numerical Methods	25	75	100
13	IV	2	2	Value Education	BGA20	Value Education	25	75	100
14	IV	2	1	Soft Skill	BSS20	Soft Skill	25	75	100
<b>TT</b>		<b>30</b>	<b>23</b>				<b>200</b>	<b>600</b>	<b>800</b>
Semester III									
15	I	6	4	Language	BLT30	Tamil III	25	75	100
16	II	6	4	English	BLE30	English III	25	75	100
17	III	6	4	Core	BMA31	Differential Equations	25	75	100
18	III	7	4	Allied II	BAMA13B	Mathematical Statistics I	25	75	100
19	IV	3	3	Skill	BSMA33	Linear Programming	25	75	100

				Based					
20	IV	2	2	Non-Major Elective	BNCS34	Introduction To Information Technology	25	75	100
<b>TT</b>		<b>30</b>	<b>21</b>				<b>150</b>	<b>450</b>	<b>600</b>
<b>Semester IV</b>									
21	I	6	4	Language	BLT40	Tamil IV	25	75	100
22	II	6	4	English	BLE40	English IV	25	75	100
23	III	6	4	Core	BMA41	Vector Analysis and Fourier Analysis	25	75	100
24	III	4	4	Allied II	BAMA23B	Mathematical Statistics II	25	75	100
25	III	3	2	Allied II (Practical)	BPMA26	Mathematical Statistics	25	75	100
26	IV	3	3	Skill Based	BSMA43	Mathematics For Competitive Examinations I	25	75	100
27	IV	2	2	Non-Major Elective	BNCS44	Internet And Its Applications	25	75	100
<b>TT</b>		<b>30</b>	<b>23</b>				<b>175</b>	<b>525</b>	<b>700</b>
<b>Semester V</b>									
28	III	5	4	Core	BMA51	Abstract Algebra	25	75	100
29	III	5	4	Core	BMA52	Real Analysis I	25	75	100
30	III	5	4	Core	BMA53	Complex Analysis I	25	75	100
31	III	5	4	Core	BMA54	Statics	25	75	100
32	III	4	4	Core	BMA55	Dynamics	25	75	100
33	III	3	3	Elective	BEMA56A	Graph Theory	25	75	100
34	IV	3	3	Skill Based Subject	BSMA57	Mathematics For Competitive Examinations II	25	75	100
<b>TT</b>		<b>30</b>	<b>26</b>				<b>175</b>	<b>525</b>	<b>700</b>
<b>Semester VI</b>									
35	III	5	4	Core	BMA61	Linear Algebra	25	75	100
36	III	5	4	Core	BMA62	Real Analysis II	25	75	100
37	III	5	4	Core	BMA63	Complex Analysis II	25	75	100
38	III	3	3	Core	BMA64	Programming in C Language	25	75	100
39	III	3	2	Core (Practical)	BPMA 68	Practical In C Language	25	75	100
40	III	3	3	Elective	BEMA65A	Operations Research	25	75	100
41	III	3	3	Elective	BEMA66B	Fuzzy Mathematics	25	75	100
42	IV	3	3	Skill Based	BSMA67	Mathematics For Mathematics III	25	75	100
43	V	0	1	Extension Activities	BEA60	Extension Activities	100	0	100
<b>TT</b>		<b>30</b>	<b>27</b>				<b>300</b>	<b>600</b>	<b>900</b>

Part	Subject	Papers	CRD	TT CRD	Marks	Total marks
Part I	Languages	4	4	16	100	400
Part II	English	4	4	16	100	400
Part III	Allied (Odd Sem)	2	4	8	100	200
	Allied (Even Sem)	2	4	8	100	200
	Allied –Prac (Even Sem)	2	2	4	100	200
	Electives	3	3	9	100	300
	Core	15	(3-7)	57	100	1500
Part IV	Env. Science	1	2	2	100	100
	Soft skill)	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others/NME	2	2	4	100	200
	Skill Based	4	3	12	100	400
Part V	Extension	1	1	1	100	100
	<b>Total</b>	<b>42</b>		<b>140</b>		<b>4200</b>

**\*\*\* NON-MAJOR ELECTIVES (Semesters 3 & 4)**

SE M	PA RT	CODE	TITLE	TYPE	HRS	CRD
<b>3</b>	<b>IV</b>	BNBA37	Management Concepts	T	<b>2</b>	<b>2</b>
		BNCP37	Elements of Accountancy	T		
		BNCA34	Introduction to information Technology	T		
		BNEN35	Language Skills and Communication I	T		
<b>4</b>	<b>IV</b>	BNCP46	Advertising and Salesmanship	T		
		BNCA44	Internet and its Applications	T		
		BNEN45	Language Skills and Communication II	T		
		BNBA47	Training and Development	T		

**LIST OF ELECTIVE PAPERS**

<b>Semester 5 - Paper 1</b>		
<b>A</b>	<b>BEMA56A</b>	Graph Theory
<b>B</b>	<b>BEMA56B</b>	Astronomy
<b>Semester 6 - Paper 2</b>		
<b>A</b>	<b>BEMA65A</b>	Special function
<b>B</b>	<b>BEMA65B</b>	Fuzzy Mathematics
<b>Semester 6 - Paper 3</b>		
<b>A</b>	<b>BEMA66A</b>	Operations Research
<b>B</b>	<b>BEMA66B</b>	Calculus of finite differences & Numerical Methods

## DETAILED SYLLABI

BLT10	TAMIL I	Lecture	Practical	Credit
SEM I - LANGUAGE		6	0	4

**நோக்கங்கள்**

தமிழின் புதுக்கவிதைகள் உள்ளடக்கியபடைப்பிலக்கியங்களை இப்பாடம் அறிமுகம் செய்கிறது. தமிழ் இலக்கியத்தில் தோத்தெடுக்கப்பட்ட மிகமுக்கியமான செய்யுட்கள், கவிதைகள், கதைகள். ஊரைநடை ஆகியவற்றைக் கொண்டு இப்பாடம் கட்டமைக்கப்பட்டுள்ளது. மாணாக்கரின் இலக்கியத் தேடலை உருவாக்குவதும், தற்சார்புடைய அறிவைமேம்படுத்துவதும் இப்பாடத்தின் நோக்கமாகும்.

**SYLLABUS**

**அலகு1:கவிதை** மாணவர்களிடையே கவிதை படிக்கும் ஆர்வம் கவிதை எழுதும் திறனை வளர்த்தல்.

**அலகு2:ஊரைநடை**மாணவர்களுக்குகருத்துக்களைஎளிதில் சொல்லுவதற்கேற்றஎழுத்துவடிவமேஉரைநடையாகும்.

**அலகு3:நாடகம்** மனதின் வெளிப்பாடு இயல் ஆகவும் மொழியின் இனிமை இசையாகவும் மெய்யின் அழகியசெயற்பாடுநாடகமாகவும் மலரும் காண்போரைபெரிதும் கவர்வதுநாடககலை.

**அலகு4:சிறுகதை** மனிதனுடைய வாழ்வின் சிறு பகுதியை கருவாகக் கொண்டு ஏற்றுவதுதான் சிறுகதை.

**அலகு5:மொழித்திறன்** மொழித்திறனின் மூலம் மாணவர்கள் அகரவரிசையில் எழுதவும் பிழையில்லாமல் எழுதவும் சொற்களுக்கு பொருள்களை உணரவும் மொழித்திறன் பயிற்சிஉதவுகிறது.

**சிறப்பு நோக்கம்**

**CO1:** மரபுவழியானகவிதைபோக்கும் புதுவகையிலானநோக்கும் கலந்த இச்சூழல் கவிதை இலக்கியத்திற்குஒருதிருப்புமுனையாகஅமைந்தது.

**CO2:** மாணவர்கள் எளிதில் நேரேபொருளைஉணர்ந்துக்கொள்ளுதல் இதன் மூலம் மாணவர்கள் படிக்கும் ஆற்றலைவளர்த்துக்கொள்கிறார்கள்.

**CO3:** மாணவர்கள் நாடகம் படிப்பதின் வாயிலாகதங்களின் தனித்திறமைவெளிப்படுத்துவதற்குஏதுவாக இப்பாடப்பகுதிஅமைகிறது.

**CO4:** மாணவர்கள் சிறுகதையைபடிப்பதின் வாயிலாகதங்களின் தனித்திறனையைவெளிப்படுத்துவதற்குஏதுவாகசிறுகதைஎழுதும் ஆற்றலைபெறுகிறார்கள்.

**CO5:** மாணவர்கள் மொழித்திறனைஅறிவதின் விளைவாகதாய் மொழியைபிழையின்றிபேசவும் பிழையின்றிஎழுதவும் இலக்கணமுறைமையுடன் எழுதகற்றுக்கொள்கிறார்கள்.

**REFERENCES: NIL**

BLE10	ENGLISH I	Lecture	Practical	Credit
SEM I - LANGUAGE		6	0	4

### LEARNING OBJECTIVES

1. To write, read, and understand any text
2. To understand English better and to attain competency in both written and spoken skills.

### SYLLABUS

**UNIT 1 - PROSE** 1. My greatest Olympic Prize - Jesse Owens 2. The Tree Speaks –Rajagopalachari C 3. Snake in the Garden – R.K.Narayan 4. Futurology - Aldous Huxley

**UNIT 2 - POETRY** 1. The River – Parthasarathy 2. Ode to Nightingale – John Keats 3. “O Captain, My Captain Walt Whitman 4. Paper Boat – Rabindranath Tagore

**UNIT 3 - SHORT STORY AND ONE ACT PLAY** 1. A Day’s Wait – Ernest Miller Hemingway 2. Little Girls Wiser Than Men – Tolstoy – One act play 3. The Bishop’s Candlesticks – Morman Mckinnel

**UNIT 4 - GRAMMAR AND COMPOSITION** 1. Correct usage of Words 2. Vocabulary – Synonyms & Antonyms 3. Abbreviations 4. English for Excellence – Parts of Speech -Modern Avenue 5. Functional English: Creative Writing - College Grammar Letter of Application

**UNIT 5 - COMMUNICATION SKILLS** 1. Listening Conversation – (i) Agreeing and Disagreeing. (ii) Seeking and giving permission (iii) Greetings (iv) Introducing Oneself to other

### LEARNING OUTCOMES

The students will be able to

**CO1:** Learn new words and their meanings within the context of literary texts.

**CO2:** Understand the basic elements of poetry

**CO3:** Learn about the storytelling skills

**CO4:** Identify the elements of a One-Act Play

**CO5:** Learn to form new words, antonyms and synonyms using prefixes and suffixes, to make new dialogues, letters (formal & informal) and to write short paragraphs.

### REFERENCES

NIL

BLE10	ALGEBRA	Lecture	Practical	Credit
SEM I – CORE THEORY		6	0	4

### LEARNING OBJECTIVES

- In this Course students are exposed to topics like Theory of Equations, Summation of Series, Matrices, Continued Fractions and Elementary Number Theory.
- The stress is on the development of problem solving skills.

### SYLLABUS:

#### UNIT-I: THEORY OF EQUATIONS

Polynomial Equations - Symmetric Functions of roots in terms of Coefficients - Reciprocal Equations - Transformation of Equations.

#### UNIT-II: THEORY OF EQUATIONS (Contd...)

Descartes Rule of Signs - Approximate Solutions of Polynomials by Horner's method - Newton - Raphson method of Solution of a Cubic Polynomial.

#### UNIT-III: SUMMATION OF SERIES

Summation of series using Binomial - Exponential and Logarithmic series (Theorems without proofs) - Approximation using Binomial & Exponential series and logarithmic series simple problems.

#### UNIT-IV: MATRICES

Symmetric - Skew symmetric, - Hermitian - C - Orthogonal and Unitary Matrices - Cayley-Hamilton Theorem (without proof) - Eigen Values - Eigen Vectors-Similar Matrices - Diagonalisation of a Matrix.

#### UNIT-V: ELEMENTARY NUMBER THEORY

Prime Number - Composite Number - Decomposition of a Composite Number as a Product of Primes uniquely (without proof) - Divisors of a Positive Integer - Congruence Modulo  $n$  - Euler Function (without Proof) - Highest Power of a Prime Number  $p$  contained in  $n!$  - Fermat's and Wilson's Theorems (statements only) - simple problems.

### LEARNING OUTCOMES

The students will be able to

**CO1:** Describe the concepts of Polynomial Equations, Reciprocal Equations and Transformation of Equations.

**CO2:** Recognize Descartes Rule of Signs, Horner's method and Newton -Raphson method.

**CO3:** Differentiate the series and find the summations of such series.

**CO4:** Identify Symmetric, Skew symmetric, Hermitian and Skew Hermitian matrices and also using Cayley-Hamilton theorem can solve sums.

**CO5:** Distinguish Fermat's and Wilson's theorems and also can do simple sums using the above.

#### Recommended Texts

T.K.ManicavachagomPillay, T.Natarajan and K.S.Ganapathy.(2004) *Algebra*, Volume I & II S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

#### Reference Books

1. P.Kandasamy, K.Thilagavathy (2004), Mathematics for B.Sc. Vol-I, II, III & IV, S.Chand& Company Ltd., New Delhi-55.
2. S.Arumugam (2003) *Algebra*. New Gamma Publishing House, Palayamkottai.
3. A.Singaravelu (2003) *Algebra and Trigonometry*, Vol.-I & II Meenakshi Agency, Chennai.

BMA12	Trigonometry	Lecture	Practical	Credit
SEM I – CORE THEORY		4	0	3

**LEARNING OBJECTIVES**

- This course is a fundamental one for many courses of this Degree Programme.
- This covers topics on the expansions of trigonometric functions, hyperbolic functions, inverse circular, inverse hyperbolic functions. It aims to develop computational skills.

**Syllabus:****UNIT-I: Trigonometric Functions**

Expansions of  $\cos n\theta$ ,  $\sin n\theta$  - Expansion of  $\tan n\theta$  in terms of  $\tan \theta$  - Expansion of  $\tan(A+B+C+\dots)$  - Formation of Equations. Chapter III section 1 to 3

**UNIT-II**

Powers of sines and cosines of  $\theta$  in terms of functions of multiples of  $\theta$  - expansions of  $\sin \theta$  and  $\cos \theta$  in a series of ascending powers of  $\theta$  - Expansion of Inverse Circular Functions. Chapter III section 4 and 5

**UNIT-III: Hyperbolic Functions**

Definition – Relation between Hyperbolic Functions - Inverse Hyperbolic Functions. Chapter IV sections 1 to 2.3

**UNIT-IV**

Resolution into Factors - simple problems only - DeMoivre's Property on the Circle and Cote's Property on the Circle. Logarithm of complex quantities.

Chapter V sections 2 and 3 (Problems only) Chapter V sections 4, 4.1, 4.2, 5, 5.1, 5.2...

**UNIT-V**

Summation of Trigonometric Series: When the angles are in A.P, C+iS method of summation - Method of Differences - Gregory Series - Euler Series.

Chapter VI section 1, 2, 3, 3.1, 3.2.

**LEARNING OUTCOMES**

The students will be able to

**CO1:** Expand  $\cos n\theta$ ,  $\sin n\theta$  and  $\tan n\theta$  in terms of  $\tan \theta$  and also form the equations of the trigonometric roots.

**CO2:** Determine the powers of sines and cosines of  $\theta$  in terms of functions of multiples of  $\theta$  and expansions of  $\sin \theta$  and  $\cos \theta$  in a series of ascending powers of  $\theta$ .

**CO3:** Differentiate hyperbolic and circular functions and also analyse the relation between Hyperbolic Functions and circular functions.

**CO4:** Analyse DeMoivre's Property on the Circle and Cote's Property on the Circle and can apply to the problems. Students can find Logarithm of complex quantities.

**CO5:** Evaluate the summation of trigonometric series using C+i S method, A. P method, Gregory Series and Euler's Series.

**Recommended Text**

1. S.Narayanan and T.K.Manicavachagom Pillay (2004) *Trigonometry*. S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

**Reference Books**

1. P.Kandasamy, K.Thilagavathy (2004), *Mathematic for B.Sc. Vol.-I, II, III & IV*, S.Chand & Company Ltd., New Delhi-55.
2. S.Duraipandian and LaxmiDuraipandian (1984) *Trigonometry*. Emerald Publishers, Chennai.
3. B.S.Grewal. (2002) *Higher Engineering Mathematics*. Khanna Publishers. New Delhi.
4. S.L.Loney. (1982) *Plane Trigonometry*, Part II, Cambridge University Press, London.
5. A.Singaravelu (2003) *Algebra and Trigonometry*, Vol.-I Meenakshi Agency, Chennai.
6. P.R.Vittal. (2004) *Trigonometry*, Margham Publications, Chennai.



BMA12	Numerical Methods I	Lecture	Practical	Credit
SEM I – ALLIED I		7	0	3

### LEARNING OBJECTIVES

- This course will cover basic methods for finding the Finite differences, Central differences, Inverse interpolation, Summation of series.
- Interpolation for equal & unequal intervals, Solutions of simultaneous equations, important principles, Method and Processes to get numerical results, Reliability of numerical result.

### SYLLABUS:

#### UNIT-I: Finite Differences

First and higher order differences-forward differences and Backward differences-Properties of operators-Differences of a Polynomial-Factorial Polynomials-Operator E, Relation between  $\Delta$ ,  $\nabla$  and E-Interpolation - Newton - Gregory forward & backward formulae for interpolation.

#### UNIT-II: Central Differences

Central difference Operators-Central differences formulae: Gauss Forward and Backward formulae- Sterling's formula-Bessel's formula.

#### UNIT-III: Interpolation for Unequal Intervals

Divided differences-Newton's divided differences formula and Lagrange's-Estimating the Missing terms (With one or more missing values).

#### UNIT-IV: Inverse Interpolation

Lagrange's method and Reversion of series method (Using Newton's forward formula only). Summation of series: Sum to n term of the series whose general term is the first difference of a function-summation by parts.

#### UNIT-V: Solutions of Simultaneous Linear Equations

Gauss elimination method-matrix inversion method-Gauss-Jordan Method, Gauss-Seidal method (Three unknowns only).

### LEARNING OUTCOMES

The students will be able to

**CO1:** Understand a different approach in interpolation and also to learn Finite differences and Central difference operators.

**CO2:** Explain the mathematics concepts underlying the numerical methods.

**CO3:** Construct a polynomial like Newton Gregory method and Lagrange method.

**CO4:** Apply solve an algebraic equation using an appropriate numerical method.

**CO5:** Solve a linear system of equations using an appropriate numerical methods like Gauss Elimination methods and Gauss Seidal method

### Recommended Text

1. B.D. Gupta.(2001) *Numerical Analysis*.Konark Pub. Ltd., Delhi
2. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

### Reference Books

1. S. Arumugham. (2003) *Numerical Methods*, New Gamma Publishing, Palamkottai.
2. H.C. Saxena. (1991) *Finite differences and Numerical analysis* S.Chand& Co., Delhi
3. A.Singaravelu (2004). *Numerical Methods*Meenakshi Agency, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) *Calculus of Finite difference & Numerical Analysis*, S. Chand & Company Ltd., New Delhi-55.

BES10	ENVIRONMENTAL STUDIES	Lecture	Practical	Credit
SEM I - ENVIRONMENTAL STUDIES		2	0	2

### LEARNING OBJECTIVES

- Acquire knowledge on natural resources and the impact of man-made fertilizers on the environment.
- Understand the Ecosystem, Biodiversity and its Conservation.

### SYLLABUS

#### UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES:

Environmental Sciences - Relevance - Significance - Public awareness – Forest resources - Water resources - Mineral resources - Food resources – conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

#### UNIT-II: ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION:

Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem. Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity - Insitu&Exsitu.

#### UNIT-III: ENVIRONMENTAL POLLUTION AND MANAGEMENT

Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earthquake, Cyclone and Landslides. Role of individuals in prevention of pollution - pollution case studies.

#### UNIT-IV: SOCIAL ISSUES - HUMAN POPULATION

Urban issues - Energy - water conservation - Environmental Ethics – Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental Protection Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness – Case studies.

#### UNIT-V: FIELD WORK

Visit to a local area / local polluted site / local simple ecosystem – Report submission

### LEARNING OUTCOMES

The students will be able to

**CO1:** Explain the various natural resources and the impact of man-made fertilizers on the environment.

**CO2:** Describe the Ecosystem, Biodiversity and its Conservation.

**CO3:** Explain the Environmental Pollution and Management

**CO4:** Analyse the Social Issues and Human Population.

**CO5:** Do a study on the local ecosystem and prepare a FIELD WORK Report.

### REFERENCES

1. Kumarasamy, K., A.Alagappa Moses AndM.Vasanthi, 2004. Environmental Studies, Bharathidsan University Pub, 1, Trichy
2. Rajamannar, 2004, Environmental Studies, Evr College Pub, Trichy
3. Kalavathy,S. (Ed.) 2004, Environmental Studies, Bishop Heber College Pub., Trichy

BLT20	TAMIL II	Lecture	Practical	Credit
SEM II - LANGUAGE		6	0	4

### நோக்கங்கள்

மாணவர்கள் வாழ்க்கையில் அறநெறியுடன் வாழ்வதற்கும் மனதை ஒருமுகப்படுத்துவதற்கும் பக்தி இலக்கியங்களும் சிற்றிலக்கியங்களும் மாணவர்களுக்கு பயன்படுகிறது. பக்தி இலக்கியத்தின் வாயிலாக புராணங்களின் முக்கியத்துவத்தையும் தெய்வங்களின் பெருமைகளையும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள். கடவுள்களையும் அரசர்களையும் பேரிலக்கியங்கள் பேசியகாலங்களில் சிற்றிலக்கியங்கள் எளியமக்களின் வாழ்க்கைமுறையை பற்றி பேசுகிறது என்பதை மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

### SYLLABUS

**அலகு 1** : மாணவர்கள் சைவத்திருமுறைகள் பன்னிரண்டு குறித்து அறிந்துக்கொள்கிறார்கள்

**அலகு 2** : நாலாயிரதிவ்யபிரபந்தத்தில் ஆழ்வார்களின் வாழ்க்கை வரலாற்றை அறிந்துக்கொள்கிறார்கள்.

**அலகு 3** : சங்க இலக்கியங்களின்

தனிப்பாடல்களாக வருகின்ற சிற்றிலக்கியங்களை மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு 4** : மாணவர்கள் சமய இலக்கியங்கள் குறித்து அறிந்துக்கொள்கிறார்கள்.

**அலகு 5** : மாணவர்கள் கடிதம் எழுதவும் நேர்காணலைப் பற்றியும் தெரிந்துக்கொள்ளுதல்.

### சிறப்பு நோக்கம்

**CO1:** மாணவர்கள் நாயன்மார்கள், சித்தர்களின் வாழ்க்கை வரலாற்றையும் அவர்கள் பாடிய பாடல்களையும் அறிந்துக்கொள்கிறார்கள்.

**CO2:** மாணவர்கள் ஆழ்வார்களின் வாழ்க்கை முறையையும் திருமாலின் பெருமைகளையும் அறிந்துக்கொள்கிறார்கள்

**CO3:** மாணவர்கள்

தூது, உலா, கோவை ஆகிய சிற்றிலக்கியவகைகளை அறிந்துக்கொள்கிறார்கள்

**CO4:** மாணவர்கள் சமயம் குறித்தும் கிறித்துவம், இஸ்லாமியம் ஆகிய சமய நூல்களில் கூறும் வரலாற்றுச் செய்திகளை அறிந்துக்கொள்கிறார்கள்

**CO5:** மாணவர்கள் பொதுக்கட்டுரை எழுதுதல், நேர்காணல் செய்தல் என்பதனை இப்பாடப்பகுதியின் வாயிலாக அறிந்துக்கொள்கிறார்கள்

### REFERENCES

NIL

<b>BLE20</b>	<b>ENGLISH II</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credit</b>
<b>SEM II - ENGLISH</b>		<b>4</b>	<b>0</b>	<b>4</b>

## **LEARNING OBJECTIVES**

To understand English better and to improve communication both verbal and written in English language.

## **SYLLABUS**

**UNIT - 1 PROSE** 1.Ant and Grasshopper - Somerset Maugham 2.Early Influences - A.P.J. Abdul Kalam 3. Forgetting – Robert Lynd 4. The Unity of Indian Culture – HumayunKabir

**UNIT - 2 POETRY** 1. The Soul’s Prayer.-Sarojini Naidu 2. The Lotus - Toru Dutt 3. Nutting – William Wordsworth 4. Ozymandias - P.B.Shelley

**UNIT - 3 SHORT STORY AND ONE ACT PLAY** 4. The Doll’s House - Katherine Mansfield 5.Karma - Kushwant Singh One Act Play 6. Hijack -Charles Wills

**UNIT - 4**Vocabulary 6. Functional Grammar 7. Functional English

**UNIT - 5 COMMUNICATION SKILLS** 8. Making Request 9.Offering Help 10.Inviting Someone 11. Asking Permission

## **LEARNING OUTCOMES**

The students will be able to

**CO1:** Learn new words and new meanings and gain an introductory knowledge of the issues explored in influential works.

**CO2:** Understand the basic terminology and practical elements of poetry.

**CO3:** Learn essential short story elements.

**CO4:** Learn to form new words, antonyms and synonyms using prefixes and suffixes to master the essential rules of spelling and grammar and to read and comprehend a short prose passage

**CO5:** Learn new dialogues, letters (formal & informal) and to write short paragraphs.

## **REFERENCES**

NIL

BMA21	Calculus	Lecture	Practical	Credit
SEM II – CORE THEORY		5	0	3

### LEARNING OBJECTIVES

- The course introduces students to the fundamental principles, concepts and knowledge in the areas of Differential and Integral Calculus.
- This prepares the students to apply these fundamental concepts and working knowledge to other courses.

### SYLLABUS

#### UNIT-I

Differential Calculus: nth derivative - Leibnitz's theorem (Without proof) and its application - Jacobians - Total differential - maxima and minima functions of 2 & 3 independent variable, Lagrange's method (without proof), problems on these concepts.

#### UNIT-II: Differential Calculus (Contd...)

Polar coordinates – Angle between radius vector and tangent – Angle between two curves, Curvature, Radius of Curvature in Cartesian and Polar coordinates, p-r equation, Evolutes.

#### UNIT-III: Differential Calculus (Contd...)

Asymptotes: Methods (without proof) of finding asymptotes of rational algebraic curves with special cases.(First 5 sections only)

#### UNIT-IV: Integral Calculus

$\int \sin x \cos nx \, dx$ , Beta and Gamma Functions - Properties and Problems.

#### UNIT-V: Integral Calculus (Contd...)

Double Integrals - Change of order of Integration - Triple Integrals - Applications to Area, Surface Area and Volume.

### LEARNING OUTCOMES

The students will be able to

**CO1:** Determine nth derivative of the functions by Leibnitz's theorem.

**CO2:** Evaluate the angle between curves and evolutes.

**CO3:** Compute asymptotes of rational algebraic curves with special cases.

**CO4:** Define Beta and Gamma Functions and solve problems.

**CO5:** Solve Double Integrals and Triple Integrals and Identify areas in mathematics and other fields where Calculus is useful.

### Recommended Text

S.Narayanan and T.K.ManicavachagomPillay (2004) *Calculus*.S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

### Reference Books

1. P.Kandasamy, K.Thilagavathy (2004), *Mathematic for B.Sc. Vol.-I, II, III & IV*, S.Chand& Company Ltd., New Delhi-55.
2. Shanti Narayan (2001) *Differential Calculus*.Shyamlal Charitable Trust, New Delhi.
3. Shanti Narayan (2001) *Integral Calculus*.S.Chand& Co. New Delhi.
4. S.Sudha (1998) *Calculus*. Emerald Publishers, Chennai.

BMA22	Analytical Geometry of Three Dimensions	Lecture	Practical	Credit
SEM II - CORE THEORY		4	0	3

**LEARNING OBJECTIVES**

- To expand the knowledge of the students in various concepts of Analytical Solid Geometry.

**SYLLABUS****Unit I: Plane**

General equation of a plane – Equation of a plane in the normal form – Angle between planes – Plane through three given points – Equation of a plane through the line of intersection of two planes.

**UNIT II: Straight Line**

Symmetrical form of a straight line – Image of a point with respect to a plane – Image of a line with respect to a plane – Length and equation of the shortest distance between two skew lines - Coplanar lines.

**UNIT III: Sphere**

Equation of the sphere – Length of the tangent – Tangent plane – Section of a sphere by a plane – Orthogonal spheres – Equation of a sphere through a given circle.

**UNIT IV: Cone**

- Equation of a cone with its vertex at the origin - Condition for the general equation of the second degree to represent a cone - Right circular cone – Enveloping cone - Tangency of a plane to a cone.

**UNIT V: Cylinder**

Equation of a cylinder with a given generator and a given guiding curve - Right circular cylinder - Enveloping cylinder – Enveloping cylinder as a limiting form of an enveloping cone.

**LEARNING OUTCOMES**

The students will be able to

**CO1:** Express equation of the plane that passes through a point and perpendicular to the line given.

**CO2:** Analyze equation of the line a point and direction and Describe equation of the line two points.

**CO3:** Calculate the length and equation of the sphere

**CO4:** Solve the Equation of a cone with a given vertex and guiding curves.

**CO5:** Explain Equation of a cylinder with a given generators cylinder with a given generator and a given guiding curve - Right circular cylinder - Enveloping cylinder – Enveloping cylinder as a limiting form of an enveloping cone.

**Recommended Text**

T.K.Manickavachagom Pillay & others. (2004) *Analytical Geometry*( Three Dimensions)

S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

**Reference Books**

1. P.Duraipandian and LaxmiDuraipandian (1965) *Analytical Geometry-2D*, Asia Publishing company, Bombay

2. P.Duraipandian and LaxmiDuraipandian (1975) *Analytical Geometry-3 D*, Emerald Publishers, Chennai.

3. G.B.Thomas and R.L.Finney.(1998) *Calculus and Analytic Geometry*, Addison Wesley (9thEdn.), Mass. (Indian Print).

4. P.R.Vittal (2003) *Coordinate Geometry*. Margham Publishers, Chennai

BMA23A	Numerical Methods II	Lecture	Practical	Credit
SEM II - ALLIED II		4	0	4

### LEARNING OBJECTIVES

This course covers the techniques of Numerical Differentiation and Numerical Integration.

It also deals with solution of difference equations, Algebraic and Transcendental equations and Numerical solution of Ordinary differential equations of first order.

#### SYLLABUS:

##### UNIT-I: Numerical Differentiation

Newton's forward and backward differences to compute derivatives-derivative using divided differences formula-maxima and minima using the above formulae.

##### UNIT-II: Numerical Integration

General Quadrature formula-Trapezoidal rule-Simpson's one third rule- Simpson's three-eighth rule, Weddle's rule- Euler-Maclaurin Summation Formula

##### UNIT-III: Difference Equations

Linear differences equations-Linear homogeneous difference equation with constant co-efficient-Particular integrals for  $ax$ ,  $Xm\sin ax$ ,  $\cos ax$  and  $ax^2$ .

##### UNIT-IV: Solution of Algebraic and Transcendental Equations

Bisection method-Iteration method-Regula-falsi method (False Position Method)-Newton-Rapson Method.

##### UNIT-V: Numerical Solution of Ordinary Differential Equations (First order only)

Euler's method- Euler's modified method-Picard's method - Taylor's methods-Runge-Kutta method (Fourth order only).

#### LEARNING OUTCOMES:

The students will be able to

**CO1:** Define Newton's forward and backward differences and Divided differences formula.

**CO2:** Explain about Numerical Integration on few topics.

**CO3:** Express equation of the linear differences equations-Linear homogeneous difference.

**CO4:** Use knowledge about the Solution of Algebraic and Transcendental Equations.

**CO5:** Solve Numerical Solution of Ordinary Differential Equations.

#### Recommended Text

1. B.D. Gupta. (2001) *Numerical Analysis*. Konark Pub. Ltd., Delhi
2. M.K.Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

#### Reference Books

1. Gupta-Malik, Calculus of finite differences and numerical Analysis, KrishbaPrakashanMandir, Meerut Seveenth Edition.
2. S.C.Saxena, Calculus of finite differences and Numerical Analysis, S.Chand& Co., New Delhi. IX Edition.
3. A.Singaravelu, Numerical methods, Meenakshi Publications-First Edition 1992.

<b>BPMA 26</b>	<b>Numerical Methods</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credit</b>
<b>SEM II - Allied Practical (1)</b>		<b>0</b>	<b>3</b>	<b>2</b>

### **LEARNING OBJECTIVES:**

To acquire the practical knowledge on numerical analysis using the effective methods of numerical analysis.

### **SYLLABUS:**

#### **LIST OF PROBLEMS**

1. Derivatives by Newton's method
2. Gauss elimination method.
3. Gauss-Jacobi method.
4. Gauss-Siedel method.
5. Power method (eigenvalue).
6. Newton's forward and backward interpolation.
7. Lagrange interpolation.
8. Trapezoidal and Simpson one-third rules.
9. Euler's method.
10. Picard's method
11. Runge-Kutta's method.
12. Predictor-corrector method.

### **LEARNING OUTCOMES:**

The students will be able to

**CO1:** Compare Newton's forward and backward differences and divided differences formula.

**CO2:** Reduce the error using Trapezoidal, Simpson one-third rules and Euler's method.

**CO3:** Calculate Eigen values using power method.

**CO4:** Solve matrices by Gauss elimination method, Gauss-Jacobi method and Gauss-Siedel method.

**CO5:** Evaluate solutions by Runge-Kutta's method.



BGA20	VALUE EDUCATION	Lecture	Practical	Credit
SEM II - VALUE EDUCATION		2	0	2

### LEARNING OBJECTIVES

- The values and attitudes we live by affect how we relate to other people and to all our activities in the environment.
- A major influence on our prospects for achieving a sustainable future.

### SYLLABUS

**UNIT-I** Value Education - Definition - relevance to present day - Concept of Human Values - self introspection - Self-esteem.

**UNIT-II** Family values - Components, structure and responsibilities of family – Neutralization of anger -Adjustability-Threatsoffamilylife-Statusofwomeninfamilyandsociety-Caring for needy and elderly - Time allotment for sharing ideas and concerns.

**UNIT-III** Ethical values - Professional ethics - Mass media ethics - Advertising ethics – Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

**UNIT-IV** Social values - Faith, service and secularism - Social sense and commitment – Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities Redressal mechanisms.

**UNIT-V** Effect of international affairs on values of life/ Issue of Globalization – Modern warfare Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

### LEARNING OUTCOMES

The students will be able to.

**CO1:** Define an understanding of values education strategies.

**CO2:** Explain the relation between values and personal behaviour affecting the achievement of sustainable futures.

**CO3:** Describe on your futures awareness, commitment and actions

**CO4:** Recognize skills for using values clarification and values analysis in teaching.

**CO5:** Construct international affairs on values of life and mutual respect of different cultures, religions and their beliefs.

### REFERENCES

1. T. Anchukandam and J. Kuttainmathathil (Ed) Grow Free Live Free, KrisituJyoti Publications, Bangalore (1995)
2. Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.
3. DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.]

BSS20	SOFT SKILLS	Lecture	Practical	Credit
SEM II – SOFT SKILLS		2	0	2

### LEARNING OBJECTIVES

- Learn to listen, write, read and understand communication
- Acquire knowledge to read and respond to the instructions and the interpretation and the skill to transpose information

### SYLLABUS

**UNIT I** 1.Skills in Listening and Writing 1.2. Skills in Reading and Understanding

**UNIT II** 1.Skills to Read and Respond to Instructions 2.2. Skills of Interpretation and Transcoding Information

**UNIT III** 1.Skills in Seeking and Responding to Information 3.2. Skills of Day-to-Day communication

**UNIT IV** 1.Grammatical skills and Spelling rules 4.2. Career skills

**UNIT V** 1.Skills of formal and in-formal rules 5.2. Skills of non-verbal communication

### LEARNING OUTCOMES

The students will be able to

**CO1:** Demonstrate the skill for listening, writing, reading and writing

**CO2:** Exhibit the skill to read and respond to instruction

**CO3:** Demonstrate skill in seeking, responding to information in day to day life

**CO4:** Explain the grammatical, spelling and career skills

**CO5:** Describe the skills for formal, in-formal and non-verbal communication

### REFERENCES

NIL

BLT30	TAMIL III	Lecture	Practical	Credit
SEM III - LANGUAGE		6	0	4

### நோக்கங்கள்

- சங்ககாலத்தின் இறுதிப்பகுதி ஒழுக்ககேடுகள் நிறைந்ததாக இருந்தது தமிழ்ச் சமுதாயம் குழப்பத்திற்கு ஆளானது அப்பொழுது வந்த சமயக்குறவர்கள் நீதி இலக்கியங்களை இயற்றினர்.
- இத்தகைய அறநூல் பணிக்கு வெண்பாவை பயன்படுத்தி இருந்தார் வள்ளுவர் வெண்பா இரண்டு அடி முதல் நான்கு அடி வரை உள்ளது.
- நீதி நூல்களின் தொடக்க காலத்தில் சிலம்பும் மேகலையும் நீதி அறம் சார்ந்த கருத்துக்களை பரப்புதலையே முதல் நோக்கமாகக் கொண்டன.

**அலகு.1 திருக்குறள் - விருந்தோம்பல், இறைமட்சி, காலமறிதல், மக்கட்பேறு, நெஞ்சேடுப்புலத்தல்.** எல்லா சமயத்திற்கும் பொதுவான கருத்துக்களை எடுத்தியம்பும் திருக்குறளைப்பற்றி மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு. 2 சிலப்பதிகாரம் - மதுரைக்காண்டம், மணிமேகலை, - சிறைக்கோட்டம் அறக்கோட்டம் ஆக்கியக்காதை.**

மாணவர்கள் இரட்டைக்காப்பியங்களான சிலப்பதிகாரத்தையும் மணிமேகலையும் அறிந்துக்கொள்கிறார்கள்

**அலகு. 3 சீவகசிந்தாமணி - காந்தருவத்தையர் இலம்பகம், கம்பராமாயணம் - கிட்கிந்த காண்டம் - வாலி வதைப்படலம்.**

ஐம்பெருங்காப்பியங்களின் ஒன்றான சீவகசிந்தாமணியையும் கம்பராமாயணத்தையும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு 4 பெரியபுராணம் - தடுத்தாட்க் கொண்டபுராணம், சீராப்புராணம் - தசைக்கட்டியை பெண்ணுறுவாக்கிய படலம். தேம்பாவணி - வளன் சனித்தப்படலம்**

பெருமைமிக்க அடியார்களின் பெருமைமிக்க வரலாற்றை எடுத்துக்கூறும் புராணக் கதைகளை மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு. 5 கடிதம் வரைதல், விண்ணப்பம் எழுததல், தன் விபக்குறிப்பு, நிகழ்ச்சி நிரல் அறிக்கை தயாரித்தல், இலக்கிய வரலாறு, பதினெண்கீழ்க்கணக்கு நூல்கள் அற இலக்கியங்கள், நீதி இலக்கியங்கள்**

மாணவர்கள் கடிதம் எழுதவும், விண்ணப்பம் எழுதவும் நிகழ்ச்சி நிரல் அறிக்கை தயாரிக்கவும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

### சிறப்பு நோக்கம்

- மாணவர்கள் திருக்குறளில் கூறப்படும் அறத்துப்பால், பொருட்பால், இன்பத்துப்பால் ஆகிய செய்திகளையும் திருவள்ளுவரின் பெருமையும் அறிந்துக்கொள்கிறார்கள், அவர்கள் அறம் சார்ந்த வாழ்க்கை வாழ்வதற்கு உதவுகிறது.
- மாணவர்கள் இரட்டைக்காப்பியங்களான சிலப்பதிகாரத்தையும் மணிமேகலையும் தெரிந்துக்கொள்வதின் வாயிலாக நீதி தவறாது வாழ்வதற்கு கற்றுக்கொள்கிறார்கள்.
- மாணவர்கள் சமண நூலான சீவகசிந்தாமணியில் யாழின் சிறப்பு வாசிக்கும் தன்மையும் துறவு வாழ்க்கையின் மேன்மையும், வாலி இராமனின் உரையாடலின் மூலம் வாதத்திறமையை வளர்த்துக்கொள்கிறார்கள்.
- மாணவர்கள் நபிகள் நாயகத்தின் வாழ்க்கையும், சூசையப்பரின் வாழ்க்கையும் இப்பகுதியின் வாயிலாக அறிந்துக்கொள்கிறார்கள்.
- மாணவர்கள் அலுவலக கடிதம், எழுதவும் நிகழ்ச்சி நிரல் தயாரித்தல் குறித்த செய்திகளை இப்பகுதியின் வாயிலாக எழுதப் பயிற்சிப் பெறுகிறார்கள். ஐம்பெரும் காப்பியங்கள், திருக்குறள், சீராப்புராணம், பெரியபுராணம், தேம்பாவணி, கம்பராமாயணம், பொதுக்கட்டுரைகள்.

<b>BLE30</b>	<b>ENGLISH III</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credit</b>
<b>SEM III - ENGLISH</b>		<b>6</b>	<b>0</b>	<b>4</b>

**SYLLABUS****UNIT -1 PROSE**

1. The Right to Public Amnesia – Santhosh Desai
2. On saying “Please” – .A.G. Gradiner.
3. With the Photographer – Stephen Leacock
4. Indian Women -Dr.S.Radhakrishnan

**UNIT -2 POETRY**

1. Time and Love -William Shakespeare
2. Satan’s Speech – John Milton
3. Obituary -A.K.Ramunujam
4. The Professor – Nissim Ezekiel

**UNIT -3 DRAMA**

1. Lady Macbeth soliloquy- Act I scene V
2. Women's Monologue- Antony & Cleopatra Act IV scene ii and Act V scene xiii

**BIOGRAPHY**

1. Mother Teresa -F.G.Herod

**UNIT -4 VOCABULARY**

1. Lexical Skills
2. Functional Grammar
3. Functional English

**UNIT -5 COMMUNICATION SKILLS**

1. Asking for Advice
2. Expressing Gratitude
3. Complementing and Congratulating
4. Complaining

**Books for Reference:****NIL**

BMA31	Differential Equations	Lecture	Practical	Credit
SEM III – CORE THEORY		6	0	4

### Learning Objectives

- This course aims to provide logical skills in the formation of differential equations, to expose to different techniques of finding solutions to these equations.
- In addition stress is laid on the application of these equations in geometrical and physical problems.

### SYLLABUS

#### UNIT-I: Ordinary Linear Differential Equations

Bernoulli Equation – Exact Differential Equations – Equations Reducible to Exact Equations – Equations of First order and Higher degree: Equations solvable for p, Equation solvable for x and Equations Solvable for y – Clairaut's Equation.

#### UNIT-II: Ordinary Linear Differential Equations [Contd...]

Method of Variation of Parameters – 2<sup>nd</sup> order Differential Equations with Constant Coefficients for finding the P.I's of the form  $e^{ax} V$ , where V is  $\sin(mx)$  or  $\cos(mx)$  and  $x^n$  – Equations reducible to Linear equations with constant coefficients – Cauchy's homogeneous Linear Equations – Legendre's Linear Equations.

#### UNIT-III: Differential Equations of Other Types

Simultaneous Equations with Constant coefficients – Total Differential Equations Simultaneous Total Differential Equations – Equations of the form  $dx/P = dy/Q = dz/R$

#### UNIT-IV: Laplace Transform

Transform-Inverse Transform – Properties – Application of Laplace Transform to solution of first and second order Linear Differential equations [with constant coefficients].

#### UNIT-V: Partial Differential Equations

Formation of PDF – Complete Integral – Particular Integral – Singular Integral – equations Solvable by direct Integration – Linear Equations of the first order – Non-linear Equations of the first Order: **Types:**  $f[p,q]=0$ ,  $f[x,p,q]=0$ ,  $f[y, p, q]=0$ ,  $f(z, p, q)=0$ ,  $f[x, q]=f[y, p]$ ,  $z = px+qy + f[p, q]$

#### Learning Outcomes:

The student will be able to

**CO1:** Define and derive the meaning of solution of a differential equation.

**CO2:** Express the existence-uniqueness theorem of differential equations.

**CO3:** Solve first-order ordinary differential equations.

**CO4:** Analyze Solves exact Laplace Transform and Inverse Transform.

**CO5:** Construct the solution of equations Partial Differential Equations and Non-linear Equations of the first Order.

#### Recommended Text

S.Narayananand T.K.Manickavachagapillai[2004] Calculus S.Viswanathan Printers and publishers Pvt.Ltd.,Chennai.

#### Reference Books

1. M.D. Raisinghania, [2001] Ordinary and Partial Differential Equations, S.Chand and Co., New Delhi.

BAMA13B	Mathematical Statistics I	Lecture	Practical	Credit
SEM III – ALLIED THEORY III		7	0	4

**Learning Objective**

- To apply Statistics Methods for Mathematical Problems .Statistical methods used in practice are based on a foundation of statistical theory.
- One branch of this theory uses the tools of probability to establish important distributional results that are used throughout statistics.

**SYLLABUS****UNIT-I**

Concept of Sample Space - Events - Definition of Probability (Classical, Statistical and Axiomatic) - Addition and Multiplication laws of Probability - Independence of Events - Conditional Probability - Baye's Theorem - Simple Problems.

**UNIT-II**

Random Variables (Discrete and Continuous) - Distribution Function - Expectation and Moments - Moment Generating Function - Probability Generating Function - Cumulant Generating Function - Simple Problems.

**UNIT-III**

Characteristic Function - Properties - Uniqueness and Inversion Theorem (Statement only) Chebychev's Inequality - Simple Problems

**UNIT-IV**

Concept of Bivariate Distribution - Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation - Linear Regression.

**UNIT-V**

Standard distributions: Discrete distributions - Binomial, Poisson, Hyper Geometric and Negative Binomial Distributions - Continuous Distributions Normal, Uniform, Exponential.

**Learning Outcome:**

The student will be able to

**CO1:** Define the knowledge of sample space and properties of, statistical models and some problems.

**CO2:** Describe Random Variables, Probability Generating Function and solve some problems.

**CO3:** Understand the basic principles underlying characteristic inference and solve different problems.

**CO4:** Construct Concept of Bivariate Distribution and Rank Correlation - Linear Regression.

**CO5:** Demonstrate knowledge of applicable Standard distributions and Binomial Distributions.

**Recommended text book:**

S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical Statistics, Sultan & sons

**Books for Reference**

1. Hogg, R.V. & Craig.A.T.(1998) : Introduction to Mathematical Statistics, Macmillan

2. Mood. A.M. Graybill. F.A.&Boes.D.G.(1974) : Introduction to theory of Statistics, McGraw Hill.

BSMA33	Linear Programming	Lecture	Practical	Credit
SEM III – SKILL BASED SUBJECT I		3	0	3

### Learning Objectives:

- To improve the skills of solving very common problems which we come across in various fields like transportation, games and industries with machines.

#### UNIT-I

Linear programming problem - Mathematical formulation of the problem - Graphical solution method - simple method - Duality - primal and dual relation ( simple Problems).

#### UNIT-II

Transportation problem - Degeneracy in transportation problem.

#### UNIT-III

The Assignment problem – Travelling salesman method.

#### UNIT-IV

Game theory - two persons zero sum game - the maximinminimax principle - saddle points - games without saddle points.

#### UNIT-V

Simulation - application - advantages and disadvantages - Monte Carlo method - simple problems.

### Learning Outcomes:

The student will be able to

**CO1:** Sketch a graphical representation of a two-dimensional linear programming model given in general, standard or canonical form and Graphical Method.

**CO2:** Critique Transportation problem - Degeneracy in transportation problem.

**CO3:** Formulate a given simplified description of a suitable real-world problem as a linear programming model in assignment problem and Travelling Salesman problem.

**CO4:** Solve a Game Theory linear programming problem in Maximum ion and Minimum.

**CO5:** Use the Monte Carlo method to solve small linear programming models by hand, given a basic feasible point.

### Recommended Text

Gupta P.K.and Hira D.S., (2000) Problems in Operations Research, S.Chand & Co. Delhi

### Reference Books

- Quantitative Aptitude - R.S. Aggarwal (S.Chand& Co - New Delhi 2008)
- Quantitative Aptitude for Competitive Examinations - AbhigitGuha (Tata McGraw - Hill Pub., Co., Ltd. New Delhi - III Edn.,)

BNCS34	Introduction to Information Technology	Lecture	Practical	Credit
SEM III – Non- Major Elective I		2	0	2

**Learning Objectives:**

- To enable the student to be proficient with Information Technology with a better knowledge of Computer.

**SYLLABUS****UNIT– I : Introduction to Computers:**

Definition - Characteristics of a Computer - Classification of Computers - Basic Anatomy of the Computer - Applications / Uses of Computers in different fields

**UNIT – II : Input and Output Devices:**

Input Devices - Output Devices - Data Representation - Programming Languages / Computer Languages - Software: System Software - Application Software

**UNIT – III : Data Communication and Computer Networks:**

Data Communication - Computer Network - The Uses of a Network - Types of Networks - Network Topologies- Transmission Media: Guided Transmission Media - Wireless Transmission

**UNIT – IV Internet and its Applications:**

History of Internet - Uses of Internet - Advantages of Internet - ISP - Internet Services - IP Address - Web Browser - URL - DNS - Internet Explorer - Types of internet connections - E-mail - Search Engine.

**UNIT – V Operating System:**

Evolution of operating systems - Function of Operating System - Classification of Operating –System - Example of Operating System – DOS –Windows – UNIX - Linux

**Learning Outcomes:**

The student will be able to

**CO1:** Apply knowledge of computing and mathematics appropriate to the discipline.

**CO2:** Inspect the problem, and identify and define the computing requirements appropriate to its solution

**CO3:** Establish the design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

**CO4:** Construct function effectively on teams to accomplish a common goal.

**CO5:** Understand professional, ethical, legal, security and social issues and responsibilities.

**TEXT BOOKS:**

- Alexis Leon and Mathews Leon, “Fundamentals of Information Technology”, Vikas Publishing House Pvt. Ltd.
- Introduction to Information Technology, P.Rizwan Ahmed, Second Edition, Margham Publications, 2016
- Introduction to Information Technology, PelinAksoy, Laura DeNardis, Cengage Learning India Private Limited.



BLT40	TAMIL IV	Lecture	Practical	Credit
SEM IV – LANGUAGE		6	0	4

### நோக்கங்கள்

- சங்க இலக்கியங்களான பத்துப்பாட்டு எட்டுத்தொகை நூல்கள் மூவேந்தர்களின் வாழ்க்கை முறையும் தமிழர்களின் பண்பாட்டையும் அறிந்துக்கொள்கிறார்கள்.
- பொற்காலமான சங்ககாலத்தின் மகளிர் ஒழுக்கங்களைப்பற்றியும் ஆடாவரின் வீரத்தைப்பற்றியும் மக்கள் போர்காலத்தைப் அமைதி வாழ்க்கையை வாழ்ந்தனர்

**அலகு. 1 குறந்தொகை, பாடல் எண்: 7,8,58,94,103. நற்றிணை, பாடல் எண்:**

**1,226,238,249,380. ஐங்குறுநூறு – சிறுவெண்காக்கைப்பத்து பாடல்கள் மட்டும்.**

**குறக்குப்பத்து பாடல்கள் 1,5**

தமிழர்களின் சங்ககால அக வாழ்க்கை முறைகளையும் பழக்க வழக்கங்களையும் பண்பாட்டையும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு. 2 புறநானூறு, பாடல்கள் 10,18,206,212,278, பதிற்றுப்பத்து பாடல்கள் - 20,59.**

சங்ககால தமிழ் மக்களின் புற வாழ்வில் அவர்களின் போர் முறைப்பற்றியும் வீரத்ததைப்பற்றியும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு. 3கலித்தொகை பாடல்கள் 8,59,84,108,120 – பறிபாடல் திருமால், செவ்வேள், வைகை பாடல்கள்.**

சங்ககால மக்களின் காதல் வாழ்க்கை முறையும் தெய்வ வழிபாட்டு முறையும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு. 4பத்துப்பாட்டு – முல்லைப்பாட்டு முழுவதும்.**

சங்ககால மக்களின் பாசறைப் பற்றியும் போர்கள் பாசறையில் தங்கும் அரசர், ஆடவர், பெண்டிர் வாழ்க்கை முறையை மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.

**அலகு. 5சங்க இலக்கிய வரலாறு, எட்டுத்தொகை நூல்கள், பத்துப்பாட்டு நூல்கள், மொழிப்பெயர்ப்பு – ஆங்கில பகுதியை தமிழில் மொழிப்பெயர்த்தல், அலுவலக கடிதம் தமிழில் மொழிப்பெயர்த்தல்.**

சங்க இலக்கியங்களான எட்டுத்தொகைப் பத்துப்பாட்டு நூல்களைப் பற்றி அறிதல்.

மொழிப்பெயர்ப்பு, அலுவலக கடிதங்கள் மொழிப்பெயர்த்து எழுத கற்றுக்கொள்கிறார்கள். சிறப்பு நோக்கம்

- குறந்தொகை, நற்றிணை ஐங்குறுநூறு ஆகிய நூல்களைப் பற்றியும் அவற்றில் கூறப்பட்டுள்ள திணை துறைகளைப் பற்றியும் மாணவர்கள் அறிந்துக்கொள்கிறார்கள்.
- புறநானூறு பற்றியச் செய்திகளையும் சோழர் மற்றும் பாண்டியர்களின் போர் திறனையும் கொடைத்திறனையும் சேர மன்னர்களின் போர் திறனையும் மாணவர்கள் வாழ்க்கையில் பிறருக்கு ஈதல் பழக்கத்தை வளர்த்துக்கொள்கிறார்கள்.
- ஆங்கிலத்தில் உள்ளச் செய்தியை தமிழில் மொழிப்பெயர்த்தலும் அலுவலக கடிதத்தையும் மொழிப்பெயர்க்கும் முறையைப்பற்றி மாணவர்கள் கற்றுத்தெளிகிறார்கள்.

BLE40	ENGLISH IV	Lecture	Practical	Credit
<b>SEM IV – ENGLISH</b>		<b>6</b>	<b>0</b>	<b>4</b>

**SYLLABUS****UNIT -1 PROSE**

1. What is Courage - J.B.Priestly
2. Travel By Train - J.B.Priestly
3. Nobel Lecture - C.Malala Yousafjai
4. I won't Let him Go -Mathavan Kutty

**UNIT -2 POETRY**

1. Stopping by Woods on Snowy Evening – Robert Frost
2. Refugee Mother and Child -Chinua Achebe
3. An Octobere Morning - Jayanta Mahapatra
4. Lyric No.1-XX11 (From Gitanjali) – Rabindranath Tagore

**UNIT -3 DRAMA**

Selected Scenes from Shakespeare

1. Hamlet (Soliloquy) Act III Scene I
2. Funeral Oration – Julius Caesar Act III Scene II

**BIOGRAPHY**

1. Rabindranath Tagore – E.M. Carter

**UNIT -4 VOCABULARY**

1. Lexical Skills
2. Functional Grammar and English Grammar

**UNIT -5**

1. E-mail
2. Presentation Skills
3. Curriculum Vitae and Covering Letter
4. Facing an Interview

**Books for Reference:**

**NIL**

BMA41	Vector Analysis and Fourier Analysis	Lecture	Practical	Credit
SEM IV – Core Theory		6	0	4

### Learning Objectives

- This course covers the topics in vector and tensor calculus which are essential tools of modern applied mathematics.
- To develop deep understanding of key concepts followed by problems of applied nature.
- The portion on Fourier analysis will lead to post-graduate studies and research in pure as well as applied mathematics.

### SYLLABUS

**UNIT-I: Differential Vector Calculus:** Differentiation of a Vector - Geometrical Interpretation of the Derivative - Differentiation Formulae - Differentiation of dot and Cross Products - Partial Derivatives of Vectors - Differentials of Vectors.

**UNIT-II: Gradient, Divergence and Curl:** Vector Differential Operator Del - Gradient of a Scalar Function - Directional Derivative - Geometric Interpretation - Gradient of the sum of Functions; of the product of functions and of a function of function - Operations involving Del - Divergence of a Vector and its Physical Interpretation - Curl of a Vector and its Physical Interpretation - Expansion Formulae for Operators involving Del - Solenoidal and Irrotational.

**UNIT-III: Vector Integration:** The Line Integral - Surface Integral and its Physical Meaning – Volume integral. Simple problems.

**UNIT-IV: Vector Integration(Contd.):** Statements of Stoke's Theorem, Gauss Divergence Theorem and Green's Theorem and problems.

**UNIT-V: Fourier Series:** Euler's Formulae - Conditions for Fourier Expansion - Functions having Discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even periodic Functions - Half-range Series-Typical Wave Forms - Parseval's Formula

### Learning Outcomes:

#### The student will be able to

**CO1:** Define and Execute vector algebra and use the gradient of scalar field to solve elementary problems

**CO2:** Identify the most appropriate coordinate system for a given problem and apply the gradient.

**CO3:** Test the Surface integral and Volume Integral as well as differentiation of scalar and vector fields.

**CO4:** Interpret the divergence and the curl physically and apply these operators to carry out surface and line integration by means of Gauss and Stoke's theorems.

**CO5:** Use noble operator and index notation to simplify and carry out Fourier series calculations and simple problems.

**CO6:** solve Poisson's equation with appropriate boundary conditions for problems with cylindrical and spherical symmetries

### Recommended Text

P.R. Vittal. (2004) *Vector Calculus, Fourier series and Fourier Transform*. Margham Publications, Chennai.

### Reference Books

1. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9th Edn), Mass. (Indian Print).
2. M.K.Venkataraman. (1992) *Engineering Mathematics-Part B*. National Publishing Company, Chennai.
3. B.S.Grewal. *Higher Engineering Mathematics* (2002), Khanna Publishers, New Delhi.

BAMA23B	Mathematical Statistics II	Lecture	Practical	Credit
<b>SEM IV – ALLIED THEORY IV</b>		<b>4</b>	<b>0</b>	<b>4</b>

**Learning Objective**

- To apply Statistics for Mathematical problems.

**SYLLABUS****UNIT-I**

Statistical Population Census and Sampling Survey - Parameter and Statistics - Sampling and Sampling Distribution and Standard Error. Sampling distributions - students 't', chi - square and F distributions.

**UNIT-II**

Test of significance - Large sample test for proportion, mean and standard deviation - Exact test based on 't', Chi - square and F distribution with respect to population mean, variance and correlation coefficient - Tests of independence of attributes - goodness of fit tests.

**UNIT-III**

Point estimation - Concept of unbiasedness, consistency, efficiency and sufficiency - Cramer- Rao Inequality - Methods of Estimation - Maximum Likelihood Estimation - Method of Moments.

**UNIT-IV**

Test of Hypothesis: Null and Alternate Hypothesis - Type I and Type II error - Power of the test - Neymann Pearson lemma - Likelihood Ratio Test - Concept of Most Powerful test (Statement and Results only) - Simple Problems

**UNIT-V**

Analysis of Variance - One - way and Two-way Classification - Basic Principles of Design of Experiments - Randomization, Replication, Local Control, Completely Randomized Design, Randomized Block Design and Latin Square Design.

**Learning Outcomes:**

The student will be able to

**CO1:** Define the knowledge of Sampling and Sampling Distributions.

**CO2:** Demonstrate the basic principles of Test of significance.

**CO3:** Construct tests and estimators, and derive their properties.

**CO4:** Appraise the knowledge of large sample theory of estimators and tests.

**CO5:** Devolope the ideas of the analysis of variance and solve some problems.

**Recommended Text:**

S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan & sons

**Books for Reference**

- Hogg, R.V. & Craig. A. T. (1998): Introduction to Mathematical Statistics, Macmillan
- Mood.A.M., Graybill. F.A. & Boes. D.G. (1974): Introduction to theory of Statistics, McGraw Hill.

BPMA26	Mathematical Statistics	Lecture	Practical	Credit
SEM IV – ALLIED PRACTICAL II		3	0	2

**Learning Objectives:**

- To acquire the practical knowledge on Mathematical statistics.

**SYLLABUS:****List of Experiments:**

- Measures of location and Dispersion (absolute and relative)
- Computation of Correlation Coefficient for raw and Grouped data, Rank Correlation Coefficient
- Computation of Regression Equations for Raw and Grouped Data
- Curve Fitting by the Method of Least Squares
  - $y = ax+b$
  - $y = ax^2+bx+c$
  - $y = ae^{bx}$
  - $y = ax^b$
- Fitting of Binomial, Poisson, Normal distributions and tests of goodness of fit.
- Large sample tests with regard to population mean, proportion, standard deviation
- Exact tests with Respect to Mean, Variance and Coefficient of Correlation
- Test for Independence of Attributes Based on Chi-Square Distribution
- Confidence Interval based on Normal, t and Chi-square and F Distributions
- Problems based on ANOVA-one way and two way Classification
- Completely Randomized Design
- Randomized Block Design
- Latin Square Design

**Learning Outcomes:**

The students will be able to

**CO1:** Compute Measures of location and Dispersion for the data.

**CO2:** Fit the curves by method of least squares.

**CO3:** Test the hypothesis for large and small samples.

**CO4:** Evaluate Confidence interval on normal, t, chi-square and F- distribution.

**CO5:** Analyze Completely Randomized Design, Randomized Block Design and Latin Square Design

**Note**

Use of scientific calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

Mathematics faculty alone should be appointed as examiners.

**Books for Reference**

- Hogg, R.V. & Craig, A.T. (1998): Introduction to Mathematical Statistics, Macmillan.
- Mood, A.M., Graybill, F.A. & Boes, D.G. (1974): Introduction to theory of Statistics, McGraw Hill.

BSMA43	Mathematics for Competitive Examinations - I	Lecture	Practical	Credit
SEM IV: SKILL BASED PAPER		3	0	3

### Learning Objectives

- To introduce concepts of mathematics with emphasis on analytical ability and computational skill needed in competitive examinations.

### SYLLABUS

#### Unit- I

Numbers, H.C.F. and L.C.M. of numbers, Decimal Fractions.

#### Unit -II

Simplification, Square roots and Cube Roots, Average.

#### Unit- III

Problems on numbers, problems on Ages.

#### Unit -IV

Surds and Indices, Percentage, Profit and Loss.

#### Unit -V

Ratio and Proportion, Partnership.

### Learning Outcomes:

**The student will be able to**

**CO1.** Recall the number systems.

**CO2.** Understand the basic concepts of QUANTITATIVE ABILITY  
And LOGICAL REASONING Skills

**CO3.** Acquire satisfactory competency in use of VERBAL REASONING

**CO4.** Solve campus placements aptitude papers covering Quantitative  
Ability, Logical Reasoning and Verbal Ability

**CO5.** Compete in various competitive exams like CAT, CMAT, GATE,  
GRE, GATE, UPSC, GPSC etc.

### Text Books:-

- Quantitative Aptitude for competitive Examination ,R.S.Aggarwal. S.Chand and company Ltd,152, Anna salai, Chennai. (2001)
- Quantitative Aptitude and Reasoning Praveen PHI P. Ltd.

BNCS44	Internet and its Applications	Lecture	Practical	Credit
SEM IV: Non- Major Elective II		2	0	2

**Learning Objective:**

- To equip students to basics of Internet usage and prepare them for digital world.

**SYLLABUS****UNIT - I Internet Basics**

Introduction to Computers Programming Language types History of Internet Personal computers History of World Wide Web- Micro software .NET Java-Web resources.

**UNIT - II Web Browsers**

Web Browsers - Internet Explorer - connecting to Internet Features of Internet explorer6 Searching the Internet- online help and tutorials - File Transmission Protocol (FTP) Browser settings.

**UNIT - III E-Mail**

Attaching a file, Electronic mail creating an E-mail id sending and Receiving mails - attaching a file - Instance messaging - other web browsers.

**UNIT - IV HTML**

Introduction to HTML headers – Linking - Images-special characters and line breaks unordered lists- simple HTML programs.

**UNIT - V Digital Cash**

E-marketing consumer tracking Electronic advertising search engine – CRM - credit card payments Digital cash and e-wallets micro payments- smart card

**Learning Outcomes:****The student will be able to**

**CO1:** Define and classify Basics for the development of Internet applications and Internet programming,

**CO2:** Use the Principles of sites design and design technology and web browsers.

**CO3:** Develop Basic programming sites of various software tools.

**CO4:** Design Web-applications using design technology and Internet programming.

**CO5:** Apply Internet programming in the development of Web-applications.

**Text book**

- Internet and World Wide Web Third edition H.M.Deitel, P.J. Deitel and A.B.Goldberg - PHI Reference
- The Internet- Complete Reference Harley hahn, Tata McGraw Hill

BMA51	ABSTRACT ALGEBRA	Lecture	Practical	Credit
SEM V - CORE THEORY		5	0	4

### LEARNING OBJECTIVES

1. This course aims to impart emphasis on concepts and technology of the groups and rings as these algebraic structures have applications in Mathematical Physics, Mathematical Chemistry and Computer Science.

### SYLLABUS

#### UNIT-I: Groups

Definition of a Group - Examples - Subgroups;

#### UNIT-II: Groups (Contd)

Counting Principle - Normal Subgroups - Homomorphisms.

#### UNIT-III: Groups (Contd)

Automorphisms - Cayley's Theorem - Permutation Groups.

#### UNIT-IV: Rings

Definition and Examples - Integral Domain - Homomorphism of Rings - Ideals and Quotient Rings.

#### UNIT-V: Rings (Contd)

Prime Ideal and Maximal Ideal - The field of quotients of an Integral domain – Euclidean rings.

### LEARNING OUTCOMES

The students will be able to

**CO1:** Understand the concepts of sets, groups and rings and also mappings on sets, groups and rings.

**CO2:** Describe the basic concepts of group actions and their applications in both algebraic and geometric contexts

**CO3:** Analyze the basic concepts of group presentations and use appropriate techniques and reasoning to derive properties of groups defined by generators and relations

**CO4:** Define the elementary concepts of rings and integral domains; categorize the similarities and differences between these concepts of rings and integral domains.

**CO5:** Identify the prime Ideal and maximal Ideal, Explain the field of quotients of integral domain and Euclidean rings.

#### Recommended Text

I.N.Herstein (1989), Topics in Algebra, (2nd Edn.)Wiley Eastern Ltd. New Delhi

Chapter-2: Sections 2.1-2.10 (Omit Applications 1 and 2 of 2.7)

Chapter-3: Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.

#### Reference Books

1. S.Arumugam. (2004) *Modern Algebra*.Scitech Publications, Chennai.
2. J.B.Fraleigh (1987). *A First Course in Algebra* (3rd Edition) Addison Wesley, Mass. (Indian Print)
3. Lloyd R.Jaisingh and Frank Ayres,Jr. (2005) *Abstract Algebra*, (2nd Edition), Tata McGraw Hill Edition, New Delhi.
4. M.L.Santiago (2002) *Modern Algebra*, Tata McGraw Hill, New Delhi.



BMA52	REAL ANALYSIS -I	Lecture	Practical	Credit
SEM V - CORE THEORY		5	0	4

**LEARNING OBJECTIVES**

1. To understand various limiting behaviour of sequences and series
2. To explore the various limiting processes viz. continuity, uniform continuity, differentiability and integrability and to enhance the mathematical maturity and to work comfortably with concepts.

**SYLLABUS****UNIT-I: Functions & Sequences**

Functions – real valued functions – equivalence – countability and real numbers – least upper bound – definition of sequence and subsequence – limit of a sequence – convergent sequence  
Ch. 1.4 to 1.7, 2.1 to 2.3 of Goldberg.

**UNIT-II: Sequences [Contd...]**

Divergent sequences – Bounded sequences – Monotone sequence – Operations on convergent sequences – Operations on divergent sequences – Limit superior and Limit inferior – Cauchy sequences  
Ch. 2.4 to 2.10 of Goldberg.

**UNIT-III: Series of Real Numbers**

Convergence and Divergence – Series with non negative terms – Alternating series – conditional convergence and Absolute convergence – Test for Absolute convergence.  
Ch. 3.1 to 3.4 and 3.6 of Goldberg.

**UNIT-IV: Series of Real Numbers [Contd...]**

Test for Absolute convergence – The class  $\ell_2$  – Limit of a function on the real line – Metric spaces – Limits in Metric spaces.  
Ch. 3.7, 3.10, 4.1 to 4.3 of Goldberg.

**UNIT-V: Continuous Functions on Metric Spaces**

Functions Continuous at a point on the real line – Reformulation – Functions Continuous on a Metric Spaces – Open Sets – Closed Sets.  
Ch. 5.1 to 5.5 of Goldberg

**LEARNING OUTCOMES**

The students will be able to

- CO1:** Understand the real numbers, functions, sequences and limit of the functions and sequences.  
**CO2:** Categorize sets; equivalent sets, finite, countable and uncountable sets; Calculate the limit superior, limit inferior, and the limit of a sequence.  
**CO3:** Recognize convergent, divergent, bounded, Cauchy and monotone sequences.  
**CO4:** Apply the ratio, root, and limit and limit comparison tests to the series and metric spaces.  
**CO5:** Analyze the Functions Continuous at a point on the real line and Functions Continuous on a Metric Spaces.

**Recommended Text**

R.Goldberg [2000] Methods of Real Analysis. Oxford & IBH Publishing Co., New Delhi.

**Reference Books**

1. Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley New York.
2. Bartle, R.G. and Shebert [1976] Real Analysis, John Wiley and Sons Inc., New York.
3. Malik, S.C. and SavitaArora [1991] Mathematical Analysis, Wiley Eastern Limited, New Delhi.

BMA53	COMPLEX ANALYSIS -I	Lecture	Practical	Credit
SEM V - CORE THEORY		5	0	4

**LEARNING OBJECTIVES**

This course provides

1. A modern treatment of concepts and techniques of complex function theory
2. To gain knowledge about the complex number system, the complex function and complex integration.

**SYLLABUS****UNIT-I: Complex numbers and Elementary functions**

Complex Number system, complex numbers –Algebraic properties-Point at Infinity Stereographic Projection-Function of a complex variable-Mappings-Elementary Functions- The Logarithmic function- Branches of  $\log Z$ .

Sections 1-10, 21-30.

**UNIT-II: Analytic functions**

Definitions of Limits -Continuity-Derivatives and Differentiation formula-Cauchy-Riemann equations-Cauchy-Riemann equations in polar form-properties of Analytic functions-Necessary and sufficient conditions for Analytic functions-problems. Sections 11-19.

**UNIT-III: Conformal Mappings**

Harmonic functions-Determination of Harmonic conjugate and Analytic functions-conformal mapping-Isogonal mapping-Further properties and examples-transformations of Harmonic functions.

Sections 20, 76-80.

**UNIT-IV Mapping by Elementary transformations**

The transformations  $w = z + d$ ,  $w = 1/z$ ,  $w = z^2$ ,  $w = z$ ,  $w = e^z$ ,  $w = \sin z$ . Bilinear Transformation and special Bilinear Transformation problems.

Sections 31-36, 38-39

**UNIT-V: Integrals**

Contours - Line Integrals \_ Cauchy- Goursat's Theorem (without proof) Cauchy's Integral Formula - Derivatives of Analytic Functions - problems.

Sections 43-46, 50-52.

**LEARNING OUTCOMES**

The students will be able to

**CO1:** Gain knowledge about the complex number System and the complex functions and Point at Infinity Stereographic Projection; explain the graphical representation of complex numbers and Function of a complex variable.

**CO2:** Describe limits, Continuity and derivatives; Recognize Cauchy-Riemann equations, Cauchy-Riemann equations in polar form and can verify analyticity of the functions.

**CO3:** Define Harmonic functions and determine Harmonic conjugate and Analytic functions; Differentiate conformal mapping and Isogonal mapping.

**CO4:** Locate the elementary transformations such as  $w = z + d$ ,  $w = 1/z$ ,  $w = z^2$ ,  $w = z$ ,  $w = e^z$ ,  $w = \sin z$ .

**CO5:** Understand Contours and Line Integrals; Using Cauchy's Integral Formula and Derivatives of Analytic Functions can find the integrals of the analytic functions.

**Recommended Text**

R.V.Churchill and J.W.Brown, (1984) *Complex Variables and Applications*. McGraw Hill International Book Co., Singapore. (Third Edition)

BMA54	STATICS	Lecture	Practical	Credit
SEM V - CORE THEORY		5	0	4

**LEARNING OBJECTIVES**

1. This course introduces the students the basic concepts of forces, moments, couple, friction law virtual displacement and work, catenaries and the centre of gravity and kinematics.
2. This course stresses the development of skills in formation of suitable mathematical models and problems solving techniques.

**SYLLABUS****UNIT- I**

Forces, Type of forces- Resultant of three forces related to triangle acting at a point - Resultant of several forces acting on a particle - Equilibrium of a particle under three forces - Equilibrium of a particle under several forces - Limiting Equilibrium of a particle on an inclined plane.

**UNIT- II**

Moment of a forces- General motion of a Rigid body- Equivalent system of forces – Parallel forces- Forces along the sides of the triangle.

**UNIT- III**

Couples- Resultant of several coplanar forces – Equation of line of action of the resultant – Equilibrium of a rigid body under three coplanar forces.

**UNIT - IV**

Reduction of coplanar forces into a force and a couple – Friction – laws of friction – cone of friction and angle of friction – Applications involving frictional forces.

**UNIT - V**

Center of mass – Center of mass of a triangular lamina – Three particles of same mass - Three particles of certain masses – uniform rods forming a triangle – lamina in the form of a trapezium and solid tetrahedron – Center of mass using integration – circular arc – circular lamina – elliptic lamina – solid hemisphere – solid right circular cone – hemispherical shell – hollow right circular cone.

**Learning Outcomes:**

The students will be able to

**CO1:** Familiarize with subject matter, which has been the single center, to which were drawn mathematicians, Physicists, astronomers and engineers together.

**CO2:** Describe Newton's laws of motion, Force, Rigid body, Resultant Force (Combination of a force system) and equilibrium of Particle; Classify the moment of forces and calculate its value about a specified axis, analyze the moment of forces and parallel forces.

**CO3:** Recognize Couples and Resultant of several coplanar forces; explain equation of line of action of the resultant and Equilibrium of a rigid body under three coplanar forces. Apply Varignon's theorem to the resultant of forces and couples

**CO4:** Demonstrate friction and laws of friction; compare cone of friction and angle of friction.

**CO5:** Compile center of mass and center of mass of a triangular lamina; compute circular arc, circular lamina circular cone, hemispherical shell and hollow right circular cone.

**Recommended Text**

P. Duraipandian, LaxmiDuraipandian ,MuthamizhJayapragasam, Mechanics, 6-e, S. Chand and Company Ltd, 2005.

BMA55	DYNAMICS	Lecture	Practical	Credit
SEM V - CORE THEORY		4	0	4

**LEARNING OBJECTIVES**

1. This course aims to provide models for some real life problems. This covers topics like Simple Harmonic Motion, Projectiles, Central Orbits and Moment of Inertia.
2. Also Stress is on the mathematical formulation of the physics aspects of the problems and it develops logical deduction and interpretation.

**SYLLABUS****UNIT- I**

Velocity, Relative Velocity, Angular Velocity, Acceleration, Rectilinear motion, Rectilinear motion with constant acceleration, Relative angular velocity, Work, Power, Energy.

**UNIT- II**

Motion of a projectile, Nature of a trajectory, Results pertaining to the motion of a projectile, Range on an inclined plane, Maximum range on the inclined plane. Simple problems.

**UNIT -III**

Impulsive force, Conservation of linear momentum, Impact of a sphere, Laws of impact, Impact of two smooth spheres, Direct impact of two smooth spheres, Direct impact of a smooth sphere on a plane, oblique impact of a smooth sphere on a plane. Simple problems.

**UNIT- IV**

Central force and Central Orbit, Equation of central orbit, finding law of force and speed for a given orbit, Determination of the orbit when law of force is given, Kepler's Laws on planetary motion. Simple Problems.

**UNIT -V**

Moment of Inertia of simple bodies, Theorems of parallel and perpendicular axes, Moment of inertia of triangular lamina, circular lamina, circular ring, right circular cone, sphere. Simple problems.

**Learning Outcomes:**

The students will be able to

**CO1:** Understand and use basic terms for the description of the Velocity of particles, Relative angular velocity, Work, Power, and Energy.

**CO2:** Solve simple problems in Motion of a projectile and maximum range on the inclined plane.

**CO3:** Analyze the Impulsive force, Demonstrate direct impact of two smooth spheres, direct impact of a smooth sphere on a plane and oblique impact of a smooth sphere on a plane.

**CO4:** Apply Kepler's Laws on planetary law motion and Central force form to problems in more than one dimension.

**CO5:** Evaluate problems relating to Moment of Inertia of simple bodies and simple problems, explain theorems of parallel and perpendicular axes, Moment of inertia of triangular lamina, circular lamina, circular ring, right circular cone.

**Recommended Text**

P. Duraipandian, LaxmiDuraipandian, MuthamizhJayapragasam, Mechanics, 6-e, S. Chand and Company Ltd, 2005.

**Reference Books**

1. S. Narayanan, R. HanumanthaRao, K. Sitaraman, P. Kandaswamy, *Statics*, S. Chand and Company Ltd, New Delhi.

<b>BEMA56A</b>	<b>GRAPH THEORY</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credit</b>
<b>SEM V - ELECTIVE</b>		<b>3</b>	<b>0</b>	<b>3</b>

**LEARNING OBJECTIVES:**

- To study and develop the concepts of graphs, subgraphs, trees connectivity, Eulerian and Hamiltonian graphs, matching colorings of graphs and planar graphs.

**SYLLABUS****UNIT-I**

Graphs, sub graphs, Degree of a vertex, Isomorphism of graphs, independent sets and coverings.

**UNIT-II**

Intersection graphs; Adjacency and incidence of matrices; Operations on graphs;

**UNIT-III**

Walks; trails; paths; Connectedness and components; cut point, bridge, block.

**UNIT-IV**

Connectivity theorems and simple problems. Eulerian graphs and Hamiltonian graphs; simple problems

**UNIT-V**

Trees, theorems, and simple problems.

**Learning Outcomes:**

The students will be able to

**CO1:** Understand the basic concepts of graphs, sub graphs and types of graphs.

**CO2:** Differentiate the types of matrices and classify the operations on graphs.

**CO3:** Solve Problems using basic graph theory and Solve problems involving vertex and edge connectivity, planarity and crossing numbers.

**CO4:** Analyze whether the graphs are Hamiltonian or Eulerian.

**CO5:** Categorize various types of trees and methods for traversing trees.

**Recommended Text**

S.Arumugam and S.Ramachandran, "Invitation to Graph Theory", SITECH Publications India Pvt. Ltd., 7/3C, Madley Road, T.Nagar, Chennai - 17

**Reference Books**

- S.Kumaravelu, SusheelaKumaravelu, Graph Theory, Publishers, 182, Chidambara Nagar, Nagercoil-629 002.
- S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd.
- Robin J.Wilson, Introduction to Graph Theory, Longman Group Ltd.
- J.A.Bondy and U.S.R. Murthy, Graph Theory with Applications, Macmillon, London.

<b>BSMA57</b>	<b>MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credit</b>
<b>SEM V – SKILL BASED SUBJECT</b>		<b>3</b>	<b>0</b>	<b>3</b>

**LEARNING OBJECTIVES:**

1. To enhance the problem solving skills, to improve the basic Mathematical skills.
2. To help students who are preparing for any type of competitive Examinations.

**SYLLABUS****Unit- I**

Chain rule –Time and work.

**Unit- II**

Time and Distance

**Unit- III**

Problems on Trains.

**Unit- IV**

Boats and Streams.

**Unit- V**

Alligation or Mixture.

**Learning Outcomes:**

The students will be able to

**CO1:** Gain Knowledge on Chain rule and time and work.

**CO2:** Know about time and distance and solve the problems related to it.

**CO3:** Recognize the concepts of problems in trains.

**CO4:** Work with the concepts of boats and streams.

**CO5:** Compute problems in allegation and Mixture.

**Text Book:-**

Quantitative Aptitude for competitive Examination R.S. Aggarwal.  
S. Chand and company Ltd,152,Anna salai, Chennai. 2001

BMA61	LINEAR ALGEBRA	Lecture	Practical	Credit
SEM VI - CORE THEORY		5	0	4

**LEARNING OBJECTIVES:**

- To study the Algebraic structures of Vector Spaces and Linear Transformation.

**SYLLABUS****UNIT-I: Vector Spaces**

Definition and examples-Linear dependence and independence

**UNIT-II: Vector Spaces (Contd)**

Dual space - Inner Product spaces.

**UNIT-III: Linear Transformation**

Algebra of linear transformations - Characteristic roots

**UNIT-IV: Linear Transformation (Contd)**

Matrices, Canonical forms; Triangular forms.

**UNIT-V: Linear Transformation (Contd)**

Trace and Transpose, Determinants

**Learning Outcomes:**

The students will be able to

**CO1:** Describe Vector space, compile linear dependence and independence.

**CO2:** Explain dual space and Inner Product spaces, demonstrate Inner Product spaces.

**CO3:** Express required conditions for a transformation in order to be a linear transformation, evaluate characteristic roots.

**CO4:** Analyze matrices, evaluate canonical forms and triangular forms of the matrices. Express row and column space of a matrix.

**CO5:** Compute trace, transpose and determinants of the matrices in linear transformation.

**Recommended Text**

I.N.Herstein. (1989) *Topics in Algebra*. Wiley Eastern Ltd. New Delhi.

Chapter-4: Sections 4.1, 4.2, 4.3, 4.4,

Chapter-6: Sections 6.1, 6.2, 6.3, 6.4, 6.8, 6.9

**Reference Books**

1. S.Arumugam. (2004) *Modern Algebra*. Scitech Publications, Chennai.

2. J.B.Fraleigh (1986) *A First Course in Algebra* (3rd Edition) Addison Wesley. Mass. (Indian Print)

3. S.Lipschutz (2005) *Beginning Linear Algebra*, Tata McGraw Hill Edition, New Delhi.

4. M.L.Santiago. (2002) *Modern Algebra*, Tata McGraw Hill, New Delhi.

<b>BMA62</b>	<b>REAL ANALYSIS - II</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credit</b>
<b>SEM VI - CORE THEORY</b>		<b>5</b>	<b>0</b>	<b>4</b>

**LEARNING OBJECTIVES:**

- To develop the understanding of point wise and uniform convergence of sequence and series of functions.
- To enhance the mathematical maturity and to work comfortably with concepts.

**SYLLABUS****UNIT-I: Connectedness, Completeness**

Open Sets – Connected Sets – Bounded Sets and Totally Bounded Sets – Complete Metric Spaces.

Ch. 6.1 to 6.4 of Goldberg

**UNIT-II: Compactness**

Compact Metric Space – Continuous Functions on Compact Metric Spaces - Continuity of Inverse Functions – Uniform Continuity.

Ch. 6.5 to 6.8 of Goldberg

**UNIT-III: Riemann Integration**

Sets of measure zero - Definition Riemann Integral – Properties of Riemann Integral – Derivatives.

Ch. 7.1, 7.2 7.4, 7.5 of Goldberg.

**UNIT-IV: Riemann Integration [Contd...]**

Rolle's Theorem – The law of mean – Fundamental theorems of calculus – Taylor's theorem.

Ch. 7.6 to 7.8 and 8.5 of Goldberg.

**UNIT-V: Sequences and Series of Functions**

Pointwise convergence of sequences of functions – Uniform convergence of sequences of functions – consequences of uniform convergence – Convergence and uniform convergence of series of functions.

Ch. 9.1 to 9.4 of Goldberg

**Learning Outcomes:**

The students will be able to

**CO1:** Describe the basics of Connectedness, Completeness; explain Complete Metric Spaces.

**CO2:** Analyse compact metric space; demonstrate Continuous Functions on Compact Metric Spaces.

**CO3:** Define Riemann Integral; assess Properties of Riemann Integral and evaluate Derivatives of the functions.

**CO4:** Utilize Rolle's theorem in a proper way; revise the Fundamental theorems of calculus and Taylore's theorem.

**CO5:** Differentiate point wise convergence of sequences of functions and Uniform convergence of sequences of functions.

**Recommended Text**

R.Goldberg Methods of Real Analysis Oxford & IBH Publishing Co., New Delhi.

**Reference Books**

- Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley Publishing Company Inc. New York.
- Bartle, R.G. and Shebert [1976] Real Analysis, John Wiley and Sons Inc., New York,
- Malik, S.C. and SavitaArora [1991] Mathematical Analysis, Wiley Eastern Limited, New Delhi.
- Sanjay Arora and Bansilal [1991] Introduction to Real Analysis, SatyaPrakashan, New Delhi.



BMA63	COMPLEX ANALYSIS - II	Lecture	Practical	Credit
SEM VI - CORE THEORY		5	0	4

**LEARNING OBJECTIVES:**

- To gain knowledge about complex Integration and series.
- This course provides methods to solve problems in pure as well as in applied mathematics.

**SYLLABUS****UNIT-I: Integrals:**

Morera's theorem- Maximum Moduli of functions- The fundamental theorem of Algebra-Liouille's theorem-convergence of sequences and series-uniform convergence. Sections 53-56, 61.

**UNIT-II: Power series.**

Taylor's and Laurent's theorem-Integration and differentiation of power series-problems. Sections 57-60.

**UNIT-III: Singularities and Residues.**

Singularities and classifications- Isolated singularities: Removable singularity Pole and essential singularity-Residues-Cauchy's Residue theorem-problems.

Sections 67-71.

**UNIT-IV: Analytic continuation**

Conditions under which  $f(z)=0$ -Uniqueness-Singular points:Poles and zeros-Essential singular points-Number of zeros and poles-The Argument principal.

Sections 106 -114.

**UNIT V: Contour Integration**

Evaluation of Improper Real Integrals-Improper integrals involving Trigonometric functions - Integration around a Branch point.

Sections 72-75.

**Learning Outcomes:**

The students will be able to

**CO1:** Recognize convergence and uniform convergence of series and sequences. Demonstrate Morera's theorem and Liouille's theorem with examples.

**CO2:** Apply Taylore's and Laurent's theorem to solve problems.

**CO3:** Describe Singularities and Residues; distinguish the types of singularities, evaluate integrals using Cauchy's Residue theorem.

**CO4:** Demonstrate Argument principal; compute residues of the analytic functions.

**CO5:** Compile contour integration; determine improper real integrals and improper integrals using Trigonometric functions.

**Recommended Text**

R.V.Churchill and J.W.Brown, (1984) *Complex Variables and Applications*. McGraw Hill International Book Co., Singapore. (Third Edition)

**Reference Books**

- P. Duraipandian and LaxmiDuraipandian (1976) *Complex Analysis*: Emerald Publishers, Chennai.
- S. Ponnusamy. (2000) *Foundations of Complex Analysis*, Narosa Publishing House, New Delhi.
- Murray R. Spiegel. (2005) *Theory and Problems of Complex Variable*. Tata-Mcgraw Hill Edition, New Delhi

BMA64	PROGRAMMING IN C LANGUAGE	Lecture	Practical	Credit
SEM VI - CORE THEORY		3	0	3

**LEARNING OBJECTIVES:**

1. To develop programming skill in the Computer Language C
2. To provide programming essentials, including algorithms, data types, elementary control structures and functions used within the framework of imperative and structural programming paradigms.
3. To develop logics which will help to create programs, applications in c.

**SYLLABUS****UNIT-I**

C Constants, variables, Data-type, Declaration of variables, assigning values to variables.

**UNIT-II: Operators**

Arithmetic, Relational, Logical, Assignment, Increment and decrement, Conditional, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic operators, Formatted input and output.

**UNIT-III: Operators**

Decision making and branching If, simple if, If else, Nesting of if - else, Else - If ladder, Switch statement, the?: operator, Go to statement. Decision making with looping: While, Do, for statement, Jumps in loops.

**UNIT-IV: Arrays**

One - dimensional array, two - dimensional array, Initializing arrays, Multi - dimensional arrays.

**UNIT-V: User-Defined Function**

Need for User-defined function, Multi-function program, the form of C-Function, Return Value and their types.

**Structures and Unions:**

Structure definition, Structure initialization, Comparison of structure variables, union.

**Learning Outcomes:**

The students will be able to

**CO1:** Define algorithm, flow chart and its uses; Create algorithms to solve simple problems.

**CO2:** Describe the various c operators; Design, implement, test and debug programs using logics, selections, loops and arrays.

**CO3:** Describe various storage classes and its functionalities; Analyze the function arguments and parameters.

**CO4:** Define pointers and its various operations; Ability to handle possible errors during program execution.

**CO5:** Apply programming skills for real world problem; Appreciate programming in c language and its uses.

**Recommended Text**

E.Balagurusamy. (1996) *Programming in ANSI C*. Tata McGraw Hill, New Delhi

**Reference Books**

1. V.Rajaraman. (1995) *Computer Programming in C*. Prentice Hall. New Delhi
2. H. Schildt, Osborne. (1994) *Teach Yourself C* McGraw Hill. New York.

BPMA68	PRACTICAL IN C LANGUAGE	Lecture	Practical	Credit
SEM VI - CORE PRACTICAL		0	3	2

**LEARNING OBJECTIVES:**

1. This computer practice course aims to provide strong logical thinking and error-free syntax codes writing, to master the debugging techniques and to present the results in neat form in C Language for numerical methods.
2. Students will be able to solve problems numerically whenever theoretical methods are not available.
3. The following exercises shall be performed as minimum mandatory requirements (for eligibility to take the practical examination) and a RECORD of the code-listing and outputs shall be maintained by each student.

**SYLLABYS****List of Programmes:**

1. Assigning the ASCII value.
2. Square of numbers: Using For loop, While loop
3. Square of numbers: Do-While loop, Goto statement.
4. Characters between two given characters.
5. Number of vowels and consonants.
6. Three – dimensional matrix.
7. Prime numbers between two give numbers.
8. Fibonacci series.
9. Factorial numbers
10. Power of a value.
11. Interchange sort.
12. Student record.

**Note:** Mathematics faculty should be appointed as an Examiner.

**Learning Outcomes:**

The students will be able to

**CO1:** Read, understand and trace the execution of programs written in C language

**CO2:** Write the C code for a given algorithm

**CO3:** Design programs that perform operations using derived data types and variables

**CO4:** Implement programs with pointers and arrays, function, pointers and structures

**CO5:** Analyze and solve problem using c programming

**Reference Books**

1. The spirit of C, Mullish Cooper, Indian Edition by Jaico Publishers, 1987.
2. Teach yourself C, Herbert Schildt, Obsbome Megrawhill, 2nd Edition 1994.
3. Programming in C, Schaum Series.

BEMA65A	OPERATIONS RESEARCH	Lecture	Practical	Credit
SEM VI - ELECTIVE		3	0	3

**LEARNING OBJECTIVES:**

- To develop computational skill and logical thinking in formulating industry oriented problems as a mathematical problem and finding solutions to these problems.

**SYLLABUS****UNIT-I**

Network-construction of network diagram-Critical path method (CPM) – Three floats

**UNIT-II**

Three time estimates-Network scheduling by PERT Method-PERT Computation

**UNIT-III**

Inventory models - EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate finite production rate with no shortages – Inventory control with Price Breaks.

**UNIT-IV**

Sequencing problem - n jobs through 2 machines, n jobs through 3 machines - two jobs through m machines – n jobs through m machines.

**UNIT-V**

Queuing Theory - Basic concepts - Steady state analysis of M/M/1 and M/M/N systems with finite and infinite capacities.

**Learning Outcomes:**

The students will be able to

**CO1:** Develop mathematical skills to analyze and solve integer programming and network models arising from a wide range of applications.

**CO2:** Use CPM and PERT techniques, to plan, schedule, and control project activities.

**CO3:** Identify and develop Inventory models from the verbal description of the real system.

**CO4:** Understand the mathematical tools that are needed to solve sequencing problems.

**CO5:** Describe the queuing model; solve the models.

**Recommended Text:** Gupta P.K. and Hira D.S. (2000) *Problems in Operations Research*, S.Chand & Co. Delhi

**Reference Books**

- J.K.Sharma, (2001) *Operations Research: Theory and Applications*, Macmillan, Delhi
- KantiSwaroop, Gupta P.K. and Manmohan, (1999) *Problems in Operations Research*, Sultan Chand & Sons., Delhi.
- V.K.Kapoor [1989] *Operations Research*, sultan Chand & sons.
- Ravindran A., Philips D.T. and Solberg J.J., (1987) *Operations research*, John Wiley & Sons, New York.
- Taha H.A. (2003) *Operations Research*, Macmillan Publishing Company, New York.
- P.R.Vittal (2003) *Operations Research*, Margham Publications, Chennai.
- S.J.Venkatesan, *Operations Research*, J.S. Publishers, Cheyyar-604 407.
- Arumugam&Issac, *Operations research - Vol. - I*, New Gamma Pub., House. Palayamkottai.

BEMA66B	FUZZY MATHEMATICS	Lecture	Practical	Credit
SEM VI - ELECTIVE		3	0	3

**LEARNING OBJECTIVES:**

1. To know the fundamentals of fuzzy Algebra.
2. To know the basic definitions of fuzzy theory
3. To know the applications of fuzzy Technology.
4. To introduce the fundamental theory and Concepts of computational intelligence methods.
5. In particular neural networks, fuzzy systems, genetic algorithms and their applications in the area of machine intelligence.

**SYLLABUS****UNIT-I**

Introduction- Fuzzy subsets-Lattices and Boolean Algebras- L fuzzy sets-operations on fuzzy – level sets – properties of fuzzy subsets of a set section s 1.1-1.10

**UNIT-II**

Algebraic product and sum of two fuzzy subsets-properties satisfied by Addition and product-cartesian product of fuzzy subsets. Sections 1.11-1.13.

**UNIT-III**

Introduction- Algebra of fuzzy relations-logic-connectives. section s 2.1-2.4

**UNIT-IV**

Some more connectives-Introduction-fuzzy subgroup-homomorphic image and Pre-image of subgroupoid. Sections 2.5,3.1-3.3

**UNIT-V**

Fuzzy invariant subgroups-fuzzy subrings.  
Section 3.4 and 3.5.

**Learning Outcomes:**

The students will be able to

**CO1:** Describe Fuzzy subsets, lattices and Boolean algebras; assess the operations on fuzzy and properties of fuzzy subsets.

**CO2:** Compute product and sum of two fuzzy subsets; demonstrate the properties satisfied by addition and product of fuzzy subsets.

**CO3:** Discuss the algebra of fuzzy relations, logic and connectives.

**CO4:** Analyze the other connectives and fuzzy subgroup; identify the homomorphic image and pre-image of subgroupoid.

**CO5:** Implement the Fuzzy concept in Group theory; Compile the fuzzy invariant subgroups and fuzzy subgroups.

**Recommended Text**

S.Nanda and N.R.Das “Fuzzy Mathematical concepts,Narosa Publishing House, New Delhi..

BSMA67	MATHEMATICS FOR COMPETITIVE EXAMINATIONS - III	Lecture	Practical	Credit
SEM VI – SKILL BASED SUBJECT		3	0	3

**LEARNING OBJECTIVES:**

1. To create the knowledge of students with emphasis on analytical ability and computational skill needed in competitive examinations.

**SYLLABUS****Unit- I**

Simple Interest.

**Unit- II**

Compound Interest

**Unit- III**

Logarithms – Races and Games of Skill.

**Unit- IV**

Area

**Unit- V**

Volume and surface areas.

**Learning Outcomes:**

The students will be able to

**CO1:** Compute problems in simple interest.

**CO2:** Apply the knowledge on the problems in compound interest.

**CO3:** Evaluate the solutions of logarithms and problems involving in races and games.

**CO4:** Analyze the concept area and use the knowledge to solve the problems.

**CO5:** Demonstrate volume and surface areas; apply the formulae to find the solutions of the sums.

**Text Book:-**

Quantitative Aptitude for competitive Examination ,R.S.Aggarwal. S.Chand and company Ltd, 152, Anna salai, Chennai. 2001