

BACHELOR OF SCIENCE IN MATHEMATICS
Affiliated to Thiruvalluvar University

PROGRAMME HAND BOOK

CURRICULUM & SYLLABUS UNDER CBCS
WITH EFFECT FROM 2020-21



DON BOSCO COLLEGE (CO-ED)

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BACHELOR OF SCIENCE-MATHEMATICS
(B.SC-MATHEMATICS)
CURRICULUM AND SYLLABUS UNDER CBCS

WITH EFFECT FROM 2020-21

• **PROGRAM OVERVIEW**

B.Sc., Mathematics is a three-year undergraduate program that aims to develop students' analytical, logical and interpretive skills necessary for a career in Mathematics. The program focuses on solving both concrete and abstract problems through critical observation.

It covers various subjects such as Algebra, Trigonometry, Calculus, Graph Theory, Differential Geometry, Complex Analysis, Real Analysis and Differential Equations. Practical sessions provide hands-on training, deepening students' understanding of mathematical principles. Additionally, students gain exposure to computer science and English, which prepare them for success in diverse fields.

The curriculum is designed to enhance students' software computing, mathematical, experimental, and communication skills, enabling them to pursue advanced studies or careers in academia, research, or professions like M.Sc., Mathematics, MAC, M.S.W, MBA and more. Computer Science knowledge is particularly valuable in today's technological landscape, where mathematical modelling and computational techniques are widely used. Strong communication skills in English are essential for effective presentation and dissemination of mathematical ideas and findings. This curriculum is designed to improve students' software computing knowledge.

Don Bosco College's Department of Mathematics was established in 2012, making it one of the early departments at the institution. The B.Sc., Mathematics program was introduced in the academic year 2015-16.

- **OBJECTIVES:**

1. Develop a solid foundation in various branches of Mathematics.
2. Foster student engagement in the learning process through active participation in classroom activities, student-oriented seminars, and related events.
3. Cultivate and improve computational skills that are essential in contemporary society.
4. Nurture the student's capacity to critically analyse numerical and graphical data.
5. Develop and refine problem-solving abilities in students.
6. Improve students' proficiency in using computation tools, software, and programming languages to solve mathematical problems and conduct numerical simulations.
7. Promote and reinforce students' critical thinking skills.
8. Enhance students' capability to effectively communicate mathematical findings through both written and oral means.
9. Collaborate closely with other departments in the college to ensure that students majoring in different fields possess the necessary mathematical foundation for success in their academic and professional pursuits.
10. Encourage department staff members to engage in professional development opportunities that enable educational excellence.

- **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 for Final Year Students
- Career Guidance Programs

- Soft Skills Programs

2. Scholarships

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

- **PROGRAMME OUTCOMES (PO)**

1. **Proficiency in mathematical knowledge and techniques:** Graduates will demonstrate a solid understanding of fundamental mathematical concepts, theories, and techniques across various branches of mathematics.
2. **Problem-solving and critical thinking skills:** Graduates will be able to apply mathematical principles and analytical reasoning to identify, formulate, and solve problems encountered in mathematics and related fields.
3. **Computational and technological proficiency:** Graduates will possess proficiency in using mathematical software, computational tools, and programming languages to perform calculations, analyse data, and simulate mathematical models.
4. **Effective communication of mathematical ideas:** Graduates will be able to effectively communicate mathematical ideas, results, and solutions through clear and concise written and oral presentations, demonstrating their ability to convey complex mathematical concepts to both technical and non-technical audiences.
5. **Interdisciplinary application of mathematics:** Graduates will be able to apply mathematical principles and techniques to solve problems in interdisciplinary contexts, such as physics, engineering, economics, computer science, and data analysis, facilitating collaboration with professionals from various fields.
6. **Lifelong learning and professional development:** Graduates will possess a commitment to lifelong learning, demonstrating the ability to engage in independent study, stay updated with advancements in mathematics, and adapt to evolving mathematical theories and techniques. They will also recognize the importance of professional development and continue to expand their knowledge and skills in their chosen careers.

- **PROGRAMME SPECIFIC OUTCOMES (PSO)**

7. **Mathematical modelling and problem-solving:** Graduates will be able to apply mathematical modelling techniques and problem-solving strategies to analyse and solve

real-world problems in diverse areas, such as physics, engineering, economics, and finance.

8. **Advanced mathematical knowledge and specialization:** Graduates will have a deeper understanding of advanced mathematical topics within their chosen specialization, such as algebra, analysis, geometry, or applied mathematics, allowing them to pursue further studies or careers in specialized fields.
9. **Proficiency in mathematical software and programming:** Graduates will be proficient in using mathematical software, numerical methods, and programming languages to implement algorithms, simulate mathematical models, and analyse data, enabling them to tackle complex computational problems.
10. **Mathematical proof and reasoning:** Graduates will demonstrate the ability to construct rigorous mathematical proofs and logical arguments, understanding the principles of mathematical reasoning and the foundations of mathematical theory.
11. **Research and independent study skills:** Graduates will have developed research skills and the ability to conduct independent studies, including formulating research questions, designing experiments or investigations, collecting and analysing data, and drawing valid conclusions. They will be prepared to contribute to mathematical research or pursue advanced studies in mathematics.

- **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	PSO 7	PSO8	PSO9	PSO 10	PSO 11
1 : EDUCATION	√	√	√			√	√	√	√	√	√
2 : COMPETENCY	√	√		√		√		√			√
3 : TEACHING SKILL	√					√	√		√		√
4 : ETHICAL AND PROFESSIONAL		√		√	√	√				√	

• **MAPPING COURSE OUTCOMES WITH POs / PSOs**

SEM	COURSE CODE	COURSE	PO1	PO2	PO3	PO4	PO5	PO6	PSO7	PSO8	PSO 9	PSO 10	PSO 11
1	CLT10	Tamil-I			√	√							
	CLE10	Communicative English I			√	√							
	CMA11	Algebra	√						√				
	CMA12	Trigonometry	√						√				
	CAMA13A	Numerical Methods I	√						√	√			√
	CES10	Environmental Studies					√	√					
	CPE10	Professional English for Physical Sciences I											
2	CLT20	Tamil II			√	√							
	CLE20	Communicative English II			√	√							
	CMA21	Calculus	√										
	CMA22	Analytical Geometry of three dimensions	√						√	√			

	CAMA23A	Numerical Methods II	√						√	√			√
	CPMA24	Practical: Numerical Methods								√			
	CGA20	Value Education		√			√	√					
	CSS20	Soft Skill			√								
	CPE20	Professional English for Physical Sciences II			√	√							
3	CLT30	Tamil III			√	√							
	CLE30	English III			√	√							
	CMA31	Differential Equations	√										
	CAMA13B	Mathematical Statistics I	√					√	√				
	CEMA55A	Linear Programming	√						√				
	CNCS34	Introduction to Information Technology (NME 1)											√
4	CLT40	Tamil IV			√	√							
	CLE40	English IV			√	√							
	CMA41	Vector Analysis and Fourier Analysis	√					√	√				
	CMA42	Mechanics	√					√	√				
	CAMA23B	Mathematical Statistics II	√					√	√				√
	CPMA26	Practical : Mathematical Statistics							√				
	CSMA43	Mathematics For Competitive Examinations I											√
	CNCS44	Internet And Its Applications											
5	CMA51	Abstract Algebra	√					√	√	√			
	CMA52	Real Analysis I	√					√	√	√			
	CMA53	Complex Analysis I	√					√	√	√			
	CMA54	Programming in C Language	√					√	√	√	√		
	CSMA57	Mathematics For Competitive Examinations II	√					√	√	√			√
	CPMA 68	Practical In C Language	√					√	√	√			
6	CMA61	Linear Algebra	√					√	√	√			
	CMA62	Real Analysis II	√					√	√	√			
	CMA63	Complex Analysis II	√					√	√	√	√		
	CSMA64A	Graph Theory											√
	CEMA66B	Project	√										
	CEA60	Extension Activities	√					√		√	√	√	√

**REGULATIONS FOR UNDER GRADUATE DEGREE COURSES
CBCS PATTERN With effect from 2020-2021**

DEFINITIONS

Programme	“Programme” means a course of study leading to the award of a degree in a discipline.
Course	“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.

COURSE OF STUDY:

The course of study for the UG degree courses of all branches shall 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 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-II : Communicative English and English Language The Communicative English subject shall be offered each in I and II Semester with one examination at the end of each semester (2 courses: $2 \times 4 = 8$ credits) and English Language subject shall be offered each in III and IV semester with one examination at the end of each semester (2 courses: $2 \times 4 = 8$ credits).

PART-III

- (i) **Core subject:** Core papers including practical's wherever applicable are offered as prescribed in the scheme of examination, by the Boards of studies of different subjects. There are 14 core papers, 4 allied papers, 2 allied practical papers and 3 electives consisting 80 credits for theory and 22 for practical papers.
- (ii) **Allied Subjects:** Allied papers including practical wherever applicable are offered as prescribed in the scheme of Examination by the Boards of Studies of different subjects. There shall be 4 papers, one each in I, II, III and IV semester, for all UG Courses except for Science courses with practical. For all UG courses with / without practical, for Odd semesters (1st & 3rd) there shall be 2 theory papers for a total of $(2 \times 3) = 6$ credits only. For all UG courses without practical, for Even semesters (2nd & 4th) there shall be 2 theory papers for a total of $(2 \times 5) = 10$ credits only.
- (iii) **Electives Courses:** Three elective courses with $(3 \times 3 =) 9$ credits are to be offered one in the V Semester and two in the VI Semester. Elective subjects are to be selected from the list of electives prescribed by the Board of Studies concerned. Colleges can choose any one of the papers, as elective for a particular semester whether 5th semester or 6th semester. Elective paper for a particular semester once chosen by a particular college, should not be changed without getting prior permission and approval of the University.
- (iv) **Professional English Courses:** Two Professional English Courses with $(3 \times 2 =) 6$ credits are to be offered each in I and II Semester for which examination shall be conducted at the end of the respective semesters.

- (v) **Individual / Group Project:** There will be an Individual / Group project work is compulsory at the end of VI Semester as prescribed by the respective boards of studies. (Group will not be exceeding five students).

PART-IV:

(i) Basic Tamil / Advanced Tamil (OR) Non-major elective

- a) Those who have not studied Tamil up to XII standard and taken a non-Tamil language under Part-I shall take Tamil comprising of two courses with 2 credits each (2x2=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)
- b) 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 (2x2=4 credits) in the third and fourth semesters. (OR)
- c) Others who do not come under the above a/b categories can choose the offered non-major electives comprising of two courses with (2x2=4) credits, in the third and fourth semesters.

(ii) Skill Based Subjects: All the UG programmes shall offer four courses of skill based subjects one each in III, IV, V & VI semester with 2 credits each (4x2= 8 credits) for which examination shall be conducted at the end of the respective semesters.

(iii) Foundation Courses:

There are 3 Foundation Courses offered.

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

PART V:

EXTENSION ACTIVITIES:

Proper relevant records shall be maintained by the respective departments and if necessary it may be verified by the university authority at any time. The extension 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 for which students shall pay fee for one theory paper.

Marks to be awarded as follows:

- 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.

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 fulfill the extension activity prescribed by earning 1 credit to qualify for the degree.
2. A candidate should get not less than 40% in the University (external) Examination, compulsorily, in any course of Part I, II, and 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 Practical.

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 (ESE)	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 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 rd & 4 th Units of the Syllabus)	10	
4.	Test-2 (First 4 Units of the Syllabus for 2 Hours duration)	-	50
5.	Assignment-3 (5 th Unit of the Syllabus)	10	-
6.	Test-3 (Entire Syllabus for 3 Hours duration)	-	100
	Total Marks	30	200
	Marks to be converted to	5	20
	Total Maximum Marks for CIA	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

UNI. EXAM TOTAL (ESE)	PASSING MINIMUM FOR UNI.EXAM	CIA TOTAL	PASSING MINIMUM FOR CIA	TOTAL MARKS ALLOTTED	PASSING MINIMUM (UNI.EXAM+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. No.	For Practical - UG courses	Distribution of Marks	
		Assignments	Tests
1.	Regular maintenance of the Observation note book-1 (Up to the end of I-Semester)	10	-
2.	Test-1 (Up to the end of I-Semester for 2 Hours duration)	-	25

3.	Regular maintenance of the Observation note book-2 (Up to the end of II-Semester)	10	
4.	Test-2 (Up to 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 University examination pattern)	-	25
Total Marks		30	75
Marks to be converted to		10	15
Total Maximum Marks for CIA		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)

Section A	Very short answer questions	10X 2=20	10 questions – 2 from each unit
Section B	Short answer questions of either / or type (like 1a (or) 1b)	5X5=25	5 questions – 1 from each unit
Section C	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	CLT10	Tamil-I	25	75	100
2	II	6	4	English	CLE10	English I	25	75	100
3	III	5	3	Core	CMA11	Algebra	25	75	100
4	III	4	3	Core	CMA12	Trigonometry	25	75	100
5	III	7	3	Allied -I	CAMA13A	Numerical Methods I	25	75	100
6	IV	2	2	EVS	CES10	Environmental Studies	25	75	100
7	III	6	3	PE	CPE 10	Professional English I	25	75	100
TT		36	23				175	525	700
Semester II									
8	I	6	4	Language	CLT20	Tamil II	25	75	100
9	II	4	4	English	CLE20	English II	25	75	100
10	III	5	3	Core	CMA21	Calculus	25	75	100
11	III	4	3	Core	CMA22	Analytical Geometry of three dimensions	25	75	100
12	III	4	4	Allied-I	CAMA23A	Numerical Methods II	25	75	100
13	III	3	2	Allied- I (Practical)	CPMA24	Numerical Methods	25	75	100
14	IV	2	2	Value Education	CGA20	Value Education	25	75	100
15	IV	2	1	Soft Skill	CSS20	Soft Skill	25	75	100
16	III	6	3	PE	CPE 20	Professional English II	25	75	100
TT		36	26				225	675	900
Semester III									
17	I	6	4	Language	CLT30	Tamil III	25	75	100
18	II	6	4	English	CLE30	English III	25	75	100
19	III	6	4	Core	CMA31	Differential Equations	25	75	100
20	III	7	4	Allied II	CAMA13B	Mathematical Statistics I	25	75	100

21	IV	3	3	Skill Based Elective	CSMA32	Mathematics for Competitive Examinations I	25	75	100
22	IV	3	3	Skill Based Elective	CSMA33	Linear Programming	25	75	100
23	IV	2	2	Non-Major Elective	CNCS34	Introduction to Information Technology	25	75	100
TT		30	21				150	450	600
Semester IV									
24	I	6	4	Language	CLT40	Tamil IV	25	75	100
25	II	6	4	English	CLE40	English IV	25	75	100
26	III	6	4	Core	CMA41	Vector Analysis & Fourier Analysis	25	75	100
27	III	6	4	Core	CMA42	Mechanics	25	75	100
28	III	4	4	Allied II	CAMA23B	Mathematical Statistics II	25	75	100
29	III	3	2	Allied II (Practical)	CPMA26	Mathematical Statistics	25	75	100
30	IV	3	3	Skill Based Elective	CSMA43	Mathematics for Competitive Examinations II	25	75	100
31	IV	2	2	Non-Major Elective	CNCS44	Internet and its Applications	25	75	100
TT		30	23				175	525	700
Semester V									
32	III	5	4	Core	CMA51	Abstract Algebra	25	75	100
33	III	5	4	Core	CMA52	Real Analysis I	25	75	100
34	III	5	4	Core	CMA53	Complex Analysis I	25	75	100
35	III	3	3	Core	CMA54	Programming in C Language	25	75	100
36	III	3	2	Core (Practical)	CPMA57	Practical in C Language	25	75	100
37									
38	IV	3	3	Skill Based Elective	CSMA56	Mathematics for Competitive Examinations III	25	75	100
TT		30	26				175	525	700
Semester VI									
39	III	5	4	Core	CMA61	Linear Algebra	25	75	100
40	III	5	4	Core	CMA62	Real Analysis II	25	75	100
44	III	5	4	Core	CMA63	Complex Analysis II	25	75	100
45	III	3	3	Elective	CEMA66A	Graph Theory	25	75	100
46	IV	3	3		CSMA67	Project	25	75	100
47	V	0	1	Extension Activities	CEA60	Extension Activities	100	0	100

TT		30	27				300	600	900
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			
	Total	42		140		4200			

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

SE M	PA RT	CODE	TITLE	TYPE	HRS	CRD
3	IV	CNBA37	Management Concepts	T	2	2
		CNCP37	Elements of Accountancy	T		
		CNCA34	Introduction to information Technology	T		

		CNEN35	Language Skills and Communication I	T		
4	IV	CNCP46	Advertising and Salesmanship	T		
		CNCA44	Internet and its Applications	T		
		CNEN45	Language Skills and Communication II	T		
		CNBA47	Training and Development	T		

LIST OF ELECTIVE PAPERS

Semester 5 - Paper 1		
A	CEMA56A	Graph Theory
B	CEMA56B	Astronomy
Semester 6 - Paper 2		
A	CEMA65A	Special function
B	CEMA65B	Fuzzy Mathematics
Semester 6 - Paper 3		
A	CEMA66A	Operations Research
B	CEMA66B	Calculus of finite differences & Numerical Methods

DETAILED SYLLABI

CLT10	TAMIL I	Lecture	Practical	Credit
SEM I - LANGUAGE		6	0	4

Nehf;fq;fs;

jkpopd; GJf;ftpijfs; cs;slf;fpagilg;gpyf;fpaq;fis ,g;ghlk; mwpKfk; nra;fpwJ. jkpo; ,yf;fpaj;jpy; Njh;njLf;fg;gl;l kpfKf;fpakhd nra;Al;fs;> ftpijfs;> fijfs;. Ciueil Mfpatw;iwf; nfhz;L ,g;ghlk; fl;likf;fg;gl;Ls;sJ. khzhf;fhpd; ,yf;fpaj; Njliy cUthf;FtJk;> jw;rh;Gila mwpitNkk;gLj;JtJk; ,g;ghlj;jpd; Nehf;fkhFk;.

SYLLABUS

myF1:fTpij khzth;fspilNa ftpij gb;Fk; Mh;tk; ftpij vOJk; jpwid tsh;;j;jy;.

myF2:Ciueilkhzth;fSf;FfUj;Jf;fisvspjpy; nrhy;Ytjw;Nfw;wvOj;JtbtNkciueilahFk;.

myF3:ehlfk; kdjpd; ntspg;ghL ,ay; MfTk; nkhopapd; ,dpik ,irahfTk; nka;apd; mofpanraw;ghLehlfkfTk; kyUk; fhz;NghionghpJk; fth;tJehlffiy.

myF4:rpWfij kdpjDila tho;tpd; rpW gFjpia fUthff; nfhz;L Vw;WtJjhd; rpWfij.

myF5:nkhopj;jpwd; nkhopj;jpwdpd; %yk; khzth;fs; mfuthpirapy; vOjTk; gpioapy;yhky; vOjTk; nrhw;fSf;F nghUs;fis czuTk; nkhopj;jpwd; gapw;rpcjTfpwJ.

rpwg;G Nehf;fk;

CO1: kuGtopahdftpijNghf;Fk; GJtifapyhdNehf;Fk; fye;j ,r;#oy; ftpij ,yf;fpaj;jpw;FxUjpUg;GKidahfmike;jJ.

CO2: khzth;fs; vspjpy; NeNunghUisczh;e;Jf;nfhs;Sjy; ,jd; %yk; khzth;fs; gb;Fk; Mw;wiytsh;j;Jf;nfhs;fpwhh;fs;.

CO3: khzth;fs; ehlfk; gbg;gjpd; thapyhfjq;fspd; jdpj;jpwikntspg;gLj;Jtw;FVJthf ,g;ghlg;gFjpmikfpwJ.

CO4: khzth;fs; rpWfijiagbg;gjpd; thapyhfjq;fspd; jdpj;jpwidiantspg;gLj;Jtjw;FVJthfrpWfijvOJk; Mw;wiyngWfpwhh;fs;.

CO5: khzth;fs; nkhopj;jpwidmwptjpd; tpisthfjha; nkhopiagpioapd;wpNgrTk; gpioapd;wpvOjTk; ,yf;fzKiwikAld; vOjfw;Wf;nfhs;fpwhh;fs;.

REFERENCES:NIL

CLE10	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

CMA1 1	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 θ in terms of functions of multiples of θ - expansions of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ - 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 θ in terms of functions of multiples of θ and expansions of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ .

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.ManicavachagomPillay (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.

CAMA 13A	Numerical Methods I	Lectur e	Practica l	Credi t
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 Δ , ∇ 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.

CES10	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 And M. Vasanthi, 2004. Environmental Studies, Bharathidasan 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

CLT20	TAMIL II	Lecture	Practical	Credit
SEM II - LANGUAGE		6	0	4

Nehf;fq;fs;

khzth;fs; tho;f;ifapy; mwnewpAld; tho;tjw;Fk; kdijxUKfgLj;Jtjw;Fk; gf;jp ,yf;fpaq;fSk; rpw;wpyf;fpaq;fSk; khzth;fSf;Fgad;gLfpwJ.

gf;jp ,yf;fpaj;jpd; thapyhfGuhzq;fspd; Kf;fpaj;Jtj;ijAk; nja;tq;fspd; ngUikfisAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

fITsh;fisAk; murh;fisAk; Nguhpyf;fpaq;fs; Ngrpafhyq;fspy; rpw;wpyf;fpaq;fs; vspakf;fspd; tho;f;ifKiwiagw;wpNgRfpwJvd;gijkhzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

SYLLABUS

myF 1 :khzth;fs; irtj;jpUKiwfs; gd;dpnuz;LFwpj;Jmwpe;Jf;nfhs;fpwhh;fs;

myF 2 :ehyhapujpt;agpuge;jj;jpy; Mo;thh;fspd;
tho;f;iftuyhw;iwmwpe;Jf;nfhs;fpwhh;fs;.

myF 3 :rq;f ,yf;fpaq;fspd; jdpq;ghly;fshftUfpd;wrpw;wpyf;fpaq;fiskhzth;fs;
mwpe;Jf;nfhs;fpwhh;fs;.

myF 4 :khzth;fs; rka ,yf;fpaq;fs; Fwpj;Jmwpe;Jf;nfhs;fpwhh;fs;.

myF5 :khzth;fs; fbjk; vOjTk; Neh;fhziyg; gw;wpAk; njhpe;Jf;nfhs;Sjy;.

rpwg;G Neh;fk;

CO1: khzth;fs; ehad;kh;fs;>rpj;jh;fspd; tho;f;iftuyhw;iwAk; mth;fs;
ghbaghly;fisAk; mwpe;Jf;nfhs;fpwhh;fs;.

CO2: khzth;fs; Mo;th;fspd; tho;f;ifKiwiaAk; jpUkhypd; ngUikfisAk;
mwpe;Jf;nfhs;fpwhh;fs;

CO3: khzth;fs; J}J>cyh>NfhitMfparpw;wpyf;fpattiffismwpe;Jf;nfhs;fpwhh;fs;

CO4: khzth;fs; rkak; Fwpj;jk; fpwpj;Jtk;> ,];yhkpak; Mfparka E}yfspy; \$Wk;
tuyhw;Wr; nra;jpfismwpe;Jf;nfhs;fpwhh;fs;

CO5: khzth;fs; nghJf;fl;LiuvOJjy;>Neh;fhzy; nra;jy; vd;gjid ,g;ghlg;gFjppad;
thapyhfmwpe;Jf;nfhs;fpwhh;fs;

REFERENCES

NIL

CLE20	ENGLISH II	Lecture	Practical	Credit
SEM II - ENGLISH		4	0	4

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 - 4Vocabulary 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

CMA21	Calculus	Lecture	Practical	Credit
SEM II – CORE THORY		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.

CMA22	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 LaxmiDuriapandian (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

CMA23A	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.

CPMA 26	Numerical Methods	Lecture	Practical	Credit
SEM II - Allied Practical (1)		0	3	2

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. Kuttainimathathil (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.]

CSS20	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

CLT30	TAMIL III	Lecture	Practical	Credit
SEM III - LANGUAGE		6	0	4

Nehf;fq;fs;

- rq;ffhyj;jpd; ,Wjpg;gFjp xOf;fNfLfs; epiwe;jjhf ,Ue;jJ jkpo;r;rKfk; Fog;gj;jpw;F MshdJ mg;nghOJ te;j rkaf;Fwth;fs; ePjp ,yf;fpaq;fis ,aw;wpdh;.
- ,j;jifa mwE }y; gzpf;F ntz;ghit gad;gLj;jp ,Ue;jhh; ts;Sth; ntz;gh ,uz;L mb Kjy; ehd;F mb tiu cs;sJ.
- ePjp E }y;fspd; njhlf;f fhyj;jpy; rpyk;Gk; NkfiyAk; ePjp mwk; rhh;e;j fUj;Jf;fis gug;GjiyNa Kjy; Nehf;fkhff; nfhz;ld.

myF.1jpUf;Fws; -tpUe;Njhk;gy;> ,iwkhl;rp> fhykwpjy;> kf;fl;NgW> neQ;NrLg;Gyj;jy;.

vy;yh rkaj;jpw;Fk; nghJthd fUj;Jf;fis vLj;jpak;Gk; jpUf;Fwisg;gw;wp khzth;fs; mwpe;Jf;nfh;fpwhh;fs;.

myF. 2rpyg;gjpfhuk; - kJiuf;fhz;lk;> kzpNkfiy> - rpiwf;Nfhl;lk; mwf;Nfhl;lk; Mf;fpaf;fhij.

khzth;fs; ,ul;ilf;fhg;gpaq;fshd rpyg;gjpfhuj;ijAk; kzpNkfiyAk; mwpe;Jf;nfh;fpwhh;fs;.

myF. 3rPtfre;jhkzp – fhe;jUtjj;ijah; ,yk;gfk;> fk;guhkhazk; - fpl;fpe;j fhz;lk; - thyp tij;glyk;.

Ik;ngUq;fhg;gpq;fspd; xd;whd rPtfre;jhkzpiaAk; fk;guhkhazj;ijAk; khzth;fs; mwpe;Jf;nfh;fpwhh;fs;.

myF 4nghpaGuzk; - jLj;jhl;f; nfhz;lGuhzk;> rPwhg;Guzhk; - jirf;fl;bia ngz;ZWthf;fpa glyk;. Njk;ghtzp – tsd; rdpj;jg;glyk;

ngUikkpf;f mbahh;fspd; ngUikkpf;f tuyhw;iw vLj;Jf;\$Wk; Guhzf; fijfis khzth;fs; mwpe;Jf;nfh;fpwhh;fs;.

myF. 5fbjk; tiujy;> tpz;zg;gk; vOJjy;> jd; tpguf;Fwpg;G> epfo;r;rp epuy; mwpf;fif jahhpj;y;> ,yf;fpa tuyhW> gjpndz;fPo;f;fzf;F E }y;fs; mw ,yf;fpaq;fs;> ePjp ,yf;faq;fs;

khzth;fs; fbjk; vOjTk;> tpz;zg;gk; vOjTk; epfo;r;rp epuy; mwpf;if jahhpf;fTk; khzth;fs; mwpe;Jf;nfh;fpwhh;fs;.

rpwg;G Nehf;fk;

- khzth;fs; jpUf;Fwspy; \$wg;GLk;; mwj;Jg;ghy;> nghUl;ghy;> ,d;gj;Jg;ghy; Mfpa nra;jpfisAk; jpUts;Sthpd; ngUikAk; mwpe;Jf;nfhs;fpwhh;fs;> mth;fs; mwk; rhh;e;j tho;f;if tho;tjw;F cjTfpwJ.
- khzth;fs; ,ul;ilf;fhg;gpaq;fshd rpyg;gjpgfhu;ijAk; kzpNkfiyAk; njhpe;Jf;nfhs;tjpd; thapyhf ePjp jtwhJ tho;tjw;F fw;Wf;nfhs;fpwhh;fs;.
- khzth;fs; rkz E}yhd rPtfre;jhkzpapy; ahopd; rpwg;G thrpf;Fk; jd;ikAk; JwT tho;f;ifapd; Nkd;ikAk> thyp ,uhkdpd; ciuahlypd; %yk; thjj;jpwikaia tsh;j;Jf;nfhs;fpwhh;fs;.
- khzth;fs; egpfs; ehafj;jpd; tho;f;ifAk;> #irag;ghpd; tho;f;ifAk; ,g;gFjppad; thapyhf mwpe;Jf;nfhs;fpwhh;fs;.
- khzth;fs; mYtyf fbjk;> vOjTk; epfo;r;rp epuy; jahhpj;jy; Fwpj;j nra;jpfis ,g;gFjppad; thapyhf vOjg; gapw;rp; ngWfpwhh;fs;.Ik;ngUk; fhg;gpaq;fs;> jpUf;Fws;> rPwhg;Guhzk;> nghpaGuhzk;> Njk;ghtzp> fk;guhkhazk;. nghJf;fl;Liufs;.

CLE30	ENGLISH III	Lecture	Practical	Credit
SEM III - ENGLISH		6	0	4

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

CMA31	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 – 2nd 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.

CAMA13B	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.

CSMA33	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

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

CSMA32	Mathematics for Competitive Examinations - I	Lecture	Practical	Credit
SEM III: 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:-

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

CNCS34	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:

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

CLT40	TAMIL IV	Lecture	Practical	Credit
SEM IV – LANGUAGE		6	0	4

Nehf;fq;fs;

- rq;f ,yf;fpaq;fshd gj;Jg;ghl;L vl;Lj;njhif E }y;fs; %Nte;jh;fspd; tho;f;if KiwAk; jkpoh;fspd; gz;ghl;ilAk; mwpe;Jf;nfhs;fpwhh;fs;.
- nghw;fhykhd rq;ffhyj;jpd; kfsph; xOf;fq;fisg;gw;wpAk; Mlthtpd; tPuj;ijg;gw;wpAk; kf;fs; Nghh;fhyj;ijA; mikjp tho;f;ifia tho;e;jdh;

myF. 1 Few;njhif> ghly; vz;: 7>8>58>94>103. ew;wpid> ghly; vz;: 1>226>238>249>380. Iq;FEW}W – rpWntz;fhf;ifg;gj;J ghly;fs; kl;Lk;.

Fwf;Fg;gj;J ghly;fs; 1>5

jkpoh;fspd; rq;ffhy mf tho;f;if KiwfisAk; gof;f tof;fq;fisAk; gz;ghl;ilAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

myF. 2 GwehdW> ghly;fs; 10>18>206>212>278> gjpw;Wg;gj;J ghly;fs; - 20>59.

rq;ffhy jkpo; kf;fspd; Gw tho;tpy; mth;fspd; Nghh; Kiwg;gw;wpAk; tPuj;ijg;gw;wpAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

myF. 3fypj;njhif ghly;fs; 8>59>84>108>120 – gwpghly; jpUkhy;> nrt;Nts;> itif ghly;fs;.

rq;ffhy kf;fspd; fhjy; tho;f;if KiwAk; nja;t topghl;L KiwAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

myF. 4gj;Jg;ghl;L – Ky;iyg;ghl;L KOtJk;.

rq;ffhy kf;fspd; ghriwg; gw;wpAk; Nghh;fs ghriwapy; jq;Fk; murh;> Mlth;> ngz;bh; tho;f;if Kiwia khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.

myF. 5rq;f ,yf;fpa tuyhW> vl;Lj;njhif E }y;fs;> gj;Jg;ghl;L E }y;fs;> nkhopg;ngah;g;G – Mq;fpy gFjpia jkpopy; nkhopg;ngah;j;jy;> mYtyf fbjk; jkpopy; nkhopngah;j;jy;.

rq;f ,yf;faq;fshd vl;Lj;njhifg; gj;Jg;ghl;L E }y;fisg; gw;wp mwpjy;. nkhopg;ngah;g;G> mYtyf fbjq;fs; nkhopg;ngah;j;J vOj fw;Wf;nfhs;fpwhh;fs;. **rpwg;G Nehf;fk;**

- FWe;njhif> ew;wpid Iq;FEW }W Mfpa E }y;fisg; gw;wpAk; mtw;wpy; \$wg;gl;Ls;s jpiz Jiwfisg; gw;wpAk; khzth;fs; mwpe;Jf;nfhs;fpwhh;fs;.
- GwehD }W gw;wpar; nra;jpfisAk; Nrhoh; kw;Wk; ghz;bah;fspd; Nghh; jpwidAk; nfhilj;jpwidAk; Nru kd;dh;fspd; Nghh; jpwidAk; khzth;fs; tho;f;ifapy; gpwUf;F <jy; gof;fj;ij tsh;j;Jf;nfhs;fpwhh;fs;.
- Mq;fpyj;jpy; cs;sr; nra;jpia jkpopy; nkhopg;ngah;j;jYk; mYtyf fbjj;ijAk; nkhopg;ngah;f;Fk; Kiwiag;gw;wp khzth;fs; fw;Wj;nj;spfpwhh;fs;.

CLE40	ENGLISH IV	Lecture	Practical	Credit
SEM IV – ENGLISH		6	0	4

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

CMA41	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.

CMA42	Mechanics	Lecture	Practical	Credit
SEM IV – Core Theory		4	0	4

Learning Objectives

This course aims to introduce the students the basic concepts of forces moments couple friction and the centre of gravity..

SYLLABUS

Unit - 1

Forces Type of forces- Resolution of forces - Resultant of two forces acting on a particle triangle of forces Lamis theorem - Resultant of several forces acting on a particle - Condition of equilibrium - Equilibrium of a particle under several forces - simple problems.

Unit - 2

Moment of a force - Parallel forces - Varignons theorem - Forces along the sides of a triangle - Couples - Resultant of several coplanar forces - Equation of line of

action of the resultant - Equilibrium of a rigid body under three coplanar forces - Reduction of coplanar forces into a force and a couple - simple problems.

Unit – 3

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 and hollow hemisphere - solid and hollow right circular cone - simple problems.

Unit – 4

Velocity Relative Velocity Angular Velocity Acceleration Rectilinear motion Rectilinear motion with constant acceleration Relative angular velocity. The Components of Velocity and Acceleration in a. Two Perpendicular directions b. Radial and Transverse directions c. Tangential and Normal directions.

Unit – 5

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 - Impulsive force Conservation of linear momentum Impact of a sphere Laws of impact Impact of two smooth spheres Direct impact of two smooth spheres - Oblique impact of two smooth spheres - Simple problems.

Recommended Text

P. Duraipandian LaxmiDuraipandian MuthamihJayapragasam Mechanics th edition S. Chand and Company Ltd 2005

Reference Books

1. M.K.Venkataraman, Statics, Agasthiyar Publications, 17th edition, 2014. 2. S. Narayanan R. HanumanthaRao K. Sitaraman P. Kandaswamy Statics S. Chand and Company Ltd New Delhi. 3. S. L. Loney An Elementary Treatise on Statics Cambridge University Press 151 4. A.V. Dharmapadam(11) Mechanics. S. Viswanathan Printers Publishers. Chennai 5. Joseph F. Shelley (2005) Vector Mechanics for Engineers Vol-I: Statics Tata McGraw Hill Edition New Delhi.

Course Outcomes

1. Provides basic knowledge of Resultant of forces and Equilibrium of a particle
2. Knowledge pertaining to Parallel forces and coplanar forces
3. To know about Center of mass
4. Gain the knowledge of projectile and its applications
5. Understand the concept of impact

CAMA23B	Mathematical Statistics II	Lecture	Practical	Credit
SEM IV – ALLIED THEORY IV		4	0	4

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

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.

CPMA26	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:

1. Measures of location and Dispersion (absolute and relative)
2. Computation of Correlation Coefficient for raw and Grouped data, Rank Correlation Coefficient
3. Computation of Regression Equations for Raw and Grouped Data
4. Curve Fitting by the Method of Least Squares
 1. $y = ax+b$
 2. $y = ax^2+bx+c$
 3. $y = ae^{bx}$
 4. $y = ax^b$
5. Fitting of Binomial, Poisson, Normal distributions and tests of goodness of fit.
6. Large sample tests with regard to population mean, proportion, standard deviation
7. Exact tests with Respect to Mean, Variance and Coefficient of Correlation
8. Test for Independence of Attributes Based on Chi-Square Distribution
9. Confidence Interval based on Normal, t and Chi-square and F Distributions
10. Problems based on ANOVA-one way and two way Classification
11. Completely Randomized Design
12. Randomized Block Design
13. 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

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.

CSMA43	MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II	Lecture	Practical	Credit
SEM IV – SKILL BASED SUBJECT		3	0	3

LEARNING OBJECTIVES:

1. To enhance the problem solving skills, to improve the basic Mathematical skills.
1. 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

CNCS44	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

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

CMA54	PROGRAMMING IN C LANGUAGE	Lecture	Practical	Credit
SEM V - 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.

CPMA57	PRACTICAL IN C LANGUAGE	Lecture	Practical	Credit
SEM V - 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.

CMA51	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.

CMA52	REAL ANALYSIS -I	Lecture	Practical	Credit
SEM V - CORE THEORY		5	0	4

LEARNING OBJECTIVES

- To understand various limiting behaviour of sequences and series
- 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 ℓ^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.

CMA53	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)

CSMA56	MATHEMATICS FOR COMPETITIVE EXAMINATIONS - III	Lecture	Practical	Credit
SEM V – 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

CMA61	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.

CMA62	REAL ANALYSIS - II	Lecture	Practical	Credit
SEM VI - CORE THEORY		5	0	4

LEARNING OBJECTIVES:

1. To develop the understanding of point wise and uniform convergence of sequence and series of functions.
2. 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

1. Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley Publishing Company Inc. 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.
4. Sanjay Arora and Bansilal [1991] Introduction to Real Analysis, SatyaPrakashan, New Delhi.

CMA63	COMPLEX ANALYSIS - II	Lecture	Practical	Credit
SEM VI - CORE THEORY		5	0	4

LEARNING OBJECTIVES:

1. To gain knowledge about complex Integration and series.
2. 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 $f(z) \neq 0$ -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 Liouville'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

1. P. Duraipandian and LaxmiDuraipandian (1976) *Complex Analysis*: Emerald Publishers, Chennai.

2. S. Ponnusamy. (2000) *Foundations of Complex Analysis*, Narosa Publishing House, New Delhi.

3. Murray R. Spiegel. (2005) *Theory and Problems of Complex Variable*. Tata-Mcgraw Hill Edition, New Delhi

CEMA64A	GRAPH THEORY	Lecture	Practical	Credit
SEM V - ELECTIVE		3	0	3

LEARNING OBJECTIVES:

1. 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

1. S.Kumaravelu, SusheelaKumaravelu, Graph Theory, Publishers, 182, Chidambara Nagar, Nagercoil-629 002.

2. S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd.

3. Robin J. Wilson, Introduction to Graph Theory, Longman Group Ltd.
4. J.A. Bondy and U.S.R. Murthy, Graph Theory with Applications, Macmillan, London.