

B.Sc. MATHEMATICS
SYLLABUS - 2014

SCHOOLS OF EXCELLENCE
with
CHOICE BASED CREDIT SYSTEM (CBCS)



SCHOOL OF COMPUTING SCIENCES
St. JOSEPH'S COLLEGE (Autonomous)

Accredited at 'A' Grade (3rd Cycle) by NAAC
College with Potential for Excellence by UGC
TIRUCHIRAPPALLI - 620 002, INDIA

SCHOOLS OF EXCELLENCE WITH CHOICE BASED CREDIT SYSTEM (CBCS)

POST GRADUATE COURSES

St. Joseph's College (Autonomous), a pioneer in higher education in India, strives to work towards the academic excellence. In this regard, it has initiated the implementation of five "Schools of Excellence" from this academic year 2014 – 15, to standup to the challenges of the 21st century.

Each School integrates related disciplines under one roof. The school system allows the enhanced academic mobility and enriched employability of the students. At the same time this system preserves the identity, autonomy and uniqueness of every department and reinforces their efforts to be student centric in curriculum designing and skill imparting. These five schools will work concertedly to achieve and accomplish the following objectives.

- Optimal utilization of resources both human and material for the academic flexibility leading to excellence.
- Students experience or enjoy their choice of courses and credits for their horizontal mobility.
- The existing curricular structure as specified by TANSCH and other higher educational institutions facilitate the Credit-Transfer Across the Disciplines (CTAD) - a uniqueness of the choice based credit system.
- Human excellence in specialized areas
- Thrust in internship and / or projects as a lead towards research and
- The **multi-discipline** nature of the newly evolved structure (School System) caters to the needs of stake-holders, especially the employers.

What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For UG courses, a student must earn a minimum of 150 credits as mentioned in the table below. The total number of minimum courses offered by a department are given in the course pattern.

SUMMARY OF HOURS AND CREDITS UG COURSES MATHEMATICS

Part	Semester	Specification	No. of Courses	Hours	Credits	Total Credits
I	I-IV	Languages (Tamil/Hindi/French/Sanskrit)	4	16	12	12
II	I-IV	General English	4	20	12	12
III	I-VI	Core Theory Practicals Internship & Project Work Comprehensive Exam	17	90	69	98
		Core Electives	3	12	11	
		Allied	4	24	18	
		Additional Core Courses for Extra Credits	-	-	-	
IV	V-VI	Skilled Based Electives Between Schools (BS) Within School (WS)	1 1	2 2	2 2	4
		Inter Departmental Courses (IDC) - Soft Skills	1	2	2	2
	I-IV	NMC Communicative English Computer Literacy	1 1	0 2	5 2	7
		Environmental Studies	1	2	2	2
			Value Education	4	8	8
V	I-V	SHEPHERD & Gender Studies	1	-	5	5
	I-V	AICUF, Fine Arts, Nature Club, NCC & NSS				
TOTAL				180		150

Course Pattern

The Under Graduate degree course consists of Five vital components. They are as follows:

Part-I : Languages (Tamil / Hindi / French / Sanskrit)

Part-II : General English

Part-III : Core Course

(Theory, Practical, Core Electives, Allied, Project, Internship and Comprehensive Examinations)

Part-IV : SBE, NMC, Value Education, Soft Skills & EVS

Part-V : SHEPHERD, AICUF, Finearts, Nature Club, NCC, NSS, etc.

Non-Major Courses (NMC)

There are three NMC's – Communicative English, Computer Literacy and Environmental Studies offered in the I, II & III Semesters respectively.

Value Education Courses:

There are four courses offered in the first four semesters for the First & Second UG students.

Non Major Elective / Skill Based Elective:

These courses are offered in two perspectives as electives "With-in School" (WS) and "Between School" (BS).

Subject Code Fixation

The following code system (11 characters) is adopted for Under Graduate courses:

14	UXX	X	X	XX	XX
↓	↓	↓	↓	↓	↓
Year of Revision	UG Code of the Dept	Semester of the Part	Specification	Subject Category	Running in that part
14	UMA	1	3	2	1

For Example :

I B.Sc. Mathematics, first semester Basic Mathematics

The code of the paper is 14UMA130201.

Thus, the subject code is fixed for other subjects.

Subject Category

- 00 - Languages (Tamil / Hindi / French / Sanskrit)
- 01 - General English
- 02 - Core (Theory, Practicals, Comprehensive Exams, Internship & Project viva-voce)
- 03 - Core Electives
- 04 - Allied
- 05 - Additional core Courses for Extra Credits (If any)
- 06 - Skill Based Electives (BS) & (WS)
- 07 - Soft Skill
- 08 - NMC (Communicate English, Computer Literacy/SAP)
- 09 - EVS
- 10 - Value Education
- 11 - SHEPHERD & Gender Studies
- 12 - AICUF / Nature Club / Fine Arts / NCC / NSS / etc.

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks	
Passing Minimum: 40 Marks	
Library Referencing	5
3 Components	35
Mid-Semester Test	30
End-Semester Test	30
CIA	100

MID-SEM & END – SEM TEST

Centralised – Conducted by the office of COE

1. Mid-Sem Test & End-Sem Test: (2 Hours each); will have Objective + Descriptive elements; with the existing question pattern PART-A; PART-B; and PART-C
2. CIA Component III for UG & PG will be of 15 marks and compulsorily objective multiple choice question type.
3. The CIA Component III must be conducted by the department / faculty concerned at a suitable computer centres.
4. The 10 marks of PART-A of Mid-Sem and End-Sem Tests will comprise only: OBJECTIVE MULTIPLE CHOICE QUESTIONS; TRUE / FALSE; and FILL-IN BLANKS.
5. The number of hours for the 5 marks allotted for Library Referencing/ work would be 30 hours per semester. The marks scored out of 5 will be given to all the courses (Courses) of the Semester.
6. English Composition once a fortnight will form one of the components for UG general English

SEMESTER EXAMINATION

Testing with Objective and Descriptive questions

Part-A: 30 Marks

Objective MCQs only

Answers are to be marked on OMR score-sheet. The OMR score-sheets will be supplied along with the Main Answer Book. 40 minutes after the start of the examination the OMR score-sheets will be collected

Part-B + C = 70 Marks

Descriptive

Part-B: 5 x 5 = 25 marks; inbuilt choice;

Part-C: 3 x 15 = 45 marks; 3 out of 5 questions, open choice.

The Accounts Paper of Commerce will have

Part-A: Objective = 25

Part-B: 25 x 3 = 75 marks.

Duration of Examination must be rational; proportional to teaching hours
90 minute-examination / 50 Marks for courses of 2/3 hours/week (all Part IV UG Courses) 3-hours examination for courses of 4-6 hours/week.

EVALUATION

Percentage Marks, Grades & Grade Points

UG (Passing minimum 40 Marks)

Qualitative Assessment	Grade Points	Grade	Mark Range (%)
Exemplary	10	S	90 & above
Outstanding	9	A+	85-89.99
Excellent	8	A	80-84.99
Very Good	7	B	70-79.99
Good	6	C	60-69.99
Satisfactory	5	D	50-59.99
RA	4	E	40-49.99
	0	RA	<40

CGPA - Calculation

Grade Point Average for a semester is calculated as indicated here under:

$$\frac{\text{Sum total of weighted Grade Points}}{\text{Sum of Credits}}$$

Weighted Grade Points is **Grade point x Course Credits**. The final CGPA will only include: Core, Core Electives & IDCs.

A Pass in SHEPHERD will continue to be mandatory although the marks will not count for the calculation of the CGPA.

Continuous Internal Assessment (CIA):

Class	Mark Range (%)
Distinction	75 & above, first attempt
First	60 & above
Second	50 to 59.99
Third	40 to 49.99

Declaration of Result:

Mr./Ms. _____ has successfully completed the Under Graduate in _____ programme. The candidate's Cumulative Grade Point Average (CGPA) in Part – III is _____ and the class secured is _____ by completing the minimum of 150 credits.

The candidate has acquired _____ (if any) more credits from SHEPHERD / AICUF/ FINE ARTS / SPORTS & GAMES / NCC / NSS / NATURE CLUB, ETC. The candidate has also acquired _____ (if any) extra credits offered by the parent department courses.

B. Sc. MATHEMATICS
Course Pattern - 2014 Set

Sem	Part	CODE	Title of the paper	Hrs	Cr	
I	I	Language	14UGT110001	Language-I:(Tamil /Hindi /French/Sanskrit)	4	3
	II	English	14UGE12 0101	General English-I	5	3
	III	Core	14UMA130201	Basic Mathematics	7	4
			14UMA130202	Integral Calculus	6	4
	III	Allied	14UMA130401	Allied :Statistics-I	6	5
	IV	Val. Edn.	14UFC141001	Value Education	2	2
NMC		14UCE140801	Communicative English	--	5	
Total for Semester I				30	26	
II	I	Language	14UGT210002	Language-II:(Tamil /Hindi /French/Sanskrit)	4	3
	II	English	14UGE220102	General English-II	5	3
	III	Core	14UMA230203	Analytical Geometry	6	4
			14UMA230204	Differential Equations	5	4
	III	Allied	14UMA230402	Allied: Statistics-II	6	5
	IV	Val. Edn.	14UFC241002	Techniques of Social Analysis	2	1
NMC		14UCE240802	Computer Literacy	2	2	
Total for Semester II				30	22	
III	I	Language	14UGT310003	Language-III:(Tamil /Hindi /French/Sanskrit)	4	3
	II	English	14UGE320103	General English-III	5	3
	III	Core	14UMA330205	Statics	6	4
			14UMA330206	Algebra-I	5	4
	III	Allied	14UMA330403 A	Allied: Physics-I OR	6	5
			14UMA330403 B	Allied: Accounts I		
IV	Val. Edn.	14UFC341003 A	Social Ethics-I OR	2	2	
		14UFC341003 B	Religious Doctrine-I			
IV	NMC	14UCE340901	Environmental Studies	2	2	
Total for Semester III				30	23	

IV	I	Language	14UGT410004	Language-IV:(Tamil /Hindi /French/Sanskrit)	4	3
	II	English	14UGE420104	General English-IV	5	3
	III	Core	14UMA430207	Classical Algebra	4	3
			14UMA430208	Sequences and Series	5	4
	III	Core Elective	14UMA430301 A	Graph Theory OR	4	4
			14UMA430301 B	Advanced Calculus		
	III	Allied	14UMA430404 A	Allied: Physics –II OR	6	5
			14UMA430404 B	Allied: Accounts- II		
			14UMA430405	Allied : Physics Practicals		
	IV	Val. Edn.	14UFC441004 A	Social Ethics –II OR	2	2
14UFC441004 B			Religious Doctrine- II			
Total for Semester IV					30	24
V	III	Core	14UMA530209	Real Analysis	6	4
			14UMA530210	Dynamics	6	4
			14UMA530211	Algebra II	5	3
			14UMA530212	Operations Research	5	4
	III	Core Elective	14UMA530302 A	(WS) Fuzzy Theory OR	4	4
			14UMA530302 B	Number Theory		
IV	SBE	14UMA540601	(BS): Skill Based Elective-I: Mathematics for Competitive Examinations	2	2	
IV	IDC	14USS540701	Soft Skills	2	2	
Total for Semester V					30	23
VI	III	Core	14UMA630213	Internship	-	2
			14UMA630214	Complex Analysis	7	4
			14UMA630215	Computer Oriented Numerical Methods in 'C' Programming	5	3
			14UMA630216	Computer Lab ('C' Programming)	2	2
			14UMA630217	Linear Algebra	6	4
			14UMA630218	Comprehensive Examination		2
	Core Elective	14UMA630303 A	(WD): Automata Theory OR	4	4	
		14UMA630303 B	Combinatorics			
		14UMA630304 A	(WD): Astronomy	4	4	
		14UMA630304 B	Advanced Differential Equations			
	SBE	14UCS640602	(WS): Skill Based Elective-I: MATLAB Applications	2	2	
Total for Semester VI					30	27
I-V	V		14UCW651101	SHEPHERD and Gender Studies		5
Total for all Semesters					180	150

* Code numbers according to the subject chosen

@ Practical examination in the following even semester.

gUtk; 1
14UGT110001

kz p Neuk; 4
Gssrfs; 3

ngHJ j j kpo;-I

Nehf;fqfs;

1. r%f khwwr; rpej i dfi s c ssl f;fpa j wfhy , yf;fpaqfi s mwKfk; nraj y;
2. GJ fftpi j > r;Wfi j > c i uei l Mfpa , yff;paqfs;pd; eak; ghuhl Lj y;
3. rej iggpi oapdwp vOj khz thfi sg; gapWwtj j y;

gad;fs;

1. khz thfs; r%f khwwr; rpej i dfi s mwpe;J nfhst;h;
2. rej iggpi ofi s e;ffp vOJk; j p;wd; ngWth;
3. Gj j yf;fpaqfi sg; gi l fFk; j pwi dAk; j p;wd;h;T nraAk; j pwi dAk; ngWth;

myF-1: kf;hft; ghuj p;ahh; ft;pi j fs;

ghuj j; hrd; ft;pi j fs;
c i uei l - Kj y; %dW fl Li ufs; (10 kz p Neuk)

myF-2: gl LfNfhl i l ahh; ghl y;fs;

ghtyNuW ngUQrj j p;dh; ghl y;fs;
, yffz k; -ty;KfK; , l qfs; (12 kz p Neuk)

myF-3: GJ fftpi j tbtqfs;

, yff;pa; tuyhW - %dwhk; ghfk;
r;Wfi j - Kj y; MW r;Wfi j fs; (10 kz p Neuk)

myF-4: GJ fftpi j fs;

ngz z p;af; ft;pi j fs;
, yff;pa; tuyhW - ehd;fhk; ghfk;
, yffz k; - ty; k;pfh , l qfs;(14 kz p Neuk)

myF-5: nkhopngahgGfftpi j fs;

r;Wfi j - 7 Kj y; 12 Kba c s s r;Wfi j fs;
c i uei l - 4Kj y; 6 Kba c s s fl Li ufs; (14 kz p Neuk)

ghl E)y;

1. ngHJ j j kpo; nraAs; j p;ul - j k;po;h;Tj ;Ji w ntsp;al-2014-2017
2. r%ft;ay; Nehf;f; j kpo; , yff;pa; tuyhW > j k;po;h;Tj ;Ji w ntsp;al > J}a t;sd;h; f;Y;Y}h; j p;Urr;uhggss; p;2> 2014
3. c i uei l f; Nfhi t - j k;po;h;Tj ;Ji w ntsp;al > 2014
4. r;Wfi j j nj hFgG

Sem. I
14UGE120101

Hours/Week: 5
Credits: 3

GENERAL ENGLISH-I

Objectives

To help students

- * Use words and phrases related to self, home, friends and relatives in meaningful contexts.
- * Use language to perform basic functions like describing, clarifying, suggesting, and giving directions.

Unit-1

01. Personal Details
02. Positive Qualities
03. Listening to Positive Qualities
04. Relating and Grading Qualities
05. My Ambition
06. Abilities and Skills
07. Self-Improvement Word Grid
08. What am I doing?
09. What was I doing?
10. Unscramble the Past Actions
11. What did I do yesterday?

Unit-2

12. Body Parts
13. Actions and Body Parts
14. Value of Life
15. Describing Self
16. Home Word Grid
17. Unscramble Building Types
18. Plural Form of Naming Words
19. Irregular Plural Forms
20. Plural Naming Words Practice
21. Whose Words?

Unit-3

22. Plural Forms of Action Words
23. Present Positive Actions
24. Present Negative Actions
25. Un/Countable Naming Words
26. Recognition of Vowel Sounds
27. Indefinite Articles

28. Un/Countable Practice
29. Listen and Match the Visual
30. Letter Spell - Check
31. Drafting Letter

Unit 4

32. Friendship Word Grid
33. Friends' Details
34. Guess the Favourites
35. Guess Your Friend
36. Friends as Guests
37. Introducing Friends
38. What are We Doing?
39. What is (s)he / are they Doing?
40. Yes / No Question
41. What was s/he doing?
42. Names and Actions
43. True Friendship
44. Know your Friends
45. Giving Advice/Suggestions
46. Discussion on Friendship
47. My Best Friend

Unit 5

48. Kinship Words
49. The Odd One Out
50. My Family Tree
51. Little Boy's Request
52. Occasions for Message
53. Words denoting Place
54. Words denoting Movement
55. Phrases for Giving Directions
56. Find the Destination
57. Giving Directions Practice
58. SMS Language
59. Converting SMS
60. Writing Short Messages
61. Sending SMS
62. The family debate
63. Family Today

Textbook

1. Joy, J.L. & Peter, F.M. (2014). *Let's Communicate*, New Delhi, Trinity Press.

Sem. I
14UMA130201

Hours/Week: 7
Credits: 4

BASIC MATHEMATICS

Objectives

- To inculcate the basic knowledge of differentiation, expansion of functions and their applications.
- To introduce the notion of envelopes, curvatures and polar co-ordinates.

Unit-I

Successive differentiation-envelopes- Curvature-Cartesian formula for the radius of curvature - Drawing the graphs $\sin x$, $\cos x$, $\tan x$, parabola, ellipse, hyperbola. Book 1, Chap III (full), Chap X - Sec 2.1 and 2.3.

Unit-II

Expansions of $\sin nq$, $\cos nq$, $\tan nq$, $\sin nq$, $\cos nq$, $\sin q$, $\cos q$, $\tan q$ - Hyperbolic functions - Logarithm of complex quantities. Book 2, Chap III (full), Chap IV (full), Chap V Sec: 5 (only).

Unit-III

Binomial theorem for rational index – some important particular cases of the Binomial expansion – Numerically greatest term – Partial fraction – Application of the Binomial theorem to the summation of series (Proof of the theorem not required). Book 3, Chap 3: Sec: 5-6, 8-10.

Unit-IV

Exponential series expansion – Logarithmic series expansion (Proofs of the theorems not required). Book 3, Chap 4: Sec: 3, 5 - 7.

Unit-V

Polar equation of a straight line - Polar equation of a circle-Polar equation of Conic-Equation of chord-Asymptotes of the conic. Book 4, Chap IX Sec: 1 - 12.

Textbooks

1. S. Narayanan and T.K.Manicavachagam Pillay, Calculus Volume I, S.Viswanathan Printers & Publishers, 2008.
2. S. Narayanan and T.K. Manicavachagam Pillay, Trigonometry, S. Viswanathan Printers & Publishers, 2001.
3. T.K. Manicavachagam Pillay, T. Natarajan and K.S. Ganapathy, Algebra volume I, S. Viswanathan Printers & Publishers, 2008.
4. T.K. Manicavachagam Pillay and T. Natarajan, A Text book of Analytical geometry – Part I – Two Dimension, S. Viswanathan Printers & Publishers, 2002.

References

1. P.R. Vittal and V. Malini, Algebra, Calculus and Trigonometry, Margham Publications, Chennai, 1997.
2. P.R. Vittal and V. Malini, Vector Analysis, Margham Publications, Chennai, 1997.
3. P.R. Vittal and V. Malini, Calculus, 3rd Edition (For Polar co-ordinates only) Margham Publications, Chennai, 1997.

Sem. I

14UMA130202

Hours/Week: 6

Credits: 4

INTEGRAL CALCULUS

Objectives

- To expose the students to various techniques of integration.
- To study some of the applications of definite integrals.

UNIT-I

Revision of all Integral models including Integration of Rational and Irrational Functions (Articles 1- 9 of Chapter 1).

UNIT-II

Properties of Definite integrals – Integration by Parts – Bernoulli's Formula – Integration as Summation (Articles 10-11, 15 of Chapter 1).

UNIT-III

Reduction Formulae for $x^n \sin nx$, $\sin nx$, $\cos nx$, $\sin mx \cos nx$, $\tan nx$, $\cot nx$, $\sec nx$, $\operatorname{cosec} nx$, $x \ln(\log x)^n$, $e^x \cos bx$ (Articles 13-14 of Chapter 1).

UNIT-IV

Area Under Plane Curves – Area of a Closed Curves – Length of a Curve – Area of Surface of revolution – Multiple Integrals – Evaluation of Double and Triple Integrals (Cartesian Co-Ordinates only; Articles 1,4,5 of Chapter 2; Articles 1-4 of Chapter 5).

UNIT-V

Improper Integrals– Beta and Gamma Functions– Recurrence formula of Gamma Functions – Properties of Beta Functions – Relation between Beta and Gamma Functions – Evaluation of Definite Integrals Using Gamma Functions (Articles 2-5 of Chapter 7).

Textbook

1. S. Narayanan and T.K. Manicavachagam Pillay, Calculus (Major), Vol. II, S. Viswanathan Printers & Publishers, 2007.

REFERENCES

1. Dr. M.K Venkataraman, Engineering Mathematics, Volume -2, The National Publishing Company, Madras, 1988.

Sem. I

14UMA130401

Hours/Week: 6

Credits: 5

Allied: STATISTICS-I

Objectives

- To make the students gain wide knowledge in probability which plays a main role in solving real life problems.
- To apply these techniques to real life problems.

Unit-I

Short History – Basic Terminology - Axiomatic approach to probability – Some Theorems on Probability - Mathematical Notion - Conditional probability- Multiplication Theorem of Probability – Independent Events- Pairwise Independent Events - Baye's theorem. Ch. 3: Sec 3.2-3.5, 3.8 (Omit 3.8.3, 3.8.4), 3.9 (Omit 3.9.2), 3.10-3.12, 3.15 Ch 4: Sec 4.2 (Omit 4.2.1)

Unit-II

Random variable - Distribution function - Discrete random variable - Continuous random variable – Two-dimensional random variable. Ch 5 Sec 5.1-5.5 (Omit 5.5.6-5.5.7)

Unit-III

Mathematical expectation – Expected value of function of a random variable – Properties of expectation – Properties of variance - Covariance - Moment generating function – Cumulants - Chebychev's inequality. Ch 6: Sec 6.1 - 6.6. Ch 7: Sec 7.1 – 7.2.

Unit-IV

Binomial distribution- Poisson distribution – Geometric distribution. Ch 8: Sec 8.4 (Omit 8.4.3, 8.4.10-8.4.12), 8.5 and 8.7

Unit-V

Normal distribution - Gamma distribution – Beta distributions of first and second kind - Exponential distribution (Ch 9: Sec 9.2 (Omit 9.2.11-9.2.15), 9.5-9.8.

Textbook

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand and Sons, 2002.

References

1. P.R. Vittal, Mathematical Statistics, Margham Publications, Chennai, 2004.

gUtk; 2
14UGT210002

kz p Neuk; 4
GSSpfs; 3

ngHJ j j kpo;II

Nehf;fqfs; :

1. rka eyy; f;f c z hi t tshj j y;
2. j kpo; fhgg;aqfs; moFk; mw;Tz hTk; C I Lk; gFj pfi sg; gbj ;Jg; Gh;J nfhsS j y;
3. c i uei l f; fl Li u vOJ k; j ;wd; ngWj y;

gadfs; :

1. j kpi oj; j ;Uj j khfg; gbff;Tt; NgrTk; gpi oap;wp vOj Tk; Nj hrrp ngWj y;
2. , yff;jaqfs; gbj j twi w Ki wahf thofi fapy; fi l gg;bj j y;

myF: 1 (12 kz p Neuk)

r;ygj p;fhuk; - kJi uf; fhz ;k; (fhL fhz ; fhi j)
, yff;ja tuyhW - i rtk; tsuj j j kpo; Kj y; Guhz qfs;Kba.

myF : 2 (12 kz p Neuk)

kz ;Nkfi y - ghj j ;uk; ngww fhi j
ng;jaGuhz k; - nkagng;Useh;dh; Guhz k;

myF : 3 (12 kz p Neuk)

fkguhkhaz k; - fhL rgg; yk;
c i uei l - 7 Kj y; 9 Kba c ss fl Li ufs;
, yffz k; - vOj j ;yffz k;

myF : 4 (12 kz p Neuk)

Fz qFb k] j hd; rhf;G ghl y;fs;
r;w;pyff;jaqfs; - fy;pfj ;Jgguz p
c i uei l - 10 Kj y; 11 ti uapyhd fl Li ufs;

myF : 5 (12 kz p Neuk)

, ul rz ja ahj j ;p;fk; kuz ggl yk;
, yff;ja tuyhW - j kpo; , yffz E}y;fs; Kj y; r;w;w;pyff;jaqfs;
Kba.
, yffz k; - nrhy;pyffz k;

ghl E}y;

1. nraAs; j ;ul L - j kpha;Tj ;Ji w ntsp;L> 2014-2017.
2. r%;ft;ay; Nehf;fy; j kpo; , yff;ja tuyhW> j kpha;Tj ;Ji w ntsp;L> J}atsdh; fy;Y}h; j ;Urr;uhggss; 2014.
3. c i uei l fNfhi t> j kpha;Tj ;Ji w ntsp;L> 2010.

SEM-II
14UGE220102

Hours/week: 5
Credits: 3

GENERAL ENGLISH-II

Objectives

To help students

- * Use words and phrases related to education, entertainment, career, and society in meaningful contexts.
- * Use language to perform basic functions like comparing, debating, and storytelling.

Unit 1

01. Education Word Grid.
02. Reading Problems and Solutions.
03. Syllabification.
04. Forms for Expressing Quality.
05. Expressing Comparison.
06. Monosyllabic Comparison.
07. Di/polysyllabic Comparison.
08. The best monosyllabic Comparison
09. The best di/polysyllabic Comparison.
10. Practising Quality Words.

Unit 2

11. Wh Words
12. Yes/No Recollection
13. Unscramble Wh Questions
14. Wh Practice
15. Education and the Poor
16. Controlled Role play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter
22. Proverb-Visual Description
23. Supply Wh Words
24. Rearrange Questions
25. Information Gap Questions

Unit 3

26. Asking Questions
27. More about Actions
28. More about Actions and Uses

29. Crime Puzzle
30. Possessive Quiz
31. Humorous News Report
32. Debate on Media and Politics
33. Best Entertainment Source

Unit 4

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Sord Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
49. E-mailing an Application
50. Mock Interview

Unit 5

51. Society Word Grid
52. Classify Society Wordlist
53. Rearrange the Story
54. Storytelling
55. Story Cluster
56. Words Denoting Time
57. Expressing Time
58. What Can You Buy?
59. Noise Pollution
60. Positive News Headlines
61. Negative News Headlines
62. Matching Conditions
63. What Whould You Do?
64. If I were the Prime Minister
65. My Dream Country

Textbook

1. Joy, J.L. & Peter, F.M. (2014). *Let's Communicate*, New Delhi: Trinity Prss.

Sem. II
14UMA230203

Hours/Week: 6
Credits: 4

ANALYTICAL GEOMETRY

Objectives

- To study three dimensional Cartesian Co-ordinates system.
- To introduce the basic concepts of Vector Calculus.

Unit-I

Coordinates in space-Direction cosines of a line in space-angle between lines in space-equation of a plane in normal form. (Chapter I, Sec 1.5 to 1.9, Chapter II Sec 2.1 to 2.3, Pages: 10-31) Angle between planes-Distance of a plane from a point. (Chapter II Sec 2.4 to 2.8 pages: 32-47)

Unit-II

Straight lines in space-line of intersection of planes-plane containing a line. Coplanar lines-skew lines and Shortest distance between skew lines-Length of the perpendicular from a point to a line. (Chapter III Sec 3.1 to 3.3 pages: 55-68, Chapter III Sec 3.4 to 3.7 pages: 70-89).

Unit-III

General equation of a sphere-Section of a sphere by a plane-tangent planes-condition of tangency-system of spheres generated by two spheres- system of spheres generated by a sphere and a plane. (Chapter VI Sec 6.1 to 6.6 pages: 121-143).

Unit-IV

Gradient, Divergence and Curl-Definitions, identities and simple problems-Directional derivative and Laplacian-Definition and simple problems. (Chapter IV, Pages: 100-132)

Unit-V

The line integral-Volume integral-Surface integral-Gauss divergence theorem-Stoke's theorem (Omit proofs of these two theorems). (Chapter VI, pages 148-171, 178-185)

Textbooks

1. Shanthi Narayanan and Mittal P.K, Analytical Solid Geometry, 16th Edition, S. Chand & Co, New Delhi. (For units I to III).
2. Narayanan and Manickavasagam Pillay, Vector Algebra and Analysis, S.Viswanathan Printers & Publishers Pvt.Ltd. (For Unit-IV &V).

References

1. P.Duraipandian, Analytical Geometry 3 Dimensional, Emerald Student Edition, 1970.

Sem. II
14UMA230204

Hours/Week: 5
Credits: 4

DIFFERENTIAL EQUATIONS

Objectives

1. To study DEs and PDEs of first and second order.
2. To study Fourier series and application of Laplace transforms in solving DEs.

Unit-I

Variables separable, Homogeneous equations, Non- Homogeneous equations of the first degree in x and y- Linear equations - Bernoulli's equation – Exact differential equations – First order DE of higher degree. [Chapter II: Sections 1 - 6.3 & Chapter IV: Fully]

Unit-II

Linear DE with constant coefficients – particular integrals – General method of finding P.I -Special methods for finding P.I-When X is of the form x^m - Equations reducible to the linear equations. [Chapter V: Sections 1 – 6]

Unit-III

Definition of “The Laplace transform” – Properties of Laplace transform – Laplace transform of periodic functions- some general Theorems – The inverse transform – solving linear DE using Laplace transforms. [Chapter IX: Sections 1 – 8]

Unit-IV

Fourier series – Fourier series for even and odd functions – Half range expansions. [Chapter I: Sections – 1,2,6,8,9,10 (omit change of interval, Proofs and derivations)]

Unit-V

Formation of partial Differential Equations – solution of simple types – First order PDE - Charpit's method – Homogeneous and non Homogeneous equations – linear PDE with constant coefficients. [Chapter II, omit sections 10, 11, numerical problems only]

Textbooks

1. S.Narayanan & T.K. Manichavasagam Pillay, Differential equations and its applications, S.Viswanathan Pvt Ltd 2001. (For units I, II, III).
2. M.K. Venkatraman, Engineering Mathematics – III year part B, National Publishing company, Chennai. (For units IV & V).

References

1. M.K.Venkatraman, Engineering Mathematics – Volume II, National Publishing company, Chennai (for units I & II).
2. M.K.Venkatraman, Engineering Mathematics – III year part A, National Publishing Company, Chennai (for Unit-III).

Sem. II
14UMA230402

Hours/Week: 6
Credits: 5

Allied: **STATISTICS**

Objectives

- To introduce the concepts of Sampling and testing of Hypothesis.
- To apply the concepts of testing of Hypothesis for real life problems.

Unit-I

Introduction - Types of Sampling - Parameter and Statistic - Tests of significance - Test of significance – Procedure for testing of hypothesis - Test of significance for large samples - Sampling of attributes – Sampling of variables. Ch 14 Full

Unit-II

Introduction – Derivation of the chi-square distribution – MGF of chi-square distribution - Application of chi-square distribution. Ch 15: Sec 15.1- 15.3, 15.6 (Omit 15.6.4-15.6.7)

Unit-III

Introduction – Student's t- distribution - Applications of t-distribution – Distribution of sample correlation coefficient when population correlation coefficient is zero- F-distribution - Applications of F-distribution. Ch 16: Sec 16.1-16.6

Unit-IV

Introduction - Characteristics of estimators - Consistency – Unbiasedness- Efficient and Most Efficient Estimators – Sufficiency (Definition only) – Methods of Estimation - MLE(statement of properties and direct simple problems, no theorems) - method of moments. Ch15: Sec 17.1-17.2 (Omit MVU Estimators and Factorisation Theorem), 17.6 (Omit 17.6.2, 17.6.4)

Unit-V

1.Introduction – Meaning of Correlation – Scatter diagram – Karl Pearson's Coefficient of Correlation – Rank Correlation. Ch 10: Sec 10.1 -10.4, 10.7.

Textbook

1. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand and Sons, 2002.

References

1. P.R. Vittal, Mathematical Statistics, Margham Publications, Chennai, 2004.

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14UGT310003

kz p Neuk; 4
GSSpfs; 3

ngHJ j j kpo;III

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- nrknkhoj; j kpo; nraAs;fshd gj indz Nky; fz fF> gj indz ; fb; fz fFg; ghl y;fi sg; gbj ;Jg; nghUs; GhpeJ nfhS k; j pwd; ngWj y;
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- kuGf; fti j tbtqfi s mwpar; nraj y;
- fti j fs; mi keJss ghqi fg; Ghj y;
- Gj pdk; top j wfhyr; rKj har; rffiyfi sAk; mj wfhd j hTfi sAk; Muhaej wj y;

gadfs; :

- nrknkhopahk; j kpo; nkhopad; rpwgi g mwj y;
- gz i l , yffiaqfs; cz hj ;J k; mwffUj ;J ffi s mwpeJ khz th; xOff newpaj; thoeJ r%fji j NkkgLj ;J th;
- khz th; Gj pdj i j f; fwg d; %yk; rKj har; rffiyfi s cz heJ mtwwpwFj ; j hT fhz gh;

myF : 1 (16 kz p Neuk)
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myF : 4 (12 kz p Neuk)
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nehej NrhW (2014-2015)

SEM-III
14UGE320103

Hours/week: 5
Credits: 3

GENERAL ENGLISH-III

Objectives:

- * To enable the students to comprehend the local and global issues through the lessons.
- * To enable the students to do the tasks centering on Skill Development and Grammar.
- * To empower the students with interactive skills.

Tasks Designed for Each Unit	Skills Focused to be Developed for Each Unit	Hours Allotted
1. Pre-reading Task	Listening and Reading Skills through teacher-led reading practice	2 Hours
2. Objectives	Listening and Reading Skills	
3. Text	Listening and Reading Skills through teacher-led reading practice	
4. Glossary (Using Words and Phrases in Sentences)	Referring and Language Using Skills	2 Hours
5. Reading Comprehension	Reading, Speaking, and Writing Skills	1 Hour
6. Critical Analysis	Critical Thinking and Speaking Skills	2 Hours
7. Creative Task	Creative Thinking and Speaking Skills	2 Hours
8. General Writing Skills	Writing Skill	1 Hour
9. Activities on Grammar	Grammar Using and Writing Skills	2 Hours

UNIT I

- * Suggestions to Develop Your Reading Habit 12 Hrs
Grammar: Simple Present Tense

UNIT II

- * The Secret of Success: An Anecdote 12 Hrs
Grammar: Present Continuous Tense

UNIT III

- * Hygiene 12 Hrs
Grammar: Simple Past Tense

UNIT IV

- * Dr. A.P.J. Abdul Kalam: A Short Biography 12 Hrs
Grammar: Past Continuous Tense

UNIT V:

- * "Golden Rule": A Poem 12 Hrs
Grammar: Simple Future Tense & Future Continuous Tense

Textbook:

- Jayraj, S. Joseph Arul *et al.* (2014). *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*, New Delhi, Trinity.

Sem. III
14UMA330205

Hours/Week: 6
Credits: 4

STATICS

Objectives

- To provide a basic knowledge of the behavior of various types of forces.
- To give enough working knowledge to handle practical problems.

Unit-I

Law of parallelogram of forces - Lami's theorem - Resolution of forces. (Chapter 2 Sections 1-4 & 6-12 Pages: 9 to 16 & 17 to 51)

Unit-II

Like Parallel forces-Unlike Parallel forces-Moments-Varignon's theorem of Moments-Generalized theorem of Moments-Couples-Definition-equilibrium of couples-resultant of coplanar couples. (Chapter 3 Sections 1-13; Chapter 4 Sections 1-10 Pages: 52-78 & 84-97)

Unit-III

Equilibrium of three forces acting on a rigid body-three coplanar forces-conditions of equilibrium-Coplanar forces-Reduction of coplanar forces-Equation to the line of action of the resultant. (Chapter 5 Sections 1-6; Chapter 6 Sections 1-9 Pages: 98 to 122 & 143-167)

Unit-IV

Forces of Friction-Laws of Friction-Limiting Friction-Limiting equilibrium-Cone of Friction-Angle of Friction. (Chapter 7 Sections 1-13 Pages: 206-234)

Unit-V

Equation to Common Catenary-Tension at any point-Geometrical properties of Common Catenary. (Chapter 11 Sections 1-6 Pages: 375-391)

Textbook

1. Venkataraman M.K., Statics, Agasthiar Publishers, Eleventh Edition, July 2005.

REFERENCES

1. A.V.Dharmapadham, Statics, S. Viswanathan Printers & Publishers Pvt Ltd.
 2. S.Narayanan, Statics, S. Chand & Company Ltd, New Delhi, 1985.
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Sem. III
14UMA330206

Hours/Week: 5
Credits: 4

ALGEBRA-I

Objectives

- To introduce Algebra from the basic concepts of set theory, Functions, etc.
- To introduce and delve deeply into the concepts of Group theory.

UNIT-I

Relations – Equivalence Relations-Partial Order – Functions – Binary Operations. (Chapter 2)

UNIT-II

Groups – Definition and Examples – Elementary Properties of a Group – Equivalent – Definitions of a Group. (Chapter 3 Sections 3.1-3.3)

UNIT-III

Permutation Groups - Subgroups - Cyclic Groups. (Chapter 3 Sections 3.4-3.6)

UNIT-IV

Order of an Element – Cosets and Lagranges Theorem - Normal Subgroups and Quotient Groups. (Chapter 3 Sections 3.7-3.9)

UNIT-V

Homomorphism and Isomorphism of Groups - Cayley's Theorem - Fundamental theorem of homomorphism. (Chapter 3 Sections 3.10, 3.11)

Textbook

1. S Arumugam and A Thangapandi Isaac, Modern Algebra, SciTech Publications, Chennai, 2003.

References

1. N. Herstein, Topics in Algebra, John Wiley & Sons, Student 2nd edition, 1975.
-

Sem. III
14UMA330403A

Hours/Week: 6
Credits: 5

Allied:
PHYSICS-I

Objectives

- To acquire knowledge about mechanics and moving particles
- To study gravitation and elasticity and acquire knowledge about planets, satellites and their movements.
- To understand the principles of musical sound, sound waves and their application in day- to-day life.
- To study the various optical instruments and learn the method of handling them.
- To know the different types of semiconductor devices and their applications in radio and television system

Unit-I: MECHANICS (10 Hours)

SHM-velocity, time, period, frequency, phase-equations of wave motion-compound pendulum- center of suspension-interchangeability center of oscillation and suspension- Moment of Inertia –Radius of gyration – Angular Momentum – torque – Theorems of M.I- M.I. of uniform rod, disc, circular ring, Annular ring, solid sphere –Kinetic energy of rotating energy-Acceleration of a body rolling down an inclined plane.

Unit-II: GRAVITATION AND ELASTICITY (10 Hours)

Newton's law of gravitation-verification of G –Kepler's laws-relation of G and g - mass and density of earth-variation of of the acceleration due to gravity - orbital velocity-escape velocity-types of moduli- Poission's ratio-relation between ν , n & s –bending of beams-bending moment-cantilever-cantilever loaded at one end-supported at two ends and loaded in the middle.

Unit-III: SOUND (10 Hours)

Velocity of transverse waves along a stretched string-frequency of vibrating string -laws of transverse vibration of strings-verification of laws- Melde's experiment-ultrasonics- piezo-electric effect-production of ultrasonics-Experiment-detection of ultrasonics-applications-determination of velocity of sound in a liquid-reverberation-absorption

Unit-IV : OPTICS (10 Hours)

Chromatic aberration-spherical aberration-spectrometer-determination of refractive index-Newton's rings-determination of wavelength and refractive

index of liquid-plane transmission grating-resolving power of diffraction grating-determination of wavelength-double refraction Nicol prism-specific rotation-Laurant's polarimeter – Half shade device.

Unit-V : BASIC ELECTRONICS (10 Hours)

Energy level in solids -intrinsic and extrinsic semi conductors -p-n junction-forward bias, reverse bias-volt-ampere characteristics of p-n junction diode-full wave rectifier- zener diode, tunnel diode, photo diode, LED -transistor-CE and CB characteristics-transistor amplifier.

Book For Study

1. A.S.Vasudeva, Modern Engineering Physics, S.Chand and CompanyLtd., 1988.
2. V.K.Mehta, Principles of Electronics, S.Chand and CompanyLtd., 2009.

Unit	Book	Sections
I	1	Part – IV : 1.1-1.6, 2.3, 1.8-1.10. Part –I : 4.2, 4.3, 4.6, 4.7, 4.9-4.11, 4.13-4.16, 4.20
II	1	Part I : 2.1-2.5, 2.7, 2.12, 2.13, 5.4, 5.9, 5.15-5.19.
III	1	Part – IV : 4.1-4.4, 6.1-6.9
IV	1	Part – III : 2.4, 2.9, 4.25-4.27, 5.21, 5.27, 5.28, 6.10, 6.16, 6.28-6.30.
V	2	5.1-5.19, 6.1,6.2, 6.11-6.15, 6.17, 6.18, 6.25, 6.27, 7.2-7.10, 7.12, 8.1-8.5, 8.9, 8.12

Sem. III
14UMA330403B

Hours/Week: 6
Credits: 5

Allied:
ACCOUNTS-I

Objectives:

- To enable the students to have a thorough knowledge of the fundamental concept basic principles of accountancy.
- To provide knowledge on the importance of maintaining various book of accounts.

UNIT-I

Accounting Principles- Concepts - Subsidiary Books (purchase book, sales book, purchase return book, sale return book) - Cash book – Ledger. (18 Hours)

UNIT-II

Trial balance – Trading, Profit and Loss Accounts – Balance Sheet of a Sole Trader(closing stock, outstanding expenses, prepaid expenses, income receivable, received in advance, depreciation and provision for bad debts. (18 Hours)

UNIT-III

Accounts for Non-trading concerns- Preparation of Income and Expenditure Account from Receipts and Payment Accounts (simple adjustments). (18 Hours)

UNIT-IV

Single Entry system- net worth method- conversion method. (18 Hours)

UNIT-V

Errors –classification- rectification- suspense account- effect on profit-preparation of bank reconciliation statement. (18 Hours)

TEXTBOOK

Reddy TS and Murthy A, (2006), Financial Accounting, Margham Publications, Chennai.

BOOKS FOR REFERENCES

1. Shukla MC, Grewal TS and Gupta SC, (2006), Advanced Accounts Volume I, S.Chand and Company Ltd, New Delhi.
2. Gupta RL and Gupta VK, (2006), Financial Accounting, Sultan Chand and Sons, New Delhi.
3. Gupta RL and Radhaswamy, (2006), Advanced Accountancy, Volume I, Sultan Chand and Sons, New Delhi.
4. Jain SP, Narang KL, (2004), Advanced Accountancy Volume I, Kalyani Publishers.
5. Maheshwari SN and Maheshwari SK, (2005), Introduction to Accountancy, Vikas Publishing House PVT.Ltd. New Delhi.

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2. Gj ja ehl fqfi sg; gi l fFk; j pwi d khz tufspi l Na c UthfFj y;

gadfs; :

1. ehl ftop mofpay; cz u;Tfi s tsuj j y;
2. ehl fqfi sr; r%fg; gadghl bwF Vwg c UthfFj y;

myF : 1

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kNdhdKz Bk; ghapuk; mqfK; - 1> fsk; 1 - 5 ti u.

myF : 2

(12 kz p Neuk)

kNdhdKz Bk; mqfK; - 2> fsk; 1 - 3 ti u.
c i uei l ehl fK; (Kj y; , uz L ehl fqfs)

myF : 3

(12 kz p Neuk)

kNdhdKz Bk; mqfK; - 3> fsk; 1 - 4 ti u.

myF : 4

(12 kz p Neuk)

kNdhdKz Bk; mqfK; - 4> fsk; 1 - 5 ti u.

myF : 5

(12 kz p Neuk)

kNdhdKz Bk; mqfK; - 5> fsk; 1 - 3 ti u.
c i uei l ehl fK; (3> 4Mk; ehl fqfs)

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kj gngz ; gfu;T :

kNdhdKz Bk; - 80

c i uei l ehl fK; - 20

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SEM-IV
14UGE420104

Hours/week: 5
Credits: 3

GENERAL ENGLISH-IV

Objectives:

- * To enable the students to comprehend the local and global issues through the lessons.
- * To enable the students to do the tasks centering on Skill Development and Grammar.
- * To empower the students with interactive skills.

Tasks Designed for Each Unit	Skills Focused to be Developed for Each Unit	Hours Allotted
1. Pre-reading Task	Listening and Reading Skills through teacher-led reading practice	2 Hours
2. Objectives	Listening and Reading Skills	
3. Text	Listening and Reading Skills through teacher-led reading practice	
4. Glossary (Using Words and Phrases in Sentences)	Referring and Language Using Skills	2 Hours
5. Reading Comprehension	Reading, Speaking, and Writing Skills	1 Hour
6. Critical Analysis	Critical Thinking and Speaking Skills	2 Hours
7. Creative Task	Creative Thinking and Speaking Skills	2 Hours
8. General Writing Skills	Writing Skill	1 Hour
9. Activities on Grammar	Grammar Using and Writing Skills	2 Hours

UNIT-I: Women through the Eyes of Media **12 Hrs**

Grammar: Present Perfect Tense

UNIT-II: Effects of Tobacco Smoking **12 Hrs**

Grammar: Present Perfect Continuous Tense

UNIT-III: The Impact of Liquor Consumption on the Society **12 Hrs**

Grammar: Past Perfect Tense

UNIT-IV: An Engineer Kills Self as Crow Sat on his Head:
A News Paper Report **12 Hrs**

Grammar: Past Perfect Continuous Tense

UNIT-V: Traffic Rules **12 Hrs**

Grammar: Future Perfect Tense & Future Perfect Continuous Tense

Text Book:

Jayraj, S. Joseph Arul. et al. (2014). *Trend-Setter: An Interactive General English Textbook for Under Graduate Students*, New Delhi, Trinity.

Sem. IV
14UMA430207

Hours/Week: 4
Credits: 4

CLASSICAL ALGEBRA

Objectives

- To lay a good foundation for the study of Higher Pure Mathematics.
- To train the students in Operative Algebra.

Unit-I

Theory of equations -Introduction –Remainder theorem –Roots occurring in pairs. (Chap-6: Sec 1-10 pg282-292)

Unit-II

Relations between the roots and coefficients of equations -Sum of the rth powers of the roots –Newton’s theorem on the sum of the powers of the roots. (Chap-6: Sec11- 14 pg292- 317)

Unit-III

Transformations of equations – Reciprocal equations. To increase or decrease the roots of an equation by a quantity. (Chap-6: Sec-15-18 pg 318-334)

Unit-IV

Removal of terms – To form an equation whose roots are any power of the roots of a given equation - Transformation in general. (Chap-6: Sec 19-23 pg 334-351)

Unit-V

Descarte’s rule of signs –Rolle’s theorem–Sturms theorem –Newton’s method of divisors. (Chap-6: Sec 24, 25 (pg 351-358) & Sec 27 – 29 (pg362- 375))

NOTE

Proof is not expected for any theorem.

Textbook

1. T.K.Manicavachagom Pillai, T Natarajan, K S Ganapathy, Algebra, Volume I, S.Viswanathan Printers and publishers Pvt. Ltd., 2003.

References

1. William J Gilbert and Scott A Vanstone, Classical Algebra, Third Edition, Waterloo Mathematics Foundation, 1993.

Sem. IV
14UMA430208

Hours/Week: 5
Credits: 4

SEQUENCES AND SERIES

Objectives

- To lay a good foundation for classical analysis.
- To study the behavior of sequence and series.

Unit-I

Sequences-Bounded sequences - Monotonic Sequences - Convergent sequences - Divergent sequences - Oscillating sequences. (Chap-3: Sec 3.0-3.5 pg 39-55)

Unit-II

Algebra of limits –Behavior of Monotonic functions. (Chap3: Sec3.6, 3.7 pg 56-82)

Unit-III

Some theorems on limits- subsequences –limit points: Cauchy sequences. (Chap3: Sec-3.8-3.11, pg 82-102)

Unit-IV

Series-Infinite series –Cauchy’s general principle of convergence - Comparison test theorem and test of convergence using comparison test (comparison test statement only, no proof). (Chap4: Sec (4.1& 4.2) pg 112-128.

Unit-V

Test of convergence using D’ Alembert’s ratio test- Cauchy’s root test- Alternating Series –Absolute Convergence (statement only for all tests). (Relevant part of Chap - 4 and Chap 5: sec 5.1&5.2 pg 157-167)

Textbook

1. S.Arumugam, A.Thangapandi and Isaac, Sequences and Series, New Gamma Publishing House, 2002.

References

1. Konrad Knopp, Infinite Sequences and Series, Dover Publications, 1956.

Sem. IV
14UMA430301A

Hours/Week: 4
Credits: 4

GRAPH THEORY

Objectives

- To introduce the notion of graph theory and its applications.
- To learn the techniques of combinatorics in Graph Theory.

UNIT-I:

Introduction - The Konigsberg Bridge Problem - Graphs and subgraphs Definition and Examples - Degrees - Subgraphs - Isomorphism. (Sec 1.0, 1.1, 2.0, 2.1, 2.2, 2.3, 2.4)

UNIT-II:

Matrices - Operations on Graphs - Walks, Trails and Paths - Connectedness and Components - Euler Graphs. (Sec 2.8, 2.9, 4.1, 4.2, 5.0, 5.1)

UNIT-III:

Hamiltonian Graphs (Omit Chavatal Theorem) - Characterization of Trees - Centre of Tree. (Sec 5.2, 6.0, 6.1, 6.2)

UNIT-IV:

Planarity: Introduction - Definition and Properties - Characterization of Planar Graphs. (Sec 8.0, 8.1, 8.2)

UNIT-V:

Directed Graphs: Introduction - Definitions and Basic Properties - Some Applications: Connector Problem - Kruskal’s algorithm - Shortest Path Problem – Dijkstra’s algorithm. (Sec 10.0, 10.1, 11.0, 11.1, 11.2)

Textbook

1. S. Arumugam and S. Ramachandran, Invitation to Graph Theory, SciTech Publications (India) Pvt. Ltd., Chennai, 2006.

References

1. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India, 2004.
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, Tata McGraw-Hill Edition, 2004.

Sem. IV
14UMA430301B

Hours/Week: 4
Credits: 4

ADVANCED CALCULUS

Objectives

- To study functions of two variables, continuity and differentiability of two variables.
- To study the geometrical properties of curves including maxima and minima, saddle points etc.

Unit-I: Functions of Several Variables.

Limits and continuity, Derivatives, Composite functions, further cases, Differentiable functions.

Unit-II: Taylor's Theorem.

Functions of a single variable, Functions of two variables.

Jacobians. Implicit functions, the inverse of the transformation, Change of variable.

Unit-III: Maxima and minima.

Necessary conditions, sufficient conditions, Points of inflection.

Unit-IV: Functions of two variables.

Absolute maximum or minimum, Illustrative examples, critical treatment of an elementary problem.

Unit-V: Sufficient conditions

Relative extrema, saddle points, Least squares.

Textbook

David V Widder, Advanced Calculus, Second Edition, Prentice-Hall Inc. 1947.

Unit-I: Chapter 1, Article 3.

Unit-II: Chapter 1, Article 9 and 10.

Unit-III: Chapter 4, Article 1.

Unit-IV: Chapter 4, Article 2.

Unit-V: Chapter 4, Article 3.

References

Olmesled John M.H., Advanced Calculus, Eurasia Pub. House, Delhi, 1970.

Sem. IV
14UMA430404A

Hours/Week: 4
Credits: 3

Allied: PHYSICS-II

Objectives

- To understand the knowledge of nuclear bomb and X-ray studies.
- For the study of electrostatics, student acquire knowledge about forces in electric field and their applications.
- To understand the knowledge of magnetic field in various conducting media
- To know the information regarding lasers and fiber optics in communication system.
- To know the different types of digital instruments in various electronic devices and digital computer.

Unit-I: MODERN PHYSICS

Liquid drop model – nuclear fission - nuclear fusion – atom bomb-photo electric effect – Einstein's photo electric equation – experimental verification – Compton effect – theory – X-ray diffraction – Bragg's law – Bragg's X-ray spectrometer – structure of KCl and NaCl crystal – Sommerfeld relativistic atom model.

Unit-II: ELECTROSTATICS

Gauss law - proof – force between two point charges in vacuum – applications of Gauss law - electric field due to a line charge, an infinite plane sheet of charge, infinite charged conducting plate, charged spherical shell and charged sphere – Coulomb's law from Gauss law – capacitors – parallel plate capacitor with dielectric and dielectric with varying thickness.

Unit-III: MAGNETISM AND CURRENT ELECTRICITY

Magnetizing field - intensity of magnetization - flux density – deflection magnetometer – Tan A and Tan B simultaneous method – vibration magnetometer – absolute determination of M and H – hysteresis – energy loss in hysteresis - Ampere's law – Biot – Savarts law – magnetic field due to straight conductor carrying current – magnetic field on the axis of a circular coil carrying current – magnetic field due to a solenoid – force between two parallel conductors – Post Office Box – Potentiometer – principle and measurement of resistance and current..

Unit-IV : LASERS AND FIBER OPTICS

Atomic excitation - excitation by absorption-induced absorption - spontaneous absorption-spontaneous and induced emission - optical pumping-Ruby laser - He-Ne laser-applications of lasers-fiber optics-propagation of light in various media and in optical fiber- optical fiber and total internal reflection-numerical aperture - fiber optic communication-advantages –telephone system and optical fiber.

Unit-V : DIGITAL ELECTRONICS

Binary number system – conversion of binary into decimal, decimal into binary - logic gates and Universal gates – NAND and NOR as a Universal building block – Boolean algebra – De Morgan’s theorem – flip flops: SR, Clocked SR, JK, D–type, T–type.

Books For Study

1. A. S. Vasudeva - Modern Engineering Physics, S. Chand and Company Ltd., 1988.
2. Cyclostyled Text.

Units	Book	Sections
I	1	2.2,2.3,5.4,6.10-6.13,9.10-9.13,9.17,15.7,15.8
II	1	2.2-2.5,3.1,3.2,3.7,3.8
III	1	3.2-3.4,3.15,3.16,1.2-1.4,1.7-1.10.
IV	1	8.2,8.3,8.8-8.15, 8.17, 8.20, 8.22, 8.24, 8.28, 8.34, 8.35
V	2	Cyclostyled text

Sem. IV
14UMA430404B

Hours/Week: 6
Credits: 5

Allied:
ACCOUNTS-II

Objectives:-

- To impart basic knowledge of cost and management accounting
- To help the student to know the application of them in different situations.

Unit-I

Preparation of cost sheet- tender quotation. (18 hours)

Unit-II

Cash flow management- meaning- preparation of cash flow statement. (18 hours)

Unit-III

Working capital management- meaning- components- Calculation.(18 hours)

Unit-IV

Marginal costing – Marginal cost- Contribution –PV Ratio – BEP – Margin of safety –CVP-decision making (simple).(18hours)

Unit-V

Budgeting control- preparation of cash budget- sales budget- production budget- production cost budget- flexible budget.(18 hours)

Text book:

1. Reddy and murthy, Cost Accounting (latest Ed.), Margham Publications, Chennai(Unit-I).
2. Reddy and murthy, Management Accounting (latest Ed.), Margham Publications, Chennai.(Unit-II, III, IV & V)

BOOKS FOR REFERENCES

1. S.N. Maheswari, (2007), Cost Accounting, S.Chand& Co, New Delhi.
2. Jain & Narang, (2006), Cost Accounting Principles and Practice, Kalyani Publishers, New Delhi.

Sem. IV
14UMA430405

Hours/Week: 2
Credits: 2

Allied:
PHYSICS PRACTICALS

Any 16 Experiments

1. Young’s modulus – Non uniform bending – cantilever
2. Young’s modulus – Cantilever
3. S .T. – Method of drops
4. S.T. – Capillary rise.
5. Viscosity – variable pressure head
6. Concave lens – f, R, ?.
7. Air wedge – Thickness of wire.

8. Newton' Rings R
 9. Spectrometer – Solid prism
 10. Spectrometer – Grating (Normal Incidence)
 11. M1/M2 – Tan A and Tan B simultaneous method
 12. Absolute determination of M and H.
 13. P.O. Box – Temp. Coefficient
 14. Potentiometer – Ammeter calibration
 15. Potentiometer – R and ?.
 16. Field along the axis of the coil
 17. Sonometer – Frequency of turning fork
 18. Junction diode characteristics
 19. Zener diode characteristics.
 20. Logic gates – IC's
 21. Jolly's bulb
-

Sem. V
14UMA530209

Hours/Week: 6
Credits: 4

REAL ANALYSIS

Objectives

1. To study the real number system and its properties.
2. To study the properties of functions defined on the Real line.

Unit-I - Real Numbers:

Concept of real numbers – Dedekind's theory of irrational numbers – Definitions - Dedekind's theorem – Absolute value of real numbers. (Chapter 1, Sections 1-5, pages 1-19)

Unit-II - Limit of a function:

Limit of a function of one variable – Other kinds of limit – Theorems involving limits. (Chapter 4, Sections 4-6, pages. 90-115)

Unit-III - Continuity:

Notion of continuity – Classification of points of discontinuity – Properties of continuous functions of one variable. (Chapter 4, Sections 7-9, pages 115-137,140-148)

Unit-IV - Derivatives:

Introduction – Definition of derivative – Geometrical significance of derivative – Continuity and existence of derivatives – Mean value theorems of differential calculus. (Chapter 6, Sections 1-4, 13, pages 206-215, 260-280)

Unit-V - Riemann Integration:

Riemann's theory of integration of a bounded function – Necessary and Sufficient condition for Riemann integrability – Examples of Riemann integrable function – Mean value theorems for definite integrals-Second Mean value theorem for definite integrals – Fundamental theorem. (Chapter 7, Sections 1,4,7 & 8, pages. 312-318, 327-333, 344-352)

Textbook

1. S.K. Chatterjea, Mathematical Analysis (Real), Oxford and IBH Publishing Co., 1979.

References

1. S C Malik and Savita Arora, Mathematical Analysis, New Age Science Ltd., 2009.
2. Shanti Narayan, Elements of Real Analysis, S.Chand & Company Ltd, New Delhi, 1974.

Sem. V
14UMA530210

Hours/Week: 6
Credits: 4

DYNAMICS

Objectives

- To provide a basic knowledge of the behavior of objects in motion.
- To develop a working knowledge to handle practical problems.

Unit-I

Motion in a plane without air resistance - path of a projectile - Time of flight - Horizontal range - Motion of a projectile up an inclined plane. [Sections 6.1 to 6.10, 6.12 to 6.16]

Unit-II

Fundamental laws of impact - Impact of a smooth sphere on a fixed smooth plane – Direct impact of smooth elastic spheres - oblique impact of smooth elastic spheres. [Sections 8.1 to 8.11]

Unit-III

Definition - Geometrical representation of S.H.M.-Composition of S.H.M.'S of the same period and in the same line - Composition of S.H.M.'S of the same period and in two perpendicular directions. [Sections 10.1 to 10.8]

Unit-IV

Radial and transverse components of velocity and acceleration – Differential equation of a central orbit- Given the orbit to find the law of force - Given the law of force to find the orbit. [Sections 11.1 to 11.13]

Unit-V

Kinetic Energy – Angular momentum – Equation of motion – Conservation of angular momentum – Principle of energy – Compound pendulum – Centers of suspension and oscillation. [Sections 13.1 to 13.8]

Note:

50% of the question paper shall be book works and 50% of the questions may be problems.

Textbook

Dr.M.K.Venkataraman, Dynamics, Agasthiar Publications, 12th Edition 2006.
Unit-1 – Chapter 6, Unit-2 – Chapter 8, Unit-3 – Chapter 10, Unit-4 – Chapter 11, Unit-5 – Chapter 13.

References

1. A.V.Dharmapadham, Dynamics, S. Viswanathan Printers & Publishers Pvt Ltd 2006.
2. M.L. Khanna, Dynamics, Jai Prakash Nath And Company, 2004.

Sem. V
14UMA530211

Hours/Week: 5
Credits: 4

ALGEBRA-II

Objectives

- To introduce the concepts of Ring Theory and Ideals in a Ring.
- To introduce polynomial rings and study their properties.
- To introduce the basic concepts of Boolean Algebra

UNIT-I

Rings-Definitions and Examples - Elementary properties of rings – Isomorphism - Types of rings. (Chapter 4 Sections 4.1-4.4)

UNIT-II

Characteristic of a ring – subrings – Ideals - Quotient rings - Maximal and Prime Ideals. (Chapter 4 Sections 4.5-4.9)

UNIT-III

Homomorphism of rings – Field of quotient of an integral domain – unique factorization domain-Euclidean domain - Every P.I.D is U.F.D. (Chapter 4 Sections 4.10, 4.11, 4.13-15)

UNIT-IV

Polynomial rings – Polynomial rings over U.F.D – Polynomial rings over \mathbb{Q} . (Chapter 4 Sections 4.16 - 4.18)

UNIT-V

Partially ordered sets – Lattices - Distributive Lattices – Modular Lattices – Boolean algebra. (Chapter 9)

Textbook

1. Arumugam S and Thangapandi Isaac A, Modern Algebra, SciTech Publications (India) Ltd., Chennai, Edition 2003.

References

1. I.N. Herstein, Topics in Algebra, Second Edition, John Wiley & Sons (Asia), 1975.
2. Elliott Mendelson, Theory and problems of Boolean Algebra and Switching Circuits, Tata McGraw-Hill, 2004.

Sem. V
14UMA530212

Hours/Week: 5
Credits: 4

OPERATIONS RESEARCH

Objectives

- To introduce the various techniques of Operations Research.
- To make students solve real life problems in Business and Management.

UNIT-I

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases - Canonical and standard forms of Linear Programming Problem - simplex method. (Chapter 2 Sec 2.1 to 2.4, Chapter 3 Sec 3.1 to 3.5, Chapter 4 Sec 4.1 , 4.3)

UNIT-II

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form -Dual simplex method. (Chapter 4 Sec 4.4, Chapter 5 Sec 5.1 to 5.4, 5.9)

UNIT-III

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) – Degeneracy in TP - Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem – special cases in assignment problem. (Chapter 10 Sec 10.1, 10.2, 10.8, 10.9, 10.12, 10.13, Chapter 11 Sec 11.1to 11.4)

UNIT-IV

Queuing theory - Queuing system - Classification of Queuing models - Poisson Queuing systems Model I (M/M/1)(¥/FIFO) only - Games and Strategies – Two person zero sum - Some basic terms - the maximin-minimax principle -Games without saddle points-Mixed strategies - graphic solution 2xn and mx2 games. (Chapter 21 Sec 21.1, 21.2, 21.7 to 21.9, Chapter 17 Sec 17.1 to 17.6)

UNIT-V

PERT and CPM – Basic components – logical sequencing - Rules of network construction- Critical path analysis - Probability considerations in PERT. (Chapter 25 Sec 25.1 to 25.4, 25.6, 25.7)

Textbook

1. Kanti Swarup, P.K. Gupta and ManMohan, Operations Research, 13th edition, Sultan Chand and Sons, 2007.

References

1. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K, Resource Management Techniques, A.R. Publications, 2002.
2. Taha H.A., Operations Research: An introduction, 7th edition, Pearson Prentice Hall, 2002.

Sem. V
14UMA530302A

Hours/Week: 4
Credits: 4

FUZZY THEORY

Objectives

- To expose the students to the concepts of Fuzzy Sets and operations on these sets.
- To provide comprehensive knowledge of applications of Fuzzy Sets and relations to real life systems.

UNIT-I

Fuzzy Set Theory: Fuzzy sets - Fuzzy set: definition - Different Types of Fuzzy sets - General Definitions and Properties of Fuzzy Sets – Other Important Operations - General Properties: Fuzzy Vs Crisp. (Chapter 1: Sections 1.16 to 1.21)

UNIT-II

Operations on Fuzzy Sets: Introduction - Some Important Theorems - Extension Principle for Fuzzy Sets - Fuzzy Compliments – Further Operations on Fuzzy Sets. (Chapter 2: Sections 2.1 to 2.5)

UNIT-III

Fuzzy Relations and Fuzzy Graphs: Introduction - Projections and Cylindrical Fuzzy Relations - Composition - Properties of Min-Max Composition - Binary Relations on a Single Set - Compatibility Relation. (Chapter 4: Sections 4.1 to 4.6)

UNIT-IV

Possibility Theory: Introduction - Fuzzy Measures - Evidence Theory – Probability Assignment – Combined Evidence - Probability Measure - Possibility and Necessity Measures. (Chapter 5: Sections 5.1 to 5.8)

UNIT-V

Decision Making in Fuzzy Environment: Introduction- Individual Decision Making – Multi person Decision Making – Multi criteria Decision Making - Fuzzy Ranking Method - Fuzzy Linear Programming. (Chapter 9: Sections 9.1 to 9.6)

Textbook

1. Pundir and Pundir, Fuzzy sets and their Applications, A Pragati Edition, 2006.

References

1. H. J. Zimmermann, Fuzzy set theory and its applications, Springer Fourth Edition, 2001.
2. Timothy J. Ross, Fuzzy logic with engineering Applications, McGraw Hill Inc. New Delhi, 2004.
3. George J. Klir and Bo Yuan, Fuzzy sets and fuzzy logic theory and Applications, Prentice Hall of India, New Delhi, 1995.

Sem. V
14UMA530302B

Hours/Week: 4
Credits: 4

NUMBER THEORY

Objectives

- To highlight the niceties and nuances in the world of numbers.
- To prepare the students for coding through congruences.

Unit-I

Euclid's Division Lemma-Divisibility - The Linear Diophantine Equation - The Fundamental Theorem of Arithmetic. (Sec 2.1-2.4 Pages 12-29)

Unit-II

Permutations and Combinations - Fermat's Little Theorem - Wilson's Theorem-Generating Functions. (Sec 3.1-3.4 Pages 30-44)

Unit-III

Basic Properties of Congruences - Residue Systems. Linear Congruences-The Theorems of Fermat and Wilson Revisited. (Sec 4.1-4.2 Pages 49-55; Sec 5.1-5.2 Pages 58-65)

Unit-IV

The Chinese Remainder Theorem-Polynomial Congruences-Combinatorial Study of $F(n)$. (Sec 5.3-5.4 Pages 66-74, Sec 6.1 Pages 75-81)

Unit-V

Formulae for $d(n)$ and $s(n)$ -Multiplicative Arithmetic Function-The Mobius Inversion Formula. (Sec 6.2-6.3 Pages 82-92)

Textbook

1. George E. Andrews, Number Theory, Hindustan Publishing Corporation, 1984.

References

1. S.B.Malik, Basic Number Theory, Vikas Publishing House Private Limited, 1998.
2. K.C.Chowdhury, A First Course Theory of Numbers, Asian Books Private Limited, 2007.

Sem. V
14UMA540601

Hours/Week: 2
Credits: 2

MATHEMATICS FOR COMPETITIVE EXAMINATIONS

Objectives

- To learn the problem solving techniques for aptitude problems.
- To enable the students prepare themselves for various competitive examinations.

UNIT-I

H.C.F. and L.C.M. of Numbers - Percentage. (Chap 2: Pages 25-36, Chap 10: Pages 139-172)

UNIT-II

Profit and Loss - Ratio and Proportion. (Chap 11: Pages 173-204, Chap 12: Pages 205-230)

UNIT-III

Time and Work - Pipes and Cisterns. (Chap 15: Pages 257-275, Chap 16: Pages 276-283)

UNIT-IV

Time and Distance - Problems on Trains. (Chap 17: Pages 284-298, Chap 18: Pages 299-313)

UNIT-V

Simple Interest - Compound Interest - Problems on Ages. (Chap 21: Pages 334-350, Chap 22: Pages 351-356, Chap 8 : Pages 152-160)

Note: Calculators in Exams are not permitted.

Textbook

R.S.Aggarwal, Quantitative Aptitude, S. Chand & Co, New Delhi. 2013.

Sem. V
14USS540701

Hours/Week: 2
Credits: 2

IDC-1: **SOFT SKILLS**

Objectives

* This course is aimed at introducing the students to the nuances of developing the basic skills that required of an educated youth; and to train them to present the best of themselves as job seekers.

Module I: Effective Communication & Resume Writing

Basics of communication - definition of communication, Barriers of Communication, Non-verbal Communication; Effective Communication - Johari Window, The Art of Listening, Conversation Techniques, Good manners and Etiquettes.

Module II: Resume Writing & Interview skills

Resume Writing: What is resume? Types of Resume - Chronological, Functional and Mixed Resume, Steps in preparation of Resume. Interview Skills: Common interview questions, Attitude, Body Language, The mock interviews, Phone interviews, Behavioral interviews.

Module III: Group Discussion

Group Discussion Basics, GD Topics for Practice, Points for GD Topics. Personal Effectiveness: Self Discovery; and Goal Setting

Module IV: Numerical Ability

Average, Percentage; Profit and Loss, Simple Interest, Compound Interest; Time and Work, Pipes and Cisterns; Time and Distance, Problems on Trains, Boats and Streams; and Calendar, Rations and Proportions.

Module V: Test of Reasoning

Verbal Reasoning: Series Completion, Analogy; Data Sufficiency, Assertion and Reasoning; and Logical Deduction. Non-Verbal Reasoning: Series; and Classification

References

1. Aggarwal, R.S. 2010. A Modern Approach to Verbal and Non Verbal Reasoning. S.Chand, New Delhi.
2. Covey, Stephen. 2004. 7 Habits of Highly effective people, Free Press. Egan, Gerard. (1994). The Skilled Helper (5th Ed). Pacific Grove, Brooks/ Cole.
3. Khera, Shiv 2003. You Can Win. Macmillan Books , Revised Edition.
4. Murphy, Raymond. 1998. Essential English Grammar. 2nd ed., Cambridge University Press. Sankaran, K., & Kumar, M. Group Discussion and Public Speaking. M.I. Pub, Agra, 5th ed., Adams, Media.
5. Trishna's 2006. How to do well in GDs & Interviews, Trishna Knowledge Systems.
6. Yate, Martin. 2005. Hiring the Best: A Manager's Guide to Effective Interviewing and Recruiting.

Sem. VI
14UMA630214

Hours/Week: 7
Credits: 4

COMPLEX ANALYSIS

Objectives

- To study the behavior of complex-valued functions.
- To train the students in the operative techniques on complex-valued functions.

UNIT-I

Continuous Functions – Differentiability – Cauchy-Riemann Equations – Analytic Functions - Harmonic Functions. (Chapter II, Sections 2.4-2.8, Pages 30-67)

UNIT-II

Conformal Mapping - Bilinear Transformations - Cross ratio – Fixed Points of Bilinear Transformations. (Chapter II, Section 2.9, Chapter III, Section 3.2 - 3.4, Pages 67-75, 82-94)

UNIT-III

Definite integral - Cauchy's Theorem - Cauchy's Integral Formula - Higher Derivatives. (Chapter VI, Section 6.0 -6.4, Pages 132-172)

UNIT-IV

Taylor's Series - Laurent's Series - Zeros of Analytic Functions - Singularities. (Chapter VII, Section 7.0-7.4, Pages 173-208)

UNIT-V

Residues - Cauchy's Residue Theorem - Evaluation of Definite Integrals (poles not lying on the real axis) (Chapter VIII, Section 8.0-8.3, Pages 209-255)

Textbook

1. S.Arumugam, A.Thangapandi Isaac and A.Somasundaram, Complex Analysis, SciTech Publications (India) Pvt.Ltd, 2002.

References

1. S. Narayanan and T.K.Manickavasagam Pillai, Complex Analysis, S.Viswanatha printers and publishers Pvt.Ltd., 2007.
2. P.Duraipandian, Laxmi Duraipandian, D.Muhilan, Complex Analysis, Emerald publishers, Revised Edition, 2001.
3. Murray R.Spiegel, Theory and Problems of Complex Variables, Schaum's Outline Series, McGraw Hill book Company, 1964.

Sem. VI
14UMA630215

Hours/Week: 7
Credits: 4

COMPUTER ORIENTED NUMERICAL METHODS WITH 'C' PROGRAMMING

Objectives

- To introduce the techniques of C programming.
- To solve numerical problems using C.

Unit-I

Structure of C programs - Constants, Variables and Data types - Operators and Expressions - Mathematical functions - Input and output operators – Temperature conversion. (Chapters 1-4)

Unit-II

Decision making and Branching - IF statements – GOTO statement - Solving Quadratic equations - Decision making and looping- WHILE, DO, FOR statements - Prime number Checking -Arrays- series expansions of $\cos x$ and $\sin x$ - Fibonacci series - numbers in ascending order - L.C.M., G.C.D. - Mean and S.D. - Matrix addition, subtraction and multiplication (Ch. 5-7)

Unit-III

Handling of character strings - Arithmetic operations on characters- Palindrome -String handling functions - Names in alphabetical order - User defined functions -Recursion - nCr and nPr. (Chapters 8-9).

Unit-IV

Curve fitting-Linear and parabolic curves by the method of least squares principle - Solving algebraic and transcendental equations - Bisection method, false position method and Newton Raphson method - Solving simultaneous algebraic equations - Gauss- Seidel method - Gauss elimination method. (Chapter 1 Sections 1.7-1.8, Chapter 3 Sections 2, 4 and 5, Chapter 4 Sections 2 and 6).

Unit-V

Interpolation - Newton's forward and backward difference formulae - Lagrange's interpolation formula - Numerical integration using Trapezoidal and Simpson's one-third rules – Solution of ODE s - Euler method and Runge-Kutta fourth order method (Chapter 6 Sections 3,4, Chapter 8 Section 4, Chapter 9 Sections 8,10, Chapter 11 Sections 10,16).

Note:

- 1) For Numerical methods: Problems and Programs only.
- 2) For topics in italics-programs only.

Textbooks

1. E. Balagurusamy, Programming in ANSIC, Sixth edition, Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi, 2012. (For Units I, II and III).
2. M.K.Venkatraman, Numerical methods in Science and Engineering, National Publisher Company, Fifth Edition, 2001. (For Units IV and V).

References

1. Yashavant.P.Kanetkar, Let us 'C', BPB Publications, 2002.
2. Rajaraman, Computer oriented numerical methods, Prentice-Hall of India, 1971.

Sem. VI
14UMA630216

Hours/Week: 2
Credits: 2

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Computer Lab:
'C' PROGRAMMING

Objectives

- To train the students to run simple C programs.
- To solve numerical problems using C.

LIST OF PRACTICALS

1. Finding the mean and S.D. of n values.
2. Finding Correlation coefficients.
3. Arranging n numbers in ascending order and finding the median value.
4. L.C.M. and G.C.D. of two numbers.
5. Prime number Checking.
6. nCr and nPr using function subprogram.
7. Fibonacci series.
8. Finding cos x and sin x from series expansions.
9. Arranging the names in alphabetical order.
10. Matrix addition, subtraction and multiplication.
11. Palindrome verification.
12. Solving quadratic equations.
13. Newton – Raphson method - Bisection method - False position method of solving equations.
14. Gauss elimination method - Gauss-Seidel method of solving simultaneous equations.
15. Trapezoidal rule and Simpson's rule of integration.
16. R.K.Fourth order method of solving differential equations.
17. Lagrange's method of interpolation.

Sem. VI
14UMA630217

Hours/Week: 6
Credits: 4

LINEAR ALGEBRA

Objectives

- To facilitate a better understanding of Functional Analysis
- To develop analytical thinking

Unit-I: Vector spaces:

Vector spaces – Definition and examples – Subspace properties - Quotient space linear transformations – Fundamental theorem of homomorphism – Span of a set. (Chapter 5, Sec 5.1 to 5.4)

Unit-II: Basis and Dimension:

Linear Independence – Basis and Dimension – Properties – Rank and Nullity. (Chapter 5, Sec 5.5 to 5.7)

Unit-III: Matrix and Inner product space:

Matrix of a linear transformation – Vector space of a linear transformation – Inner product space – Definition and examples – Orthogonality - Gram Schmidt orthogonalisation process – Orthogonal Complement. (Chapter 5, Sec 5.8, Chapter 6, Sec 6.1 to 6.3)

Unit-IV: Theory of Matrices:

Algebra of Matrices - Types of Matrices – The Inverse of a Matrix – Elementary Transformations - Rank. (Chapter 7 Sec 7.1 to 7.5)

Unit-V: Characteristic equation and bilinear forms:

Characteristic equation – Cayley -Hamilton theorem – Eigen values and Eigen vectors – properties (Chapter 7, Sec 7.7, 7.8 Chapter 8, Sec 8.1, 8.2)

Textbook

1. Arumugam S and Thangapandi Isaac A, Modern Algebra, SciTech Publications (India) Ltd., Chennai, Edition 2012.

References

1. I. N. Herstein, Topics in Algebra, Second Edition, John Wiley & Sons (Asia), 1975.

Sem. VI
14UMA630303A

Hours/Week: 4
Credits: 4

AUTOMATA THEORY

Objectives

- To give the students an introduction to automata.
- To make them understand the relation between grammar and automata

UNIT-I

Definition of an Automaton - Description of Finite Automaton – Transition systems - Properties of transition functions - Acceptability of a string by a finite Automaton - Non deterministic finite automaton - The equivalence of DFA and N DFA. Chapter 2: Sections 2.1 to 2.7

UNIT-II

Formal Languages - Basic Definitions and examples - Chomsky classification of Languages - Languages and their relation - Recursive and Recursively Enumerable sets- Operations on Languages. Chapter 3: Sections 3.1 to 3.5

UNIT-III

Regular expressions - Finite Automata and Regular expressions. Chapter 4: Sections 4.1 and 4.2

UNIT-IV

Pumping Lemma for Regular sets - Applications of Pumping Lemma - Closure Property of Regular sets - Regular sets and Regular grammars. Chapter 4: Sections 4.3 to 4.6

UNIT-V

Context free Languages and Derivation trees - Ambiguity in Context free grammars - Simplification of Context free grammars (examples only). Chapter 5: Sections 5.1 to 5.3

Textbook

1. K L P Mishra and N Chandrasekaran, Theory of Computer Science: Automata, Languages and Computation, Third Edition, Prentice Hall of India, New Delhi, 2006.

References

1. John E. Hopcroft and J.D. Ullman, Introduction to Automata theory, Languages and Computation, Third Edition, Prentice Hall, 2006.
2. A.V. Aho and J.D. Ullman, Principles of compiler design, Pearson Education, 2012.

Sem. VI
14UMA630303B

Hours/Week: 4
Credits: 4

COMBINATORICS

Objectives

- To introduce various combinatorial numbers.
- To understand the applications of combinatorial techniques in real life problems.

Unit-I

Basic Combinatorial Numbers – Stirling numbers of the second kind – Recurrence formula for Pnm. (Part I: Unit-1) Pages 5-20

Unit-II

Generating functions – Recurrence relations- Bell's formula. (Part I: Unit-2) Pages 29-48

Unit-III

Multinomials – Multinomial theorem- Inclusion and Exclusion principle. (Part I: Unit-4,5) Pages 66-77

Unit-IV

Euler function –Permutations with forbidden positions –the Menage Problem. (Part I: Unit-5,6) Pages 77-94

Unit-V

Problem of Fibonacci –Necklace problem – Burnside's lemma. (Part I: Unit-6, Part II: Unit-1) Pages 95-111

Textbook

1. V. Krishnamurthy, Combinatorics: Theory and Applications, East West Press Pvt Ltd., 2002.

References

1. V.K. Balakrishnan, Theory and problems of Combinatorics, Schaums outline series, McGraw Hill Professional, 1995.

Sem. VI
14UMA630304A

Hours/Week: 4
Credits: 4

ASTRONOMY

Objectives

- To introduce the exciting world of astronomy to the students.
- To help the students to study about the celestial objects.

UNIT-I

Celestial sphere and diurnal motion – Celestial coordinates - Sidereal time. Art. 39 – 76.

UNIT-II

Morning and evening stars – circumpolar stars - zones of earth - perpetual day-twilight. Art. 80 – 83, 87 – 89, 111 - 116.

UNIT-III

Refraction – laws of refraction – tangent formula - horizontal refraction - geocentric parallax – horizontal parallax. Art. 117 – 128, 135 - 144.

UNIT-IV

Kepler's laws - Anomalies – Kepler's equation - Calendar. Art. 146 – 149, 156 – 159, 175 – 179.

UNIT-V

Moon - sidereal and synodic months – elongation – phase of moon – eclipses - umbra and penumbra – lunar and solar eclipses – maximum and minimum number of eclipses in a year. Art. 229 – 241, 256 – 263, 267, 268, 270 - 275.

Textbook

S. Kumaravelu and Susheela Kumaravelu, Astronomy, SKV Publications, 2004.

References

G V Ramachandran, Text Book of Astronomy, Mission Press, Palayamkottai, 1965.

Sem. VI
14UMA630304B

Hours/Week: 4
Credits: 4

ADVANCED DIFFERENTIAL EQUATIONS

Objectives

- To introduce various types of advanced differential equations.
- To understand the applications of D.E and P.D.E in other branches.

Unit-I

Picard's method of successive approximation - solving simultaneous differential equations with initial conditions. (Part I Chap 1. Sec 1.1, 1.2, 1.3)

Unit-II

Linear equations of second order – complete solution – Integral of complimentary function. (Part I Chap 4. Sec 4.1—4.5).

Unit-III

Power series solution - ordinary and singular points - Integration in series. (Part I Chap 8. Sec 8.1-8.4)

Unit-IV

Monge's method - solving equations of the form $Rr + Ss + Tt = V$. (Part II Chap 5. Sec 5.1, 5.2)

Unit-V

Boundary value problems - solution of heat equation and wave equation (one and two dimensions only). (Part III Chap 1. Sec 1.7 to 1.14, 1.16, 1.17)

Textbook

1. M.D. Raisinghania, Advanced Differential Equations, Sultan Chand Limited, 1995.

References

1. S. Deo, V.Lakshmikantham and V. Raghavendra, Text Book of Ordinary Differential Equations, Second Edition, Tata McGraw Hill Education, 2002.
2. Zafar Ahsan, Differential Equations and their Applications, Second Edition, PHI learning Pvt. Ltd., 2004.

Sem. VI
14UMA640602

Hours/Week: 2
Credits: 2

Skill Based Elective-I: (WS)
MATLAB APPLICATIONS

Objectives

- To introduce the Mathematical software MATLAB for high-performance numerical computations and visualization.
- To learn MATLAB built-in functions provided to solve all type of scientific problems.

Unit-I:

I/P, O/P, Variables, Vectors, Matrices.

Unit-II:

Interface, Menu, Workspace, Working Directory, Command Window, Diary, Printing.

Unit-III:

Built-in functions, User-defined functions, Script M-files, Variables in M-files.

Unit-IV:

Complex Arithmetic, Solving linear systems, Eigen Values and Vectors, Calculus.

Unit-V:

ezplot, 2D plots, 3D plots.

Textbook

1. Rudra Pratap, Getting started with MATLAB 7, Oxford University Press, 2008.

References

1. Brain R Hunt, Ronald L Lipsman and Jonathan M Rosenberg, A Guide to MATLAB for Beginners and Experienced Users, Cambridge University Press, 2003.