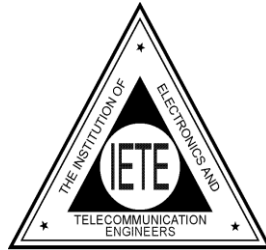


**Regulations & Syllabi
For
AMIETE Examination
(Information Technology)**



सह वीर्यं करवावहे

**Published under the authority of the Governing Council of
The Institution of Electronics and Telecommunication Engineers
2, Institutional Area, Lodi Road, New Delhi – 110 003 (India)
(2013 Edition)**

Website : <http://www.iete.org>

Toll Free No:18001025488

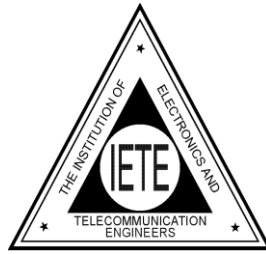
Tel. : (011) 43538800-99

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membership@iete.org

**Prospectus
Containing
Regulations & Syllabi
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THE INSTITUTION

INTRODUCTION

The Institution of Electronics and Telecommunication Engineers (IETE), formerly the Institution of Telecommunication Engineers (ITE) was founded in 1953 by a small group of professionals for the advancement of Telecommunication and Electronics in India. Today the Institution has grown in its status to international levels with its manifold activities for furthering the cause of development in the key sectors of Electronics, Telecommunications, Computer Science Engineering, Information Technology and allied disciplines. The emphasis of the current activities is on creation of a concrete base of trained manpower in these fields at various levels of competence and also to contribute gainfully towards the continued professional development needs of existing technical personnel. The IETE also provides a platform for meaningful interaction among professionals from the Industry, R&D Organisations, Educational Institutions and Government Departments.

MEMBERSHIP

1. The IETE is a professional society devoted to the advancement of Electronics and Telecommunication, Computers and Information Technology. The Institution is headed by a Council, elected from its large base of corporate members in India and abroad. It confers professional status by way of admitting such persons, as may be qualified to various classes of membership such as Honorary Fellow, Distinguished Fellow, Fellow, Member, Associate Member, Diploma Member Student Member and Associate. Organizational Membership is also open to Public/Private Sector Companies, Institutions, R&D Laboratories and Government Organisations.

OBJECTIVES

2. The IETE focuses on advancing the science and technology of electronics, telecommunications, computers, information technology and related areas. The objectives of the Institution include;

- Organise conferences, symposia, workshops and brainstorming sessions involving all concerned professionals, students and industry associations for the advancement of the Disciplines.
- Provide a forum for discussion on national policies and to provide suitable inputs to policy makers.
- Promote and conduct basic engineering and continuing technical education programmes for human resource development.
- Bring out quality publications for all levels of readership.
- Honour outstanding professionals.

EXAMINATIONS

3. The IETE conducts the AMIETE (Graduateship) Examination, in order that a student qualifies and becomes an Associate Member of the Institution. The AMIETE examination is recognized by Government of India, Ministry of Human Resource & Development (MHRD) for the

purposes of recruitment to superior posts and services under the Central Government. A similar recognition has been given by UPSC & several State Governments. A large number of Universities and Institutions have recognized AMIETE for admission to postgraduate courses. Extract/Detail of recognition from Govt of India/State Governments/ Universities/Institutions are appended at **Annexure I, II, III, & IV**

4. This qualification further enables a candidate to appear for GATE for postgraduate studies in India. AMIETE (ET) standard in a particular case has been evaluated by the World Education Service, a New York based Educational Credential Evaluators, who have declared that it is equivalent to a Bachelors Degree in Electronics and Telecommunication Engineering.

5. The IETE also conducts ALCCS course (Advanced Level Course in Computer Science) which is also recognised by the Ministry of HRD, Government of India, for the purpose of appointment to superior posts and services under the Central Government, where M. Tech in Computer Science is a prescribed qualification for recruitment.

FACILITIES FOR STUDENTS

6. The IETE helps the students by extending library facilities, laboratory assistance, and coordination of IETE Students Forum and by providing necessary guidance at its IETE Centres. To spread its many fold technical activities in all the regions of the country, IETE has established so far 65 Centres spread all over the country including a centre at Kathmandu and examination centre at Abhu Dhabi. IETE also has mutual arrangements with similar professional bodies like the Institution of Engineers (India), CSI, IEEE (USA), IEEE Com Soc and IET (UK) for availing each other's facilities for the benefit of its members.

LECTURES THROUGH EDUSAT SATELLITE

7. IETE has embarked on an ambitious project of " Reaching The Unreached "through its Satellite Education Programme. In this programme, live, interactive lectures are broadcast from its Teaching End Studio at IETE, Noida centre and is received at classrooms terminals (SITs) at Ahmedabad, Bangalore, Bhopal , Chandigarh ,Delhi, Pune ,Hyderabad, Mankapur and Imphal. More SITs are being established at other centres shortly.

SOLUTIONS TO QUESTION PAPERS

8. To help the students , IETE has printed solutions to Questions papers for both AMIETE and DipIETE streams. List of subjects for which solutions are printed is available on the website www.iete.org

LABORATORY MANUAL

9. All students of AMIETE and DipIETE are required to procure lab-manuals and conduct their experiments and record the same in the concerned lab-manuals. The manuals of all the lab examination have been printed. Students can obtain these manuals as under:

- (a) From Reception counter at IETE HQ on payment of Rs.225/- per manual without CD and Rs.300/- for manual with CD.
- (b) Through post by sending a DD in favour of Secretary General, IETE payable at New Delhi towards cost of Manuals plus postal charges. The postal charge is Rs.50/- per manual.
- (c) These manuals are also available at all IETE Centres. Students are advised to approach the nearby Centre for the same.

ASSISTANCE IN PLACEMENT

10. IETE makes effort to assist in the placement of students with the help of a Placement Cell established at IETE HQ, New Delhi.

RECOGNITION

11. The IETE is recognised by the Government of India as an EDUCATIONAL INSTITUTION OF NATIONAL EMINENCE. The IETE has also been recognised by the Government of India, Ministry of Science and Technology, Dept. of Scientific and Industrial Research as a SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION (SIRO).

STUDENT INTERACTION CELL

12. With a view to quickly resolve student queries, a single window to address all types of queries, problems and to help students, a Student Interaction Cell has been established at IETE HQ, New Delhi. This Cell is at the ground floor of the IETE HQ building. Student can approach SIC by:-

- Tel No 011-43538853
- Fax : 011-24649429
- SMS : 53131 (By typing **IETEFB** followed by < **query** >)
- Email: sic@iete.org

13. If the students queries are not answered or resolved within a reasonable time, students may contact Secretary General, IETE through personal meeting or phone (011-43538821/22) or email (sec.gen@iete.org). **Students are not to approach any other section of the HQ as their queries/problems shall not be entertained by them.**

IMPORTANT INFORMATION

**Students are advised to give their
Mobile No. & Email ID for better and
faster communication**

AMIETE EXAMINATIONS REGULATIONS & SYLLABI

INTRODUCTION

14. IETE conducts AMIETE (Graduateship) Examinations in the following three streams: -

- (a) **Computer Science & Engineering (CS)**
- (b) **Information Technology (IT)**
- (c) **Electronics & Telecommunication Engineering (ET)**

15. The course curriculum and outline syllabi of these streams are given in this booklet. In addition, detailed syllabi of Electronics & Telecommunication Engineering stream is given. (**Please see Appendix 'A', 'B', 'C', 'D', 'E', 'F', and 'G'**).

TRANSITION FROM OLD SYLLABUS TO REVISED SYLLABUS

16. Details can also be obtained from the web site www.iete.org.

ELIGIBILITY

17. A candidate desirous of taking up the AMIETE Examination should first be enrolled either as a DipIETE as per **Bye law 15**, or as Student (SG) as per **Bye law 16**, which are reproduced below:

Bye law 15-Student (DiplIETE)Member

Every candidate for election to the class of Diploma member shall be not less than 18 years of age and shall satisfy the Council that he has passed the Diploma Examination of the Institution (DiplIETE) as per the examination regulations prescribed by the Council from time to time or has passed any other Examination, which in the opinion of the Council, is equivalent to or warrants exemption from the Diploma Examination of the Institution.

Bye law 16-Student (SG) Member

Every candidate for election to the class of Student (SG) shall satisfy the Council that he/she is not less than 16 years of age and has passed the 12th standard examination of 10+2 system, conducted by a recognised Board of Education with physics and mathematics, or its equivalent as prescribed by the Council from time to time; and

- (a) is sponsored by a Corporate Member of the Institution; and either
- (b) that he/she is or has been a student of electronics engineering/telecommunication engineering/electrical engineering/computers/information technology/physics in a university/college/ institution approved by the Council;
OR
- (c) that he/she is or has been an engineering pupil/apprentice/assistant in a recognized firm, society or organization engaged in engineering or allied activities.

ENROLMENT

18. A candidate is required to apply for enrolment on the prescribed form (**Form IETE-2**), which is appended in the last. The form also includes the conditions for eligibility. Every application form for student member must be attached with the copies of certificates (age, educational/experience) duly attested by a Corporate member/Gazetted Officer, failing which the application shall not be entertained. For this purpose, the candidate may contact the office of the IETE centre/sub-centres of IETE. In case of any difficulty in getting the form proposed, the form may be submitted directly to the IETE HQ for further action.

ENROLMENT FEE

19. Fees to be paid for enrolment are as given in Form IETE-2 contained in this syllabus. The enrolment fees payable by student members are as under: -

	Member in India (Rs)	Member Abroad (US \$)
(a) Application Fee	200.00	40.00
(b) Admission Fee	200.00	40.00
(c) Building-cum-Lib. Fund	1300.00	260.00
(d) Composite Subscription	2500.00	360.00
(e) Lab Infrastructure Fee	600.00	100.00
(f) Development Fee	500.00	100.00
(g) Establishment Fee	700.00	100.00
	6000.00	1000.00

20. Enrolment fee is to be paid in one installment at the time of enrolment. The student membership will be valid for 10 consecutive examinations from the date of enrolment. Thereafter, the student members not completing their AMIETE Examination are to seek re-enrolment for further 10 examinations by remitting applicable amount before or immediately after the expiry of their membership period to enable them to appear in the remaining papers and complete AMIETE. Any examination chance not availed by a student due to whatsoever reason will be counted within 10 examinations.

MINIMUM PERIOD OF MEMBERSHIP

21. A Student member shall be allowed to appear in the AMIETE Examination only after he /she has enrolled as a Student member with the Institution. Only those Student members who get enrolled on or before 28/29th February and 31st August will be allowed to appear in the next AMIETE Examination, held in June and December respectively. Membership should be alive at the time of submitting the examination application form.

DUPLICATE IDENTITY CARD

22. In case duplicate I-Card is required due to loss of original Card, application must be submitted alongwith a fee of Rs.500/-.

TIME LIMIT TO COMPLETE AMIETE

23. A student is required to complete AMIETE Examination within two enrolment periods of 10 consecutive examinations each from the date of initial enrolment. The student will, therefore, be permitted to seek only one renewal of membership. Renewal is to be applied for before or immediately after the expiry of initial enrolment with continuity of enrolment maintained by the student. Any delayed re-enrolment entailing missed chances will be counted towards total number of examinations and no relaxation in this regard will be permissible. If the request for renewal is made after the stipulated period of two enrolments, admission will be treated as a fresh enrolment and no benefit in terms of exemptions in respect of subject(s) passed or exempted during the earlier enrolment will be granted. Students must renew their membership in time. Otherwise they will not be allowed to appear in the AMIETE examination. No notice will be sent to the students for renewal of membership.

24. **The course curriculum and outline Syllabi for all the streams are given as follows:**

- | | | |
|------------|-------------------------------|-----------------------|
| (a) | Course Curriculum (CS) | (Appendix-'A') |
| (b) | Outline Syllabus (CS) | (Appendix-'B') |
| (c) | Course Curriculum (IT) | (Appendix-'C') |
| (d) | Outline Syllabus (IT) | (Appendix-'D') |
| (e) | Course Curriculum (ET) | (Appendix-'E') |
| (f) | Outline Syllabus (ET) | (Appendix-'F') |

25. The detailed syllabus of Computer Science & Engineering Stream is appended at **Appendix 'G'**.

AMIETE EXAMINATION

26. AMIETE examination is divided in two Sections viz Section A and Section B with a total of 23 theory papers (12 in Section A and 11 in Section B) and 4 Labs (2 Labs in Section A and 2 Labs in Section B). Each Section is divided in two parts viz. Part-I and Part-II. In addition a student has to undergo a project work, seminar and a Course in Communication Skills & Technical Writing. The course on Communication Skills & Technical Writing is mandatory but would not count towards overall CGPA.

27. Distribution of subjects is as under:

- | | | |
|------------|---|-----------------------|
| (a) | SECTION A | |
| | (i) PART-I | Six subjects & 1 Lab |
| | (ii) PART-II | Six subjects & 1 Lab |
| (b) | SECTION B | |
| | (i) PART-I | Six subjects & 1 Lab |
| | (ii) PART-II | Five subjects & 1 Lab |
| | (Three compulsory & two from Elective Subjects) | |
| (c) | PROJECT WORK | |
| (d) | SEMINAR | |
| (e) | COURSE IN COMMUNICATION SKILLS & TECHNICAL WRITING | |
| | (Any time during the course) | |

28. Notwithstanding above, a student will not be allowed to complete the curriculum in less than four years unless he has been exempted in some subjects.

29. **Eligibility for appearing in various subjects:** The **eligibility** criteria can be checked on the website **www.iete.org**.

COMMUNICATION SKILL & TECHNICAL WRITING

30. **The course on Communication Skills & Technical Writing** is compulsory for all students. However, the course does not contribute to the overall CGPA. A minimum of 35% marks in theory and oral test has to be obtained by the student at any time before the completion of his/her AMIETE. This course consists of theory and oral exam. Accordingly, "PASS" or "FAIL" will be reflected in the Grade Sheet.

- (a) **Theory ::** This consists of written examination for 80 marks.
- (b) **Oral Test :** Consists of an Oral Test to test the Communication Skills which include an oral presentation on any subject of the choice of students (e.g. About IETE, General knowledge topics etc). This presentation need not be on technical subject. This test carries 20 marks.

EXEMPTIONS

31. Exemption may be granted in various papers to the students who have passed similar subjects from elsewhere or other courses. Such exemptions are granted to a candidate passing the subject and successfully completing the course/curriculum from a recognized Institution/ Colleges/Universities and approved by the IETE Council.

32. Candidates seeking exemption are required to submit the following documents along with the requisite fee:

- (a) Application form for exemption.
- (b) Certificate of the course/curriculum completed by the student duly attested.
- (c) Mark sheet duly attested.
- (d) Certified copy of syllabus from which the candidate has passed the course.
- (e) Fee @ Rs. 800/- per subject for which exemption is sought.

33. Candidates are advised to apply for exemption, if required, at the earliest opportunity. All cases of exemptions are considered by the Academic Committee of the Institution. For all subjects where exemption are granted will be communicated to the students in the Mark sheet of the first examination after the exemption is sought as it generally takes three months to process an application for exemption. Exemption will generally be granted if the major portion of the syllabi matches with IETE syllabus. **THE DECISION OF THE ACADEMIC COMMITTEE WILL BE FINAL AND BINDING TO ALL CONCERNED. NO REPRESENTATION IN THIS RESPECT WILL BE ENTERTAINED.**

AWARD OF AMIETE

34. Every Student member successfully completing Sections A and Section B subjects including lab examinations with project work, seminar and a course in Communication Skills & Technical Writing of AMIETE Examination as per regulations prescribed by the Council from time to time shall be eligible to become a Associate Member (AMIETE). On payment of requisite fee for membership, he/she will be awarded a certificate of having passed the AMIETE examination of the Institution and shall then be eligible for transfer to the class of AMIETE. To pass AMIETE Examination, a student is required to score a minimum grade of 'D' having a grade point of 4 for each subject and having an aggregate of 5 CGPA. However for Project, Seminar and lab examination he/she should get a minimum grade of C having a grade point of 5.

CGPA SYSTEM

35 CGPA System which is followed by IETE is given below :

(a) Subject wise grade and grade points are as given below:-

<u>Grade</u>	<u>Grade Point</u>
A+	10
A	9
B+	8
B	7
C+	6
C	5
D	4

(b) CGPA will be calculated as under only for the subjects where a student has passed :-

$$\text{CGPA} = \frac{C_1 G_1 + C_2 G_2 + \dots + C_n G_n}{C_1 + C_2 + C_3 + \dots + C_n}$$

where G_1, G_2, \dots denote the grade point scored.
 C_1, C_2, \dots denote the credits of subjects.

All theory Subjects & Lab Carry 4 Credits.

Project work Carries 8 Credits.

Seminar Carries 4 Credits.

(c) The award of division/classification will be as under :-

(i) CGPA of 9 or more	-	Distinction
(ii) CGPA 6.5 or more but less than 9	-	First Division
(iii) CGPA 5 or more but less than 6.5	-	Second Division
(iv) Less than 5	-	FAIL (No award will be given)

(d) CGPA is converted into percentage with a multiplier of 9.5.

EXAMINATION APPLICATION

36. Applications for appearing in any of the subjects of the AMIETE Examination must be made on the prescribed OMR Examination Form (enclosed) and accompanied by the requisite examination fee. The prescribed application form is given initially free of cost along with the prospectus and later on with the Admit card. OMR Examination application form can also be obtained by the students by payment of Rs. 20/- from any IETE Centre or HQ IETE. No action will be taken on an incomplete application. Students are advised to ensure that they have filled all the columns and have enclosed relevant documents. Separate form is to be used for exemption. Generally, after the acceptance of examination form of the students, change of examination centre is not encouraged. However in exceptional cases, change of exam Centre will be allowed with an additional charge of Rs. 500/-. For any correction in the examination form after processing and additional amount of Rs 500/- will be charged as reprocessing fee.

Note : Change of streams will be allowed with an additional charge of Rs. 600/-.

EXAMINATION FEE

37. Students are required to submit their Examination Application form along with the fee as given below. The fee may get revised from time to time and the students are required to submit their application form along with the latest fee structure in force. The present fee structure is given below:

	In India (Rs)	Abroad (US \$)	Remarks
(a) Theory papers/per subject	800.00	100.00	To be deposited alongwith exam application form
(b) Exemption/per subject	800.00	100.00	
(c) Written test of Communication Skills & Technical Writing	800.00	100.00	To be deposited at respective IETE centres
(d) Project	1500.00	280.00	
(e) Each Lab Examination	600.00	100.00	
(f) Oral Test on communication skills & technical Writing	600.00	100.00	
(g) Seminar	600.00	100.00	

Note: (a) Fees will be charged per subject irrespective of whether it is for improvement or re-appearance OR remaining paper or additional paper or exemption.

(b) Examination/Exemption fee once paid are neither refundable nor transferable to a subsequent examination.

(c) Enrolment Form, Examination Form and Exemption Form are to be sent separately with requisite fee along with each form.

LAST DATE FOR RECEIPT OF EXAMINATION APPLICATION

38. The last date for receipt of examination form duly filled in at the IETE HQ office for June/Dec examination respectively are as under:-

- Without late fee 25 Apr/25 Oct
- With late fee (of Rs.1500/-) 10 May/10 Nov.

Note: Application received after these dates will not be considered.

DATE SHEET

39. The examinations are held twice a year from 15th June and 15th December and are conducted on all days including holidays and Sundays. These dates are fixed and for the latest Date sheet students can refer to the website and will be notified along with admit cards and through our website www.iete.org and at the IETE centre.

ADMIT CARD

40. Admit Cards will be sent to all the students to reach them by about 05th of June/December. Admit Cards of eligible students will also be available on our Websites www.iete.org and can be downloaded. Students will be allowed to appear for examination with these downloaded admit card along with their identity card. In the case of non-receipt of Admit-Card by above dates or the admit card not available on the website, the student must approach the concerned Examination Centre or IETE HQ and obtain permission to appear in the examination. No complaint in respect of non-receipt of Admit Card will be entertained once the Examination is over. **A student is required to carry his IETE Identity Card and Admit Card issued by IETE for appearing in examination.**

EXAMINATION CENTRES

41. At present the Examination are conducted at the following Centres : -

In India:

Centre	Code	Centre	Code	Centre	Code
AHMEDABAD	01	KANPUR	10	RAJKOT	44
ALLAHABAD	25	KOCHI	32	RANCHI	48
AMARAVATI	53	KOLKATA	04	SHIMLA	45
BANGALORE	02	KOZIKODE	52	TRIVANDRUM	16
BHOPAL	36	LUCKNOW	11	VADODARA	42
BHUBANESWAR	27	MANKAPUR	28	VARANASI	13
CHANDIGARH	05	MHOW	40	VIJAYAWADA	15
CHENNAI	12	MUMBAI	03	VISAKHAPATNAM	34
DEHRADUN	26	MYSORE	33	Abroad:	
DELHI	06	NAGPUR	37	ABU DHABI	17
DHARWAD	49	NASHIK	39	KATHMANDU	19
GUWAHATI	07	NOIDA	38		
HYDERABAD	08	PALAKKAD	41		
IMPHAL	31	PATNA	46		
JABALPUR	23	PILANI	30		
JAIPUR	09	PUNE	14		

USE OF UNFAIR MEANS

42. If a student is found to have resorted to or made attempt to use **Unfair Means**, the Examination Superintendent/Invigilator has absolute powers to expel the candidate from the examination hall, if in his/her opinion the student has adopted unfair means. The Council/Board of Examination may take necessary disciplinary action against the candidate which may consist of punishment(s) extending from cancellation of the paper(s) to debarring from future examinations as well as expulsion from IETE.

RESULTS

43. Results of the examinations will be announced not later than 25th March and 25th September for December & June examinations respectively and communicated to the candidates through Result Sheets separately. Results will be also available on IETE Websites (www.iete.org)

RECOUNTING

44. It may be noted that there is **no provision of re-evaluation** of answer books. Therefore request for re-evaluation are out rightly rejected

45. Recounting of scores, if requested, can be done by paying Rs.200/- (US\$40) for students from abroad per subject. Requests for recounting of scores must be received at IETE HQ within 30 days from the date of announcement of results on **a separate application**.

IMPROVEMENT OF GRADES

46. A student who has passed in a subject may appear for improvement. He may take any number of chances irrespective of Grades previously obtained. If the student secures lower Grade than already secured, the original grade will hold good. Fee for improvement is Rs 600/- (US\$100) per paper. However, no improvement is permitted in AMIETE Lab examination and project work. Improvement is also allowed after completion of the examinations. After completion, students are required to give an Undertaking that they want/do not want to appear in any subject for improvement. Provisional Certificate/Certificate/final Grade Sheet will be issued only after receipt of undertaking that no improvements are required and fee towards Associate Membership is paid.

IETE MEANS-CUM-MERIT SCHOLARSHIP SCHEME FOR AMIETE AND DipIETE STUDENTS:

47. IETE has instituted IETE Means-Cum-Merit Scholarship scheme for AMIETE and DipIETE students from the year 2010. The scheme envisages award of 100 annual scholarships, 50 each to AMIETE and DipIETE economical weaker and meritorious students. The amount of scholarship will be Rs.5000/- per student in a year. The details of the scheme are available on IETE website <http://www.iete.org> freely accessible and application form freely downloadable.

AWARDS FOR ACADEMIC EXCELLENCE

48. Seven awards have been instituted to give incentive to student members for high level of performance in the AMIETE Examinations.

LEGAL MATTERS

49. Adjudication in respect of legal cases concerning IETE HQ will be as per **Bye-law 95** of the Institution which is reproduced below: -

“All Legal cases concerning IETE HQ shall lie within the jurisdiction of Delhi courts only”

For more information kindly visit <http://www.iete.org>

AFFILIATION/ACCREDITATION

50. **The Institution of Electronics & Telecommunication Engineers (IETE) neither recognises nor accepts affiliations of any private coaching Institute. Students in the past have reported that some private institution claim that they run classes/coaching on behalf of IETE. It is reiterated that IETE does not authorise any private institution to run classes on behalf of IETE. Therefore IETE is not responsible for such Private Coaching Institutes.**

CORRESPONDENCE WITH IETE HQ

51. Important announcements concerning students and examinations will be available on the website www.iete.org and are also published in IETE Journal of Education which is issued four monthly (January-April, May-August and September-December) to the AMIETE Student members who have paid their subscriptions to date. For other facilities like participation in technical lectures, symposia etc. nearest IETE Centre/Sub-Centre may be contacted. All correspondence must be addressed to the Secretary General of the Institution (by designation and not by name). Remittances shall be made by way of crossed Bank Draft only. Facilities for making payments on-line will also be available shortly. Bank drafts should be drawn in favor of Secretary General, IETE, New Delhi payable at New Delhi. Cash is accepted by hand at Accounts Section at IETE HQ only. Whenever depositing fee by cash, students must obtain receipt and attach photocopy of the same along with application. MONEY ORDER WILL NOT BE ACCEPTED.

CHANGE OF ADDRESS

52. **Students are advised to intimate their change of address to IETE HQ immediately, quoting their Membership Number, complete address with Pin Code.**

53. Students are advised to provide their e-mail ID, telephone no and mobile no with their latest address in all correspondence.

MISCELLANEOUS INFORMATION

54. Miscellaneous information is given in **Appendix 'I'**.

- Acknowledgement for receipt of enrollment forms and declaration of exam results are given through SMS and Web.
- All student related information is displayed on web site www.iete.org and <http://iete-elan.ac.in>
- Students are advised to visit our web site regularly.
- **All payment of fees can also be made on-line. For details refer our website www.iete.org.**

Scheme and Structure for the Programme of AMIETE in Computer Science & Engineering

Appendix 'A'

SECTION A									
Part - I					Part - II				
SI No	Sub Code	Title	Examination Credits		SI No	Sub Code	Title	Examination Credits	
			Theory	Practicals				Theory	Practicals
1	AC 101	Engineering Mathematics – I *	4	-	1	AC 107	Engineering Mathematics – II *	4	-
2	AC 102	Computer Concepts & C Programming *	4	-	2	AC 108	Microprocessors & Microcontrollers *	4	-
3	AC 103	Analog & Digital Electronics **	4	-	3	AC 109	Unix & Shell Programming**	4	-
4	AC 104	Data Structures with C & C++ **	4	-	4	AC 110	Operating Systems & Systems Software **	4	-
5	AC 105	Object Oriented Programming with C++ **	4	-	5	AC 111	Computer Graphics & Visualization**	4	-
6	AC106	Computer Organization **	4	-	6	AC 112	Database Management Systems **	4	-
7	AC 141	Data Structures with C & C++lab **	-	4	7	AC 142	DBMS Lab **	-	4
Total Credits			24	4	Total Credits			24	4
						AC 137	Communication Skills & Technical Writing(Oral)*	20	Marks
						AC 138	Communication Skills & Technical Writing(Written)*	80	Marks

All the students have to pass a course in "Communication Skills & Technical Writing" which will not be counted for the overall percentage

*** Few more electives will be added**

- 1. Electronics for Nuclear Instrumentation**
- 2. Foundation Course on EMI – EMC**
- 3. Quality Assurance**

SECTION B									
Part - I					Part - II				
SI No	Sub Code	Title	Examination Credits		SI No	Sub Code	Title	Examination Credits	
			Theor y	Practica ls				Theo ry	Practica ls
1	AC 113	Operations Research & Engineering Management *	4	-	1	AC 118	Software Architecture **	4	-
2	AC 114	Software Engineering **	4	-	2	AC 119	Data Communication & Computer Networks *	4	-
3	AC 115	Design & Analysis of Algorithms **	4	-	3	AC 120	Finite Automata & Formal Languages	4	-
4	AC 116	Discrete Structures	4	-	4		Elective – II (from Group B)	4	-
5	AC 117	Linux Internals **	4	-	5		Elective – III (from Group C)	4	-
6		Elective - I (from Group A)	4	-	6	AC 144	µP & µC Lab	-	4
7	AC 143	Analysis & Design of Algorithms Lab **	-	4	7	AC 135	Project Work	-	8
					8	AC 136	Seminar	-	4
Total Credits			24	4	Total Credits			20	16

GROUP A Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective I subject		
SI No	Sub Code	Title
1	AC 121	C # and .Net **
2	AC 122	VLSI Design †
3	AC 123	Artificial Intelligence & Neural Networks **
4	AC 124	Unix Systems Programs **

<p>Note :</p> <ul style="list-style-type: none"> * Common to ET / CS / IT Streams ** Common to CS / IT Streams Elective common to AMIETE - ET / CS / IT Streams *** † Elective common to ET / CS Streams

GROUP B Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective II subject		
SI No	Sub Code	Title
1	AC 125	Software Testing **
2	AC 126	Mobile Applications Development **
3	AC 127	Wireless & Mobile Systems †
4	AC 128	Internet Applications ***
5	AC 129	Cyber Crimes & IPR ***
GROUP C Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective III subject		
SI No	Sub Code	Title
1	AC 130	Compiler Design**
2	AC 131	Cloud Computing **
3	AC 132	Cryptography & Network Security **
4	AC 133	Advanced Microprocessors

Appendix 'B'
OUTLINE SYLLABUS
AMIETE (COMPUTER SCIENCE & ENGINEERING)

AC 101 ENGINEERING MATHEMATICS – I

- Partial differentiation and its application
- Multiple integrals
- Linear algebra
- Numerical Methods
- Linear differential equation of higher order
- Series Solution of differential equations and Special functions
- Fourier Series
- Fourier Transforms and Z-Transform

AC 102 COMPUTER CONCEPTS & C PROGRAMMING

- Introduction to Computer System
- Storage Device Concepts, Operating Systems and Networks
- Fundamentals of Problem Solving and Introduction to C
- Constants, Variables, and Data Types
- Managing Input and Output Operations
- Structure of a C Program
- Functions
- Selection – Making Decisions and Repetitions
- Arrays and Strings
-

AC 103 ANALOG AND DIGITAL ELECTRONICS

- Analog Electronics: Basic Semiconductor and PN Junction Theory
- Semiconductor Diodes
- Diode Applications
- Bipolar Junction Transistors
- BJT Biasing
- Amplifiers and Oscillators
- Digital Electronics: Introductory Concepts
- Number Systems and Codes
- Describing Logic Circuits
- Combinational Logic Circuits
- Digital Arithmetic Operation and Circuits
- MSI Logic Circuits
- Flip-Flop and Their Applications
- Counters and Registers

AC 104 DATA STRUCTURES WITH C & C++

- Introduction to Data Structures
- Pointers and Dynamic Memory Management
- Stacks and Queues
- Linked List
- Tree
- Graph
- Searching
- Sorting Algorithms
- Files

AC 105 OBJECT ORIENTED PROGRAMMING WITH C++

- Overview
- Declarations and Expressions
- Statements
- Array, Pointer and Structure
- Functions

Regulations and Syllabi for AMIETE (IT) Examination

- Data Abstraction through Classes and User-Defined Data Types
- Operator Overloading
- Class Relationships
- Template
- The Standard Library in C++

AC 106 COMPUTER ORGANIZATION

- Basic Structure of Computers
- Machine Instructions and Programs
- Input/Output Organization
- Memory System
- Arithmetic
- Basic Processing Unit

AC 141 DATA STRUCTURES WITH C & C++ LAB

AC 107 ENGINEERING MATHEMATICS – II

- Complex Differentiation and Transformation
- Complex Integration
- Vector Differentiation
- Vector Integration
- Numerical Methods
- Partial Differential Equations
- Theory of Probability
- Random Variables

AC 108 MICROPROCESSORS & MICROCONTROLLERS

- Introduction to Microprocessors
- Assembly Language Programs
- Interrupts in 8085
- Programs Using Interface Module
- Intel 8259A- Programmable Interrupt Controller
- Intel 8253 – Programmable Interval Timer
- 8051 Microcontroller

AC 109 UNIX & SHELL PROGRAMMING

- Introduction
- The Unix Architecture and Command Usage
- The File System
- Handling Ordinary Files
- Basic File Attributes
- The vi Editor
- The Shell
- The Process
- Customizing The Environment
- More File Attributes
- Simple Filters
- Filters Using Regular Expressions – grep And sed
- Essential Shell Programming
- awk – An Advanced Filter
- perl – The Master Manipulator

AC 110 OPERATING SYSTEMS & SYSTEMS SOFTWARE

- Evolution of OS Functions
- Processes
- Scheduling
- Deadlocks
- Process Synchronization
- File Systems
- Memory Management
- Language Processors
- Data Structures for Language Processing
- Scanning and Parsing
- Macros and Macro Processors
- Linkers
- Assemblers
- Compilers and Interpreters

AC 111 COMPUTER GRAPHICS & VISUALIZATION

- A Survey of Computer Graphics
- Overview of Graphics Systems
- Graphics Output Primitives
- Attributes of Graphics Primitives

Regulations and Syllabi for AMIETE (IT) Examination

- Geometric Transformations
- Viewing
- Visible-Surface Detection Methods
- Illumination Models and Surface-Rendering Methods
- Interactive Input Methods and Graphical User Interfaces
- Computer Animation
- Hierarchical Modeling

AC 112 DATABASE MANAGEMENT SYSTEMS

- Databases and Database Users
- Database System - Concepts and Architecture
- Data Modeling Using the Entity-Relationship Model
- The Enhanced Entity-Relationship (EER) Model
- The Relational Data Model and Relational Database Constraints
- The Relational Algebra and Relational Calculus
- Relational Database Design by ER - to - Relational Mapping
- SQL-99: Schema Definition, Constraints, Queries and Views
- Relational Database Design
- Distributed Databases and Client-Server Architectures
- Transaction Processing Concepts
- Database Recovery Techniques
- Security, Advanced Modeling, and Distribution

AC 142 DBMS LAB

AC 113 OPERATIONS RESEARCH & ENGINEERING MANAGEMENT

- What is Operations Research?
- Modeling with Linear Programming
- The Simplex Method and Sensitivity Analysis

- Duality and Post-Optimal Analysis
- Transportation Model and its Variants
- Network Models
- Decision Analysis and Games
- Queuing Systems
- Introduction to Engineering Management
- Engineering and Management
- Historical Development of Engineering Management
- Functions of Technology Management
- Planning and Forecasting
- Decision Making
- Organizing
- Some Human Aspects of Organizing
- Leading Technical People Controlling

AC 114 SOFTWARE ENGINEERING

- Socio-Technical Systems
- Software Processes
- Project Management
- Software Requirements
- Requirements Engineering Processes
- System Models
- Rapid Software Development
- Formal Specification
- Architectural Design
- Distributed Systems Architectures
- Objected-Oriented Design
- Software Reuse
- Component-Based Software Engineering
- User Interface Design
- Critical Systems Development
- Verification and Validation
- Software Testing
- Software Cost Estimation

- Quality Management
- Process Improvement
- Configuration Management

AC 115 DESIGN & ANALYSIS OF ALGORITHMS

- Introduction
- Fundamentals of the Analysis of Algorithm Efficiency
- Brute Force
- Divide and Conquer
- Decrease and Conquer
- Transform and Conquer
- Dynamic Programming Greedy Technique
- Space and Time Tradeoffs
- Limitations of Algorithmic Power
- Coping with Limitations of Algorithmic Power

AC 116 DISCRETE STRUCTURES

- Set Theory
- Mathematical Logic
- Mathematical Induction and Recursive Definitions
- Relations
- Functions
- Groups
- Coding Theory
- Rings

AC 117 LINUX INTERNALS

- Linux-The Operating System
- Compiling the Kernel
- Introduction to the Kernel
- Memory Management
- Inter-Process Communication
- The Linux File System
- Device Drivers Under Linux
- Network Implementation
- Modules and Debugging
- Multi-Processing

ELECTIVE - I

AC 143 ANALYSIS & DESIGN OF ALGORITHMS LAB

AC 118 SOFTWARE ARCHITECTURE

- Envisioning Architecture
- Understanding Quality Attributes
- Achieving Qualities
- Architectural Patterns
- Design Patterns
- Designing the Architecture
- Documenting Software Architectures
- Building Systems from off-the-Shelf Components
- Software Architecture in the Future

AC 119 DATA COMMUNICATION AND COMPUTER NETWORKS

- Data Communications, Data Networking, and the Internet
- Protocol Architecture, TCP/IP, and Internet-Based Applications
- Data Transmission
- Transmission Media
- Signal Encoding Techniques
- Digital Data Communication Techniques
- Data Link Control Protocols
- Multiplexing
- Circuit Switching and Packet Switching
- Routing in Switched Networks
- Congestion Control in Data Networks
- Local Area Network Overview
- High-Speed LANs
- Wireless LANs
- Internetwork Protocols
- Internetwork Operation
- Transport Protocols
- Internet Applications

AC 120 FINITE AUTOMATA & FORMAL LANGUAGES

- Introduction to Automata
- Regular Expressions and Languages
- Properties of Regular Languages
- Context-Free Grammars and Languages
- Properties of Context-Free Languages
- Introduction to Turing Machines
- Undecidability

ELECTIVE - II

ELECTIVE – III

AC 144 μ P & μ C LAB

AC 135 PROJECT WORK

AC 136 SEMINAR

AC 121 C# & .NET

- Introducing C# and the .Net Platform
- The Philosophy of .Net
- Building C# Applications
- Core C# Programming Constructs
- Defining Encapsulated Class Types
- Understanding Inheritance and Polymorphism
- Understanding Structured Exception Handling
- Understanding Object Lifetime
- Working with Interfaces
- Understanding Generics
- Delegates, Events, and Lambdas

AC 122 VLSI DESIGN

- A review of microelectronics and an introduction to MOS technology
- Basic electrical properties of MOS and BiCMOS circuits
- MOS and BiCMOS circuit design processes
- Basic circuit concepts
- Scaling of MOS circuits
- Subsystem design and layout
- Subsystem design processes
- Illustration of the design process-computational elements
- Memory, registers and aspects of system timing
- Practical aspects and testability

AC 123 ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

- Overview of Artificial Intelligence
- Symbolic Logic
- Knowledge Acquisition and Representation
- Reasoning and KRR Systems
- Uncertainty
- Search Techniques
- Expert Systems
- Neural Networks
- Applications of Artificial Intelligence

AC 124 UNIX SYSTEMS PROGRAMS

- Introduction
- File I/O
- Files and Directories
- Standard I/O Library
- System Data Files and Information
- Process Control
- Process Relationships
- The Environment of a Unix Process
- Signals

Regulations and Syllabi for AMIETE (IT) Examination

- Terminal I/O
- Daemon Processes
- Inter Process Communication

AC 125 SOFTWARE TESTING

- Basics of Software Testing
- Test Generation from Requirements
- Test Adequacy: Assessment Using Control Flow
- Test Adequacy: Assessment Using Data Flow
- Test Adequacy assessment Using Program Mutation
- Testing of Object-Oriented Systems

AC 126 MOBILE APPLICATION DEVELOPMENT

- Introduction to Android
- Activities and Intents
- Introducing Android User Interface
- Designing User Interface Using Views
- Displaying Pictures and Menus with Views
- Data Persistence
- Content Providers
- Messaging and Networking
- Location Based Services
- Android Services
- Hardware Sensors
- Invading the Home Screen
- Audio, Video, and Using Camera
- Bluetooth, NFC, Networks, and Wi-Fi
- Advanced Android Development
- Monetizing, Promoting, and Distributing Applications

AC 127 WIRELESS & MOBILE SYSTEMS

- Introduction

- Probability, Statistics, and Traffic Theories
- Mobile Radio Propagation
- Channel Coding and Error Control
- Cellular Concept
- Multiple Radio Access for Traffic Channels
- Multiple Division Techniques
- Traffic Channel Allocation
- Satellite Systems
- Mobile Communication Systems
- Existing Wireless Systems
- Ad Hoc and Sensor Networks
- Wireless LANs, MANs and PANs
- Recent Advances

AC 128 INTERNET APPLICATIONS

- Hypertext Markup Language
- More HTML
- Cascading Stylesheets
- Cascading Stylesheets 2
- An Introduction to Javascript
- Objects in Javascript
- Dynamic HTML with Javascript
- Programming in Perl 5
- CGI Scripting
- Building Web Applications with Perl
- An Introduction to PHP
- Building Web Applications with PHP
- XML: Defining Data for Web Applications

AC 129 CYBER CRIMES & IPR

- Introduction
- Cyber Crimes – Their Kinds and Classification
- Modes & Techniques of Cyber Crime
- Cyber Crime and IPR Violation
- International Prospective of Cyber Crimes
- Prevention of Cyber Crimes

Regulations and Syllabi for AMIETE (IT) Examination

- Introductory
- Copyright
- Trademarks
- Patents – Historical Overview of Patent Law, Concept of Patent
- Patents - Patentable Inventions
- Patents - Procedure for Obtaining Patent
- Patents – Special Category
- Patents – Infringement and Remedies
- Patents – Offences and Penalties
- Industrial Designs
- Geographical Indications
- The Information Technology Act, 2000

AC 130 COMPILER DESIGN

- Introduction
- Lexical Analysis
- Syntax Analysis
- Syntax-Directed Translation
- Intermediate Code Generation
- Run-Time Environments
- Code Generation

AC 131 CLOUD COMPUTING

- Cloud Computing Basics
- Your Organization and Cloud Computing
- The Business Case for Going to the Cloud
- Cloud Computing Technology
- Cloud Computing at Work
- Migrating to the Cloud
- Best Practices and the Future of Cloud Computing
- Using the Mobile Cloud

AC 132 CRYPTOGRAPHY & NETWORK SECURITY

- Introduction
- Mathematics of Cryptography
- Traditional Symmetric-Key Ciphers

- Introduction to Modern Symmetric-Key Ciphers
- Data Encryption Standard (DES)
- Encipherment Using Modern Symmetric-Key Ciphers
- Asymmetric-Key Cryptography
- Message Integrity and Message Authentication
- Cryptographic Hash Functions
- Digital Signature
- Key Management
- Security at the Application Layer
- Security at the Transport Layer

AC 133 ADVANCED MICROPROCESSORS

- 8086 Architecture and Programming Model
- 8086 Addressing Modes
- Instruction Templates
- Data Transfer Instructions
- Data Conversion Instructions
- Arithmetic Instructions
- Logical Instructions
- Process Control Instructions
- String Instructions
- Branch Instructions
- Interrupts and Related Instructions
- 8087 Numeric Co-Processor
- 8087 Instruction Set
- Your First Assembly Language Program
- Simple Assembly Language Programs
- BIOS and DOS Services
- Assembly Language Programs Using Recursion
- Assembly Language Programs Using BIOS Services
- Assembly Language Programs Using DOS Services
- Assembly Language Programs Using Co-Processor

Regulations and Syllabi for AMIETE (IT) Examination

- C Language Programs Using BIOS and DOS Services
- 80286 - with Memory Management and Protection
- 80386 and 80486 – The 32 Bit Processors
- Pentium Processor

AC 137 (ORAL) AC 138 (WRITTEN) COMMUNICATION SKILLS AND TECHNICAL WRITING

- Communication: Its Types and Significance
- Grammar
- Syntax
- Reading Skills
- Writing Skills
- Listening Skills
- Speaking Skills
- Technical Report and Scientific Report
- Campus Recruitment, Interview and Group Discussion
- Meeting Negotiations, Phone and

Regulations and Syllabi for AMIETE (IT) Examination

Scheme and Structure for the Programme of AMIETE in Information Technology

Appendix "C"

SECTION A									
Part - I					Part - II				
SI No	Sub Code	Title	Examination Credits		SI No	Sub Code	Title	Examination Credits	
			Theory	Practicals				Theory	Practicals
1	AT 101	Engineering Mathematics – I *	4	-	1	AT 107	Engineering Mathematics – II *	4	-
2	AT 102	Computer Concepts & C Programming *	4	-	2	AT 108	Microprocessors & Microcontrollers *	4	-
3	AT 103	Analog & Digital Electronics **	4	-	3	AT 109	Unix & Shell Programming**	4	-
4	AT 104	Data Structures with C & C++ **	4	-	4	AT 110	Operating Systems & Systems Software **	4	-
5	AT 105	Object Oriented Programming with C++ **	4	-	5	AT 111	Computer Graphics & Visualization**	4	-
6	AT 106	Computer Organization**	4	-	6	AT 112	Database Management Systems **	4	-
7	AT 141	Data Structures with C & C++lab **	-	4	7	AT 142	DBMS Lab **	-	4
Total Credits			24	4	Total Credits			24	4
					AT 137	Communication Skills & Technical Writing(Oral)*		20	Marks
					AT 138	Communication Skills & Technical Writing(Written)*		80	Marks
All the students have to pass a course in "Communication Skills & Technical Writing" which will not be counted for the overall percentage									

** Few more electives will be added*

1. **Electronics for Nuclear Instrumentation**
2. **Foundation Course on EMI – EMC**
3. **Quality Assurance**

Regulations and Syllabi for AMIETE (IT) Examination

SECTION B									
Part - I					Part - II				
SI N o	Sub Cod e	Title	Examination Credits		SI N o	Sub Cod e	Title	Examination Credits	
			Theo ry	Practic als				Theo ry	Practic als
1	AT 113	Operations Research & Engineering Management *	4	-	1	AT 118	Software Architecture**	4	-
2	AT 114	Software Engineering **	4	-	2	AT 119	Data Communication & Computer Networks *	4	-
3	AT 115	Design & Analysis of Algorithms **	4	-	3	AT 120	Java & Web Programming	4	-
4	AT 116	Multimedia Systems	4	-	4		Elective – II (from Group B)	4	-
5	AT 117	Linux Internals **	4	-			Elective – III (from Group C)	4	-
6		Elective - I (from Group A)	4	-	5	AT 144	Java & Web Programming Lab	-	4
7	AT 143	Analysis & Design of Algorithms Lab **	-	4	6	AT 135	Project Work	-	8
					7	AT 136	Seminar	-	4
Total Credits			24	6	Total Credits			20	16

Regulations and Syllabi for AMIETE (IT) Examination

GROUP A Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective I subject		
SI No	Sub Code	Title
1	AT 121	C # and .Net **
2	AT 122	Data Mining & Warehousing
3	AT 123	Artificial Intelligence & Neural Networks **
4	AT 124	Unix Systems Programs **

GROUP B Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective II subject		
SI No	Sub Code	Title
1	AT 125	Software Testing **
2	AT 126	Mobile Applications Development **
3	AT 127	E-Commerce
4	AT 128	Internet Applications ***
5	AT 129	Cyber Crimes & IPR ***
GROUP C Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective III subject		
SI No	Sub Code	Title
1	AT 130	Compiler Design**
2	AT 131	Cloud Computing **
3	AT 132	Cryptography & Network Security **
4	AT 133	System Modeling & Simulation

Note :

- * Common to ET / CS / IT Streams
- ** Common to CS / IT Streams
Elective common to AMIETE - ET/CS/IT
- ***

**OUTLINE SYLLABUS
AMIETE (INFORMATION TECHNOLOGY)**

**AT 101 ENGINEERING
MATHEMATICS – I**

- Partial differentiation and its application
- Multiple integrals
- Linear algebra
- Numerical Methods
- Linear differential equation of higher order
- Series Solution of differential equations and Special functions
- Fourier Series
- Fourier Transforms and Z-Transform

**AT 102 COMPUTER CONCEPTS
& C PROGRAMMING**

- Introduction to Computer System
- Storage Device Concepts, Operating Systems and Networks
- Fundamentals of Problem Solving and Introduction to C
- Constants, Variables, and Data Types
- Managing Input and Output Operations
- Structure of a C Program
- Functions
- Selection – Making Decisions and Repetitions
- Arrays and Strings

**AT 103 ANALOG AND DIGITAL
ELECTRONICS**

- Analog Electronics: Basic Semiconductor and PN Junction Theory
- Semiconductor Diodes
- Diode Applications
- Bipolar Junction Transistors
- BJT Biasing

- Amplifiers and Oscillators
- Digital Electronics: Introductory Concepts
- Number Systems and Codes
- Describing Logic Circuits
- Combinational Logic Circuits
- Digital Arithmetic Operation and Circuits
- MSI Logic Circuits
- Flip-Flop and Their Applications
- Counters and Registers

**AT 104 DATA STRUCTURES
WITH C & C++**

- Introduction to Data Structures
- Pointers and Dynamic Memory Management
- Stacks and Queues
- Linked List
- Tree
- Graph
- Searching
- Sorting Algorithms
- Files

**AT 105 OBJECT ORIENTED
PROGRAMMING WITH C++**

- Overview
- Declarations and Expressions
- Statements
- Array, Pointer and Structure
- Functions
- Data Abstraction through Classes and User-Defined Data Types
- Operator Overloading
- Class Relationships
- Template
- The Standard Library in C++

AT 106 COMPUTER ORGANIZATION

- Basic Structure of Computers
- Machine Instructions and Programs
- Input/Output Organization
- Memory System
- Arithmetic
- Basic Processing Unit

AT 141 DATA STRUCTURES WITH C & C++ LAB

AT 107 ENGINEERING MATHEMATICS – II

- Complex Differentiation and Transformation
- Complex Integration
- Vector Differentiation
- Vector Integration
- Numerical Methods
- Partial Differential Equations
- Theory of Probability
- Random Variables

AT 108 MICROPROCESSORS & MICROCONTROLLERS

- Introduction to Microprocessors
- Assembly Language Programs
- Interrupts in 8085
- Programs Using Interface Module
- Intel 8259A- Programmable Interrupt Controller
- Intel 8253 – Programmable Interval Timer
- 8051 Microcontroller

AT 109 UNIX & SHELL PROGRAMMING

- Introduction
- The Unix Architecture and Command Usage
- The File System
- Handling Ordinary Files
- Basic File Attributes

- The vi Editor
- The Shell
- The Process
- Customizing the Environment
- More File Attributes
- Simple Filters
- Filters Using Regular Expressions – grep And sed
- Essential Shell Programming
- awk – An Advanced Filter
- perl – The Master Manipulator

AT 110 OPERATING SYSTEMS & SYSTEMS SOFTWARE

- Evolution of OS Functions
- Processes
- Scheduling
- Deadlocks
- Process Synchronization
- File Systems
- Memory Management
- Language Processors
- Data Structures for Language Processing
- Scanning and Parsing
- Macros and Macro Processors
- Linkers
- Assemblers
- Compilers and Interpreters

AT 111 COMPUTER GRAPHICS & VISUALIZATION

- A Survey of Computer Graphics
- Overview of Graphics Systems
- Graphics Output Primitives
- Attributes of Graphics Primitives
- Geometric Transformations
- Viewing
- Visible-Surface Detection Methods
- Illumination Models and Surface-Rendering Methods
- Interactive Input Methods and
- Graphical User Interfaces

- Computer Animation
- Hierarchical Modeling

AT 112 DATABASE MANAGEMENT SYSTEMS

- Databases and Database Users
- Database System - Concepts and Architecture
- Data Modeling Using the Entity-Relationship Model
- The Enhanced Entity-Relationship (EER) Model
- The Relational Data Model and Relational Database Constraints
- The Relational Algebra and Relational Calculus
- Relational Database Design by ER - to - Relational Mapping
- SQL-99: Schema Definition, Constraints, Queries and Views
- Relational Database Design
- Distributed Databases and Client-Server Architectures
- Transaction Processing Concepts
- Database Recovery Techniques
- Security, Advanced Modeling, and Distribution

AT 142 DBMS LAB

AT 113 OPERATIONS RESEARCH & ENGINEERING MANAGEMENT

- What is Operations Research?
- Modeling with Linear Programming
- The Simplex Method and Sensitivity Analysis
- Duality and Post-Optimal Analysis
- Transportation Model and its Variants
- Network Models
- Decision Analysis and Games
- Queuing Systems

- Introduction to Engineering Management
- Engineering and Management
- Historical Development of Engineering Management
- Functions of Technology Management
- Planning and Forecasting
- Decision Making
- Organizing
- Some Human Aspects of Organizing
- Leading Technical People Controlling

AT 114 SOFTWARE ENGINEERING

- Socio-Technical Systems
- Software Processes
- Project Management
- Software Requirements
- Requirements Engineering Processes
- System Models
- Rapid Software Development
- Formal Specification
- Architectural Design
- Distributed Systems Architectures
- Objected-Oriented Design
- Software Reuse
- Component-Based Software Engineering
- User Interface Design
- Critical Systems Development
- Verification and Validation
- Software Testing
- Software Cost Estimation
- Quality Management
- Process Improvement
- Configuration Management

AT 115 DESIGN & ANALYSIS OF ALGORITHMS

- Introduction

Regulations and Syllabi for AMIETE (IT) Examination

- Fundamentals of the Analysis of Algorithm Efficiency
- Brute Force
- Divide and Conquer
- Decrease and Conquer
- Transform and Conquer
- Dynamic Programming
- Greedy Technique
- Space and Time Tradeoffs
- Limitations of Algorithmic Power
- Coping with Limitations of Algorithmic Power

AT 116 MULTIMEDIA SYSTEMS

- Introduction to Multimedia
- Multimedia Authoring and Tools
- Graphics and Image Data Representation
- Color in Image and Video
- Fundamental Concepts in Video
- Basics of Digital Audio
- Lossless Compression Algorithms
- Lossy Compression Algorithms
- Image Compression Standards
- Basic Video Compression Techniques
- MPEG Video Coding I – MPEG-1 and 2
- MPEG Video II – MPEG-4, 7, and Beyond
- Basic Audio Compression Techniques
- MPEG Audio Compression
- Multimedia Network Communication and Applications

AT 117 LINUX INTERNALS

- Linux-The Operating System
- Compiling the Kernel
- Introduction to the Kernel
- Memory Management
- Inter-Process Communication
- The Linux File System
- Device Drivers Under Linux

- Network Implementation
- Modules and Debugging
- Multi-Processing

ELECTIVE - I

AT 143 ANALYSIS & DESIGN OF ALGORITHMS LAB

AT 118 SOFTWARE ARCHITECTURE

- Envisioning Architecture
- Understanding Quality Attributes
- Achieving Qualities
- Architectural Patterns
- Design Patterns
- Designing the Architecture
- Documenting Software Architectures
- Building Systems from off-the-Shelf Components
- Software Architecture in the Future

AT 119 DATA COMMUNICATION AND COMPUTER NETWORKS

- Data Communications, Data Networking, and the Internet
- Protocol Architecture, TCP/IP, and Internet-Based Applications
- Data Transmission
- Transmission Media
- Signal Encoding Techniques
- Digital Data Communication Techniques
- Data Link Control Protocols
- Multiplexing
- Circuit Switching and Packet Switching
- Routing in Switched Networks
- Congestion Control in Data Networks
- Local Area Network Overview
- High-Speed LANs

Regulations and Syllabi for AMIETE (IT) Examination

- Wireless LANs
- Internetwork Protocols
- Internetwork Operation
- Transport Protocols
- Internet Applications

AT 144 JAVA & WEB PROGRAMMING

- The History, Evolution and Overview of Java
- Data Types, Variables and Arrays
- Operators
- Control Statements
- Introducing Classes
- Inheritance
- Packages & Interfaces
- Exception Handling
- Multithreaded Programming
- I/O, Applets
- String Handling
- The Collections Framework
- Introducing the AWT
- Introducing Swing
- Web Basics and Overview
- Creating Web Pages: XHTML
- Advanced XHTML
- Design Basics
- Information Architecture and Page Layout
- CSS, Forms and Form Processing
- Client-Side Scripting: Javascript

ELECTIVE - II

ELECTIVE – III

AT 144 JAVA & WEB PROGRAMMING LAB

AT 135 PROJECT WORK

AT 136 SEMINAR

AT 121 C# & .NET

- Introducing C# and the .Net Platform
- The Philosophy of .Net
- Building C# Applications
- Core C# Programming Constructs
- Defining Encapsulated Class Types
- Understanding Inheritance and Polymorphism
- Understanding Structured Exception Handling
- Understanding Object Lifetime
- Working with Interfaces
- Understanding Generics
- Delegates, Events, and Lambdas

AT 122 DATA MINING & WAREHOUSING

- Introduction
- Getting to Know Your Data
- Data Preprocessing
- Data Warehouse and OLAP Technology – An Overview
- Data Cube Computation and Data Generalization
- Mining Frequent Patterns and Associations
- Classification: Basic Concepts
- Cluster Analysis
- Data Mining Trends and Research Frontiers

AT 123 ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

- Overview of Artificial Intelligence
- Symbolic Logic
- Knowledge Acquisition and Representation
- Reasoning and KRR Systems
- Uncertainty
- Search Techniques
- Expert Systems
- Neural Networks

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- Applications of Artificial Intelligence

AT 124 UNIX SYSTEMS PROGRAMS

- Introduction
- File I/O
- Files and Directories
- Standard I/O Library
- System Data Files and Information
- Process Control
- Process Relationships
- The Environment of a Unix Process
- Signals
- Terminal I/O
- Daemon Processes
- Inter Process Communication

AT 125 SOFTWARE TESTING

- Basics of Software Testing
- Test Generation from Requirements
- Test Adequacy: Assessment Using Control Flow
- Test Adequacy: Assessment Using Data Flow
- Test Adequacy assessment Using Program Mutation
- Testing of Object-Oriented Systems

AT 126 MOBILE APPLICATION DEVELOPMENT

- Introduction to Android
- Activities and Intents
- Introducing Android User Interface
- Designing User Interface Using Views
- Displaying Pictures and Menus with Views
- Data Persistence
- Content Providers

- Messaging and Networking
- Location Based Services
- Android Services
- Hardware Sensors
- Invading the Home Screen
- Audio, Video, and Using Camera
- Bluetooth, NFC, Networks, and Wi-Fi
- Advanced Android Development
- Monetizing, Promoting, and Distributing Applications

AT 127 E-COMMERCE

- History of E-Commerce
- Business Models for E-Commerce
- Enabling Technologies of the World Wide Web
- E-Marketing
- E-Security
- E-Payment Systems
- E-Customer Relationship Management
- E-Supply Chain Management
- E-Strategy
- Mobile Commerce
- Customer-Effective Web Design
- Legal and Ethical Issues

AT 128 INTERNET APPLICATIONS

- Hypertext Markup Language
- More HTMLI
- Cascading Stylesheets
- Cascading Stylesheets 2
- An Introduction to Javascript
- Objects in Javascript
- Dynamic HTML with Javascript
- Programming in Perl 5
- CGI Scripting
- Building Web Applications with Perl
- An Introduction to PHP

Regulations and Syllabi for AMIETE (IT) Examination

- Building Web Applications with PHP
- XML: Defining Data for Web Applications

AT 129 CYBER CRIMES & IPR

- Introduction
- Cyber Crimes – Their Kinds and Classification
- Modes & Techniques of Cyber Crime
- Cyber Crime and IPR Violation
- International Prospective of Cyber Crimes
- Prevention of Cyber Crimes
- Introductory
- Copyright
- Trademarks
- Patents – Historical Overview of Patent Law, Concept of Patent
- Patents - Patentable Inventions
- Patents - Procedure for Obtaining Patent
- Patents – Special Category
- Patents – Infringement and Remedies
- Patents – Offences and Penalties
- Industrial Designs
- Geographical Indications
- The Information Technology Act, 2000

AT 130 COMPILER DESIGN

- Introduction
- Lexical Analysis
- Syntax Analysis
- Syntax-Directed Translation
- Intermediate Code Generation
- Run-Time Environments
- Code Generation

AT 131 CLOUD COMPUTING

- Cloud Computing Basics

- Your Organization and Cloud Computing
- The Business Case for Going to the Cloud
- Cloud Computing Technology
- Cloud Computing at Work
- Migrating to the Cloud
- Best Practices and the Future of Cloud Computing
- Using the Mobile Cloud

AT 132 CRYPTOGRAPHY & NETWORK SECURITY

- Introduction
- Mathematics of Cryptography
- Traditional Symmetric-Key Ciphers
- Introduction to Modern Symmetric-Key Ciphers
- Data Encryption Standard (DES)
- Encipherment Using Modern Symmetric-Key Ciphers
- Asymmetric-Key Cryptography
- Message Integrity and Message Authentication
- Cryptographic Hash Functions
- Digital Signature
- Key Management
- Security at the Application Layer
- Security at the Transport Layer

AT 133 SYSTEM MODELING & SIMULATION

- Introduction to Discrete-Event System Simulation
- General Principles
- Simulation Software
- Statistical Models in Simulation
- Queueing Models
- Random-Number Generation
- Random-Variate Generation
- Input Modeling
- Verification and Validation of Simulation Models

Regulations and Syllabi for AMIETE (IT) Examination

- Output Analysis for a Single Model
- Comparison and Evaluation of Alternative System Designs

AT 137 (ORAL) AT 138 (WRITTEN) COMMUNICATION SKILLS AND TECHNICAL WRITING

- Communication: Its Types and Significance
- Grammar
- Syntax
- Reading Skills
- Writing Skills
- Listening Skills
- Speaking Skills
- Technical Report and Scientific Report
- Campus Recruitment, Interview and Group Discussion
- Meeting Negotiations, Phone and Mobile Phone Skills

Regulations and Syllabi for AMIETE (IT) Examination

Scheme and Structure for the Programme of AMIETE in Electronics & Telecommunication Engineering

Appendix 'E'

SECTION A									
Part - I					Part - II				
SI No	Sub Code	Title	Examination Credits		SI No	Sub Code	Title	Examination Credits	
			Theory	Practicals				Theory	Practicals
1	AE 101	Engineering Mathematics – I *	4	-	1	AE 107	Engineering Mathematics – II *	4	-
2	AE 102	Computer Concepts & C Programming*	4	-	2	AE 108	Microprocessors & Microcontrollers *	4	-
3	AE 103	Electronic Devices & Circuits	4	-	3	AE 109	Control Engineering	4	-
4	AE 104	Linear ICs & Digital Electronics	4	-	4	AE 110	Circuit Theory & Design	4	-
5	AE 105	Principles of Electrical Engineering	4	-	5	AE 111	Instrumentation & Measurements	4	-
6	AE 106	Materials & Processes	4	-	6	AE 112	Signals & Systems	4	-
7	AE 141	Analog Electronics Lab	-	4	7	AE 142	Digital Electronics Lab	-	4
Total Credits			24	4	Total Credits			24	4

AE 137	Communication Skills & Technical Writing(Oral)*	20	Marks
AE 138	Communication Skills & Technical Writing(Written)*	80	Marks

All the students have to pass a course in "Communication Skills & Technical Writing" which will not be counted for the overall percentage

- * Few more electives will be added***
- 1. Electronics for Nuclear Instrumentation***
 - 2. Foundation Course on EMI - EMC***
 - 3. Quality Assurance***

Regulations and Syllabi for AMIETE (IT) Examination

SECTION B									
Part - I					Part - II				
SI No	Sub Code	Title	Examination Credits		SI No	Sub Code	Title	Examination Credits	
			Theor y	Practica ls				Theor y	Practica ls
1	AE 113	Operations Research & Engineering Management *	4	-	1	AE 118	Digital Communications	4	-
2	AE 114	Electromagnetics & Radiation Systems	4	-	2	AE 119	Data Communication & Computer Networks *	4	-
3	AE 115	Telecommunication Switching Systems	4	-	3	AE 120	Microwave Theory & Techniques	4	-
4	AE 116	Analog Communications	4	-	4		Elective – II (from Group B)	4	-
5	AE 117	Embedded Systems Design	4	-	5		Elective – III (from Group C)	4	-
6		Elective – I (from Group A)	4	-	6	AE 144	Analog & Digital Communications Lab	-	4
7	AE 143	µP & C Programming Lab	-	4	7	AE 135	Project Work	-	8
					8	AE 136	Seminar	-	4
Total Credits			24	6	Total Credits			20	16

Regulations and Syllabi for AMIETE (IT) Examination

GROUP A Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective I subject		
S N o	Sub Code	Title
1	AE 121	Digital Signal Processing
2	AE 122	VLSI Design †
3	AE 123	Power Electronics
4	AE 124	Operating Systems

GROUP B Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective II subject		
S N o	Sub Code	Title
1	AE 125	Information Theory & Coding
2	AE 126	Radar & Navigational Aids
3	AE 127	Wireless & Mobile Systems †
4	AE 128	Internet Applications ***
5	AE 129	Cyber Crimes & IPR ***

GROUP C Students can chose any one of the following elective subjects		
Students can choose any one of the following as an Elective III subject		
S N o	Sub Code	Title
1	AE 130	Optoelectronics & Communication
2	AE 131	Advanced Communication Systems
3	AE 132	Multimedia Systems ††
4	AE 133	DSP Algorithms and Architecture

Note:

- * Common to ET / CS / IT Streams
- *** Elective common to AMIETE - ET/CS / IT
- † Elective common to AMIETE - ET/CS
- †† Syllabus is same as that of the core subject for AMIETE - IT

**OUTLINE SYLLABUS
AMIETE (ELECTRONICS & TELECOMMUNICATION ENGINEERING)**

**AE 101 ENGINEERING
MATHEMATICS – I**

- Partial differentiation and its application
- Multiple integrals
- Linear algebra
- Numerical Methods
- Linear differential equation of higher order
- Series Solution of differential equations and Special functions
- Fourier Series
- Fourier Transforms and Z-Transform

**AE 102 COMPUTER CONCEPTS
& C PROGRAMMING**

- Introduction to Computer System
- Storage Device Concepts, Operating Systems and Networks
- Fundamentals of Problem Solving and Introduction to C
- Constants, Variables, and Data Types
- Managing Input and Output Operations
- Structure of a C Program
- Functions
- Selection – Making Decisions and Repetitions
- Arrays and Strings

**AE 103 ELECTRONIC DEVICES
AND CIRCUITS**

- Circuit Theory
- Semiconductors, Diodes and Diode Circuits
- Transistors and Other Devices
- Small-Signal Models, Amplification and Biasing

- Small-Signal Amplifiers-Frequency Response
- Large-Signal Amplifiers
- Feedback Amplifiers and Oscillators
- Integrated Circuits Fabrication

**AE 104 LINEAR ICs AND DIGITAL
ELECTRONICS**

- Introduction
- Operational Amplifier
- Operational Amplifier Characteristics
- Operational Amplifier Applications
- Comparator and Waveform Generator
- 555 Timer applications
- Voltage Regulator
- D-A and A-D Converters
- Introductory Concepts
- Number Systems and Codes
- Describing Logic Circuits
- Combinational Logic Circuits
- Digital Arithmetic
- MSI Logic Circuits
- Flip-Flops and their Applications
- Counters and Registers

**AE 105 PRINCIPLES OF
ELECTRICAL ENGINEERING**

- Magnetic Circuits
- Transformers
- D.C. Machines
- Synchronous Machines
- Induction Machines
- Fractional kW Motors
- Power systems
- Domestic wiring and measuring techniques of electrical and electronics instruments

AE 106 MATERIALS & PROCESSES

- Crystal Geometry, Atomic Structure & Bonding
- Structure of Solids & Crystal Imperfections
- Diffusion in Solids & Conducting Materials
- Dielectric Materials in Static & Alternating Fields
- Magnetic Materials
- Semi conducting Materials
- Semi conducting Devices & Electronic Component Materials
- Fabrication Processes of Semi conductors

AE 141 ANALOG ELECTRONICS LAB

AE 107 ENGINEERING MATHEMATICS – II

- Complex Differentiation and Transformation
- Complex Integration
- Vector Differentiation
- Vector Integration
- Numerical Methods
- Partial Differential Equations
- Theory of Probability
- Random Variables

AE 108 MICROPROCESSORS & MICROCONTROLLERS

- Introduction to Microprocessors
- Assembly Language Programs
- Interrupts in 8085
- Programs Using Interface Module
- Intel 8259A- Programmable Interrupt Controller
- Intel 8253 – Programmable Interval Timer
- 8051 Microcontroller

AE 109 CONTROL ENGINEERING

- Modeling of Systems
- Block Diagrams
- Signal Flow Graphs
- Feedback Characteristics of Control Systems
- Control Systems and Components
- Time Response Analysis
- Concepts of Stability
- Root Locus Technique
- Frequency Domain Analysis
- Compensation
- State Variable Analysis

AE 110 CIRCUIT THEORY AND DESIGN

- Conventions for Describing Networks
- Network Equations
- Initial Conditions in Networks
- Differential Equations Applications
- Signals, Amplitude, Phase and Delay
- The Laplace Transformation
- Transforms of other Signal Waveforms
- Impedance Functions and Network Theorems
- Network Functions; Poles and Zeros
- Elements of Realisability Theory
- Two-Port Parameters
- Synthesis of One-Port Networks
- Elements of Transfer Function synthesis
- Topics in filter Design

AE 111 INSTRUMENTATION AND MEASUREMENTS

- Measurement Fundamentals
- Measurement of Resistance, Inductance and capacitance

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- Instruments to measure Current and Voltages
- Digital measuring Instruments
- Signal Generators and Oscilloscope
- Signal Analysis Instruments and R.F Power measurement Techniques
- Recorders
- Transducers and Data Acquisition System

AE 112 SIGNALS AND SYSTEMS

- Signals
- Linear-Time Invariant Systems
- Fourier Series Representation of Periodic Signals
- The Continuous-Time Fourier Transform
- The Discrete-Time Fourier Transform
- Time and Frequency Characterization of Signals and Systems
- Sampling
- The Laplace Transform
- The Z-Transform
- Random Processes

AE 142 DIGITAL ELECTRONICS LAB

AE 113 OPERATIONS RESEARCH & ENGINEERING MANAGEMENT

- What is Operations Research?
- Modeling with Linear Programming
- The Simplex Method and Sensitivity Analysis
- Duality and Post-Optimal Analysis
- Transportation Model and its Variants
- Network Models
- Decision Analysis and Games
- Queuing Systems

- Introduction to Engineering Management
- Engineering and Management
- Historical Development of Engineering Management
- Functions of Technology Management
- Planning and Forecasting
- Decision Making
- Organizing
- Some Human Aspects of Organizing
- Leading Technical People Controlling

AE 114 ELECTROMAGNETICS AND RADIATION SYSTEMS

- Coulomb's Law and Electric Field Intensity
- Electric Flux Density, Gauss's Law and Divergence
- Energy and Potential
- Current and Conductors , Dielectrics and Capacitance
- Poisson's and Laplace's Equations
- The Steady Magnetic Field
- Magnetic Forces, Materials and Inductance
- Time-Varying Fields and Maxwell's Equations
- Radiation and Propagation of Waves
- Antennas

AE 115 TELECOMMUNICATION SWITCHING SYSTEMS

- Switching Systems
- Telecommunications Traffic
- Switching Networks
- Time Division Switching
- Control of Switching Systems
- Signaling
- Packet Switching
- Networks

AE 116 ANALOG COMMUNICATIONS

- Introduction to Communication Systems
- Noise
- Amplitude Modulation
- Single-Sideband Techniques
- Frequency Modulation
- Radio Receivers
- Transmission Lines
- Waveguides, Resonators and Components
- Pulse Communications
- Broadband Communications Systems

AE 117 EMBEDDED SYSTEMS DESIGN

- Introduction to embedded systems
- Custom single purpose processors: Hardware
- General purpose processors: Software
- Standard single-purpose processors: Peripherals
- Memory
- Interfacing
- Introduction to Real Time Operating Systems
- More operating system services
- Basic design using Real Time Operating System

ELECTIVE – I

AE 143 μ P & C PROGRAMMING LAB

AE118 DIGITAL COMMUNICATIONS

- Introduction

- Fundamental Limits on Performance
- Sampling Process
- Waveform Coding Techniques
- Base-band Shaping for Data Transmission
- Digital Modulation Techniques
- Detection and Estimation
- Spread Spectrum Modulation
- Applications

AE 119 DATA COMMUNICATION AND COMPUTER NETWORKS

- Data Communications, Data Networking, and the Internet
- Protocol Architecture, TCP/IP, and Internet-Based Applications
- Data Transmission
- Transmission Media
- Signal Encoding Techniques
- Digital Data Communication Techniques
- Data Link Control Protocols
- Multiplexing
- Circuit Switching and Packet Switching
- Routing in Switched Networks
- Congestion Control in Data Networks
- Local Area Network Overview
- High-Speed LANs
- Wireless LANs
- Internetwork Protocols
- Internetwork Operation
- Transport Protocols
- Internet Applications

AE 120 MICROWAVE THEORY & TECHNIQUES

- Introduction to Microwaves and Microwave Transmission Lines
- Microwave Waveguides
- Microwave Components
- Microwave Solid-state Devices
- Microwave Linear-Beam Tubes (O-Type)

- Microwave Cross-field Tubes (M-type)
- Strip Lines and Microstrip Lines
- Monolithic MICs

ELECTIVE – II

ELECTIVE – III

AE 144 ANALOG & DIGITAL COMMUNICATIONS LAB

AE 135 PROJECT WORK

AE 136 SEMINAR

AE 121 DIGITAL SIGNAL PROCESSING

- Sampling of Continuous-Time Signals
- Transform Analysis of Linear Time-Invariant Systems
- Structures for Discrete-Time Systems
- Filter Design Techniques
- The Discrete Fourier Transform
- Computation of the Discrete Fourier Transform
- Fourier Analysis of Signals using the Discrete Fourier Transform
- Discrete Hilbert Transforms

AE 122 VLSI DESIGN

- A review of microelectronics and an introduction to MOS technology
- Basic electrical properties of MOS and BiCMOS circuits
- MOS and BiCMOS circuit design processes
- Basic circuit concepts
- Scaling of MOS circuits
- Subsystem design and layout
- Subsystem design processes

- Illustration of the design process-computational elements
- Memory, registers and aspects of system timing
- Practical aspects and testability

AE 123 POWER ELECTRONICS

- Power Electronics
- Power Diodes and Power Transistors
- Thyristor Devices
- Single-Phase Controlled Rectifiers
- Three-Phase Controlled Rectifiers
- DC Choppers
- Inverters
- AC Voltage Controller
- Static Switches
- Some Applications

AE 124 OPERATING SYSTEMS

- Introduction
- System Structures
- Process Concept
- Multithreaded Programming
- Process Scheduling
- Synchronization
- Deadlocks
- Memory-Management Strategies
- Virtual-Memory Management
- File System
- Implementing File Systems
- Secondary-Storage Structure
- System Protection

AE 125 INFORMATION THEORY AND CODING

- Random Signal Theory
- Continuous Random Signal Theory
- Basics of Information Theory
- Fundamental Limits on Performance and Source Coding
- Discrete Memoryless Channels

- Continuous Channels
- Error Control Coding – Linear Block Codes
- Cyclic and Convolutional Codes

AE 126 RADAR AND NAVIGATIONAL AIDS

- An Introduction to Radar
- The Radar Equation
- MTI and Pulse Doppler Radar
- Tracking Radar and Detection of Signals in Noise
- Radar Clutter
- The Radar Antenna
- Radar Receiver
- Navigational Aids

AE 127 WIRELESS & MOBILE SYSTEMS

- Introduction
- Probability, Statistics, and Traffic Theories
- Mobile Radio Propagation
- Channel Coding and Error Control
- Cellular Concept
- Multiple Radio Access for Traffic Channels
- Multiple Division Techniques
- Traffic Channel Allocation
- Satellite Systems
- Mobile Communication Systems
- Existing Wireless Systems
- Ad Hoc and Sensor Networks
- Wireless LANs, MANs and PANs
- Recent Advances

AE 128 INTERNET APPLICATIONS

- Hypertext Markup Language
- More HTML
- Cascading Stylesheets
- Cascading Stylesheets 2
- An Introduction to Javascript
- Objects in Javascript
- Dynamic HTML with Javascript

- Programming in Perl 5
- CGI Scripting
- Building Web Applications with Perl
- An Introduction to PHP
- Building Web Applications with PHP
- XML: Defining Data for Web Applications

AE 129 CYBER CRIMES & IPR

- Introduction
- Cyber Crimes – Their Kinds and Classification
- Modes & Techniques of Cyber Crime
- Cyber Crime and IPR Violation
- International Prospective of Cyber Crimes
- Prevention of Cyber Crimes
- Introductory
- Copyright
- Trademarks
- Patents – Historical Overview of Patent Law, Concept of Patent
- Patents - Patentable Inventions
- Patents - Procedure for Obtaining Patent
- Patents – Special Category
- Patents – Infringement and Remedies
- Patents – Offences and Penalties
- Industrial Designs
- Geographical Indications
- The Information Technology Act, 2000

AE 130 OPTOELECTRONICS & COMMUNICATION

- Optical Fibers: Structures, Waveguiding and Fabrication
- Signal degradation in optical fibers
- Optical sources and detectors
- Power launching and coupling
- Optical receiver operation

- Analog Links
- Digital Links
- Advanced systems and techniques

AE 131 ADVANCED COMMUNICATION SYSTEMS

- Optical Fiber Transmission Media
- Cellular Telephone Concepts
- Cellular Telephone Systems
- Introduction to Data Communications and Networking
- Fundamental Concepts of Data Communications
- Data-Link Protocols and Data Communication Networks
- Satellite Communications
- Satellite Multiple Accessing Arrangements

AE 132 MULTIMEDIA SYSTEMS

- Introduction to Multimedia
- Multimedia Authoring and Tools
- Graphics and Image Data Representation
- Color in Image and Video
- Fundamental Concepts in Video
- Basics of Digital Audio
- Lossless Compression Algorithms
- Lossy Compression Algorithms
- Image Compression Standards
- Basic Video Compression Techniques
- MPEG Video Coding I – MPEG-1 and 2
- MPEG Video II – MPEG-4, 7, and Beyond
- Basic Audio Compression Techniques
- MPEG Audio Compression
- Multimedia Network Communication and Applications

AE 133 DSP ALGORITHMS AND ARCHITECTURE

- Introduction to Digital Signal Processing
- Architectures for Programmable Digital Signal Processing Devices
- Programmable Digital Signal Processors
- Programmable Digital Signal Processors (Continued) and Development Tools for DSP Implementations
- Implementation of Basic DSP Algorithms
- Implementation of FFT Algorithms and Interfacing Memory
- Parallel to I/O Peripherals to DSP Devices
- Interfacing and Applications of DSP Processor

AE 137 (ORAL) & AE 138 (Written) COMMUNICATION SKILLS AND TECHNICAL WRITING

- Communication: Its Types and Significance
- Grammar
- Syntax
- Reading Skills
- Writing Skills
- Listening Skills
- Speaking Skills
- Technical Report and Scientific Report
- Campus Recruitment, Interview and Group Discussion
- Meeting Negotiations, Phone and Mobile Phone Skill

AMIETE (IT)
DETAILED SYLLABUS

Introduction

Most of the Student Members of the IETE are working engineers/ technicians/science graduates or under graduates. Thus, due to occupational reasons and other factors these students are deprived of a formal education and therefore have to learn the subjects through self-study only.

Review of Syllabus

2. IETE periodically reviews the syllabi of AMIETE and the aim of these reviews is not only to renovate and modernize the contents but also to make them contemporary. The syllabi for both Electronics & Telecommunications (ET), Computer Science & Engineering (CS) and Information Technology (IT) streams have been reviewed recently.

3. Keeping the above aspects in view and based on feed backs/suggestions received from the students, this syllabus has been formulated to meet the following criteria:-

- The Syllabus should cater to the technological advancements.
- The textbooks should be available and affordable to the students.
- In the absence of a formal coaching to the students, there should be a reasonable correlation between the topics in a subject and the textbooks.

Salient Features

4. Some salient features of the syllabus are:-

- Each subject has a code preceding it (viz AE101, AC101 and AT101 are codes for Mathematics-I in ET, CS and IT streams respectively).
- In order to guide the student and to enable him/her to prepare well for an examination, each subject is divided into 8 units and each unit has the course contents to be covered in 7 or 8 hours.
- The textbooks have been numbered in Roman Numerical (viz I, II, III)
- The chapters and sections are mentioned inside the bracket e.g. I (2.1) would indicate chapter 2 and section 1 of textbook-I.

Scheme of the Examination

5. For all theory subjects the Question Paper contains

- 10 objective questions for 20 marks covering the complete syllabus
- 8 questions are from each unit and each question carries 16 marks.

6. Regular feedback from the students, academicians, corporate members and professionals is requested to keep this syllabus updated, so that our students keep abreast of latest technological changes. Though every effort has been made to identify standard and best textbooks for each subject, we welcome suggestions on availability of better and cheaper textbooks.

AT 101 ENGINEERING MATHEMATICS – I

UNIT I

PARTIAL DIFFERENTIATION AND ITS APPLICATION 08 hrs

Introduction to function of two or more variables; Partial derivatives; Homogeneous functions – Euler's theorem; Total derivatives; Differentiation of Implicit functions; change of variables; Jacobians; properties of Jacobians; Taylor's theorem for functions of two variables (only statement); Maxima and Minima of functions of two variables; Lagrange's Method of undetermined Multipliers; Rule of differentiation under integral sign.

I (5.1, 5.2, 5.4, 5.5 (1), 5.5 (2), 5.6, 5.7 (1), 5.7 (2), 5.11 (1), 5.11 (2), 5.12, 5.13)

UNIT II

MULTIPLE INTEGRALS 08 hrs

Introduction to Double Integrals; Evaluation of Double Integrals; Evaluation of Double Integrals in polar coordinates; change of order of integration; Triple Integrals; Evaluation of Triple Integrals; Area by Double Integration; volume as Double Integral; volume as Triple Integral. Improper integrals, Gamma and Beta function.

I (7.1, 7.2, 7.3, 7.4, 7.5, 7.6(1), 7.6(2), 7.7, 7.14, 7.15, 7.16)

UNIT III

LINEAR ALGEBRA 07 hrs

Introduction to determinants and matrices; Elementary row operations on a matrix: Rank of a matrix: Consistency of system of linear equation; Gauss elimination and Gauss Jordan Methods to solve system of Linear equations; Eigen Values and Eigen Vectors of Matrix; Properties of Eigen values; Solution of a system of linear equations.

I (2.1, 2.2, 2.5, 2.8 (1), 2.8 (2), 2.11 (1), 28.6(1), 28.6(2) 2.14 (1), 2.15, 28.6 (1))

UNIT IV

NUMERICAL METHODS 07 hrs

Introduction; Solution of algebraic and transcendental equations; Regula – falsi method; Newton- Raphson method; Numerical solution of ordinary differential equation; Taylor's Series method; Euler's Method; Modified Euler's Method; IV order Runge Kutta method; Gauss – Siedel Method to solve system of linear equations; Power method to obtain the dominant Eigen value of a Matrix and its corresponding Eigen Vector.

I (28.1, 28.2 (2), 28.2(3), 28.3, 32.1, 32.3, 32.4, 32.5, 32.7, 28.7(2), 28.9)

UNIT V

LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER 07 hrs

Definition and General form of Linear differential equation of higher order; the operator D; complete solution of Linear differential equation as a sum of complementary function (C.F) and particular integral (P.I); Rules for finding the complementary function; the inverse operator $1/f(D)$; Rules for finding Particular integral; method of variation of parameter to find the Particular integral; Cauchy and Legendre Homogenous Linear equations; Simultaneous Linear equations with constant coefficients.

I (13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 13.9, 13.11)

UNIT VI

SERIES SOLUTION OF DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTION

08 hrs

Series solution of Differential equations (Method of Frobenius); Validity of series solution; series solution when $X=0$ is an ordinary point of the equation; series solution when $X=0$ is a regular singularity of the equation.

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Bessel equation-Bessel functions Equations Reducible to Bessel's equation
Orthogonality of Bessel functions; Legendre's differential equation; Legendre
Polynomials; Rodrigue's formula; Orthogonality of Legendre polynomials.

I (16.1,16.2,16.3,16.4,16.5,16.10,16.11,16.13,16.14,16.17)

UNIT VII

FOURIER SERIES

07 hrs

Introduction,Euler's formulae,conditions for Fourier expansion,Functions having points of discontinuity,change of interval,Even and Odd functions,Half range series,Practical Harmonic Analysis.

I (10.1, 10.2, 10.3, 10.4, 10.5, 10.6(1), 10.7, 10.11)

UNIT VIII

FOURIER TRANSFORMS AND Z-TRANSFORMS

08 hrs

Introduction,Fourier Integral theorem(only statement),Infinite complex complex Fourier Transforms,Properties of complex Fourier Transforms,Convolution theorem of complex Fourier Transforms,Parseval's identity.Infinite Fourier sine and Cosine Transform.

Introduction to Z-Transform,Definition,some standard Z-Transforms,Linearity property,Damping rule,Shifting rule,Inverse Z-Transforms,Application of Z-Transformsto solve Difference equations.

I (22.1 to 22.7 and 23.1 to 23.7,23.15,23.16)

Text Book:

1. Higher Engineering Mathematics, Dr. B.S.Grewal, 41st Edition 2012, Khanna publishers, Delhi.

Reference books:

1. Advanced Engineering Mathematics, H.K. Dass, 17th Revised Edition 2007, S.Chand & Company Ltd, New Delhi.
2. Text book of Engineering Mathematics, N.P. Bali and Manish Goyal, 8th Edition 2011, Laxmi Publication (P) Ltd

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 102

COMPUTER CONCEPTS & C PROGRAMMING

UNIT I

INTRODUCTION TO COMPUTER SYSTEMS

07 hrs

Introduction, The computer defined, Basic parts and structure of computer system, Categorizing computers, Information processing life cycle, Essential computer hardware, Essential computer software, Input device, Inputting data in other ways, Output devices.

I (1.1, 1.2, 1.4 to 1.11)

UNIT II

STORAGE DEVICE CONCEPTS, OPERATING SYSTEMS AND NETWORK

08 hrs

Introduction, Number systems and computer codes, Central processing unit, Motherboard, Storage media, Software, Operating system, Computer processing techniques, Memory management techniques, Computer networks.

I (2)

UNIT III

FUNDAMENTALS OF PROBLEM SOLVING AND INTRODUCTION TO C 07 hrs

Introduction, Problem solving, System development programs, Creating and running a program, Software development steps, Applying software development method, Introduction to C, Basic structure of C programs, Programming style, Program development steps, Unix system, MS-DOS system

I (3)

UNIT IV

CONSTANTS, VARIABLES, AND DATA TYPES 08 hrs

Introduction, Character set, C tokens, Declaration of variables, Declaration of storage class, Assigning values to variables, Defining symbolic constants, Declaring a variable as constant, Declaring a variable as volatile, Overflow and underflow of data, Some additional examples

MANAGING INPUT AND OUTPUT OPERATIONS

Introduction, Reading a character, Writing a character, Formatted input, Formatted output

I (4, 5)

UNIT V

STRUCTURE OF A C PROGRAM 07 hrs

Operators and Expressions: Introduction, Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and decrement operators, Conditional operator, Bitwise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of arithmetic operators, Some computational problems, Type conversions in expressions, Operator precedence and associativity, Mathematical functions.

I (6)

UNIT VI

FUNCTIONS 08 hrs

User-Defined Functions: Introduction, Need for user-defined functions, A multi-function program, Elements of user-defined functions, Definition of functions, Return values and their types, Function calls, Function declaration, Category of functions, No arguments and no return values, Arguments but no return values, No arguments but returns a value, Functions that return multiple values, Nesting of functions, Recursion, Passing arrays to functions, Passing strings to functions, The scope, visibility and lifetime of variables, Multifile programs

I (7)

UNIT VII

SELECTION – MAKING DECISIONS AND REPETITIONS 07 hrs

Decision Making and Branching: Introduction, Decision making with if statement, Simple if statement, The if...else statement, Nesting of if...else statements, The else if ladder, The switch statement, The ?: Operator, The goto statement

Decision Making and Looping: Introduction, The while statement, The do statement, The for statement, Jumps in loops

I (8, 9)

UNIT VIII

ARRAYS AND STRINGS 08 hrs

Arrays: Introduction, One-dimensional arrays, Declaration of one-dimensional arrays, Initialization of one-dimensional arrays, Two-dimensional arrays, Initializing two-dimensional arrays, Multi-dimensional arrays, Dynamic arrays, Some additional examples

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Character arrays and strings: Introduction, Declaring and initializing string variables, Reading strings from terminal, Writing strings to screen, Arithmetic operations on characters, Putting strings together, Comparison of two strings, String-handling functions, Table of strings,

I (10.1 to 10.8, 10.10, 11.1 to 11.9)

Text Book:

1. Computer Concepts and Programming in C, E. Balagurusamy, Tata McGraw- Hill, 2010

Reference Books:

1. Introduction to Computers, Peter Norton, 7th Edition (Special Indian Edition), Tata McGraw-Hill, 2011
2. Programming with C, 2nd Edition (Special Indian Edition) Schaum's Outline Series, Tata McGraw-Hill, 2006
3. Computer Science – A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, 3rd Edition, CENGAGE Learning, 2007

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 103

ANALOG AND DIGITAL ELECTRONICS

PART A: ANALOG ELECTRONICS

UNIT I

BASIC SEMICONDUCTOR AND PN JUNCTION THEORY

04 hrs

Introduction; Atomic Theory; Conduction in Solids; Conductors, Semiconductors and Insulators; n-type and p-type Semiconductors; The p-n Junction; Biased Junctions.

I (1.1, 1.2, 1.3, 1.4, 1.6, 1.7)

SEMICONDUCTOR DIODES

04 hrs

Introduction; p-n Junction Diode; Characteristics and Parameters; Diode Approximations; DC Load Line Analysis; Temperature Effects; Diode AC Models; Zener Diodes.

I (2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.9)

UNIT II

DIODE APPLICATIONS

07 hrs

Introduction; Half Wave Rectification; Full Wave Rectification; Half Wave Rectifier DC Power Supply; Full Wave Rectifier DC Power Supply; RC and LC Power Supply Filters; Power Supply Performance and Testing; Zener Diode Voltage Regulators; Series Clipping Circuits; Shunt Clipping Circuits; Clamping Circuits; DC Voltage Multipliers.

I (3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10)

UNIT III

BIPOLAR JUNCTION TRANSISTORS

04 hrs

Transistor Operation; Transistor Voltages and Currents; Amplification; Switching; Common Emitter Characteristics.

I (4.1, 4.2, 4.3, 4.4, 4.6)

BJT BIASING

04 hrs

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DC Load Line and Bias Point; Base Bias; Collector to Base Bias; Voltage Divider Bias; Comparison of Basic Bias Circuits; Bias Circuit Design; Thermal Stability of Bias Circuits.

I (5.1, 5.2, 5.3, 5.4, 5.5, 5.7, 5.9)

UNIT IV

AMPLIFIERS AND OSCILLATORS

07 hrs

Decibels and Half Power Points; Single Stage CE Amplifier; Capacitor Coupled Two Stage CE Amplifier; Series Voltage Negative Feedback; Additional Effects of Negative Feedback; The BJT Phase Shift Oscillators; BJT Colpitts and Hartley Oscillator.

I (8.2, 12.1, 12.3, 13.1, 13.7, 16.1, 16.2, 16.3)

PART B: DIGITAL ELECTRONICS

UNIT V

INTRODUCTORY CONCEPTS

03 hrs

Introduction; Numerical Representations; Digital and Analog Systems; Digital Number Systems; Representing Binary Quantities; Digital Circuits / Logic Circuits; Parallel and Serial Transmission; Memory; Digital Computers.

II (1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8)

NUMBER SYSTEMS AND CODES

04 hrs

Introduction; Binary to Decimal Conversions; Decimal to Binary Conversions; Octal Number System; Hexadecimal Number System; BCD Code; Gray Code; Putting it all together; The Byte; Nibble and Word; Alphanumeric Codes; Parity Method for Error Detection.

II (2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10)

UNIT VI

DESCRIBING LOGIC CIRCUITS

04 hrs

Introduction; Boolean Constants and Variables; Truth Tables: OR, AND, NOT Operations; NOR, NAND Gates; Boolean Theorems; De-Morgan's Theorems; Universality of NAND and NOR Gates.

II (3.1, 3.2, 3.3, 3.4, 3.5, 3.9, 3.10, 3.11, 3.12)

COMBINATIONAL LOGIC CIRCUITS

04 hrs

Introduction; Sum of Product Form; Simplifying Logic Circuits; Algebraic Simplification; Designing Combinational Logic Circuits; Karnaugh Map Method (3 and 4 Variables); Exclusive OR and Exclusive NOR Circuits.

II (4.1, 4.2, 4.3, 4.4, 4.5, 4.6)

UNIT VII

DIGITAL ARITHMETIC OPERATIONS AND CIRCUITS

04 hrs

Introduction; Binary Addition; Representing Signed Numbers; Addition and Subtraction in 2's Complement System; BCD Addition; Arithmetic Circuits; Parallel Binary Adder; Design of a Full Adder; Carry Propagation; BCD Adder.

II (6.1, 6.2, 6.3, 6.4, 6.7, 6.9, 6.10, 6.11, 6.13, 6.16)

MSI LOGIC CIRCUITS

04 hrs

Introduction; Decoders; Encoders; Multiplexers; De-Multiplexers; Magnitude Comparator.

II (9.1, 9.4, 9.5, 9.7, 9.8)

UNIT VIII

FLIP-FLOPS AND THEIR APPLICATIONS

04hrs

Introduction; NAND Gate Latch; NOR Gate Latch; Digital Pulses; Clock Signals and Clocked Flip-Flops; Clocked SR Flip-Flop; Clocked JK Flip-Flop; Clocked D Flip-Flop; D Latch.

II (5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8)

COUNTERS AND REGISTERS

03 hrs

Introduction; Asynchronous Counters; Propagation Delay in Ripple Counters; Synchronous (Parallel) Counters; Counters with MOD Numbers $< 2^N$; Integrated Circuit Registers; Parallel In / Serial Out; Parallel In / Parallel Out; Serial In / Serial Out; Serial In / Parallel Out registers; Shift Register Counters.

II (7.1, 7.4, 7.5, 7.6, 7.15, 7.16, 7.17, 7.18, 7.19, 7.21)

Text Books:

- I. Electronic Devices and Circuits, Fifth Edition, David A Bell, OXFORD University Press, Thirteenth Impression-2010.
- II. Digital Systems – Principles and Applications, Tenth Edition, Ronald J Tocci, Neal S Widmer and Gregory L. Moss, Pearson Education, 2011.

Reference Books:

1. Electronic Devices and Circuits, I.J. Nagrath, PHI, 2007.
2. Digital Electronics and Microprocessors – Problems and Solutions, R. P. Jain, 2007, Tata-McGraw Hill.
3. Digital Fundamentals, Thomas L. Floyd and R. P. Jain, Eighth edition, Pearson Education Publisher.

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks, selecting at least **TWO** questions from each Part.

AT 104

DATA STRUCTURES WITH C & C++

UNIT I

INTRODUCTION TO DATA STRUCTURES

08 hrs

Definition, Algorithms, Complexities, Program Design, Abstract Data Types, Generic Abstract Data Types

POINTERS AND DYNAMIC MEMORY MANAGEMENT

Declaration of a Pointer, Pointers and One-Dimensional Arrays, Pointers and Two-Dimensional Arrays, Arrays of Pointers, Pointers and Strings, Pointers, Structures and Class, Pointers and Functions, Pointer to a Pointer, Dynamic Memory Management

I (1, 4)

UNIT II

STACKS AND QUEUES

07 hrs

Stack, Stack Representation and Implementation, Stack Operations, Applications of Stack, Multiple Stack, Queue, Queue Representation and Implementation, Queue Operations, Types of Queue

I (5)

LINKED LIST

07 hrs

Linked List as Data Structure, Representation of Linked List, Operations on the Linked List, Comparison between Array and Pointer Representation of Linked List, Stack as a Linked List, Queue as a Linked List, Doubly Linked List, Circular Linked List, Representation of Circular Linked List, Josephus Problem, Applications of Linked List

I (6)

UNIT IV

TREE

08 hrs

Definition of Tree, Binary Tree, Representation of a Tree, Operations on the Binary Tree, Expression Tree, General Tree, Threaded Binary Tree, Binary Search Tree, Balanced Tree, Advantages and Disadvantages of Tree Data Structures

I (7)

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UNIT V

GRAPH **07 hrs**
Graph terminologies, Types of Graph, Representation of Graph, Traversal of Graph, The Minimum Spanning Tree, The Shortest Path
I (8)

UNIT VI

SEARCHING **07 hrs**
Types of Searching, Hashing, Hash Functions, Collision and Collision Resolution Techniques
I (9)

UNIT VII

SORTING ALGORITHMS **08 hrs**
Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Heap Sort, Merge Sort, Radix Sort
I (10)

UNIT VIII

FILES **08 hrs**
Classification of Files, File Organization, Basic Operations with Files in C++, Basic Operations with Files in C,
I (11)

Text Book:

I. Data Structures using C & C++, Rajesh K. Shukla, Wiley India. 2009

Reference Books:

1. Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Ellis, Sahni, Sartaj & Anderson-Freed, Susan, Universities Press, 2008
2. Data Structures using C and C++, 2nd Edition, Langsam Yedidyah, Augenstein Moshe J, Tenenbaum Aaron M., PHI

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 105

OBJECT ORIENTED PROGRAMMING WITH C++

UNIT I

OVERVIEW **07 hrs**
Programming Paradigms, Need for Object-Oriented Programming, Basics of OOP, OO Languages, Structure of C++ Program, Some Terminologies, First C++ Program, Getting familiar with OOP terms

DECLARATIONS AND EXPRESSIONS

Introduction – Fundamental Data types, Qualifiers, Reference Data types, Variables, Constants, Operators and Expressions, Operator Precedence and Associativity.

I (1.1.3, 1.2, 1.3, 1.4, 1.5.1, 1.5.2, 1.6, 1.7, 2.1)

UNIT II

STATEMENTS **08 hrs**
Introduction – Labeled Statement, Expression Statement, Compound Statement, Control Statement, Jump Statement, Declaration Statement

ARRAY, POINTER AND STRUCTURE

Introduction – Array, Addresses and Pointers, Pointers and Functions, Structure

I (3.1, 4.1)

UNIT III

FUNCTIONS

07 hrs

Introduction – Declaration, Definition and Call, *Inline* Functions, *main* Function Arguments, Reference Variables, Function Overloading, Default Arguments, Parameter Passing, Recursion, Scope of Variables, Return – by – value and Return – by – reference, Pointers to Functions

I (5)

UNIT IV

**DATA ABSTRACTION THROUGH CLASSES
AND USER-DEFINED DATA TYPES**

07 hrs

Introduction, Class – Class Members, Controlling access to Members of a Class, Constructor, Destructor, Dynamic Memory Management

I (8)

UNIT V

OPERATOR OVERLOADING

08 hrs

Introduction – Restrictions, Overloading Unary Operators, Overloading Binary Operators, Overloaded Function Calls, Overloaded Subscripting, Overloaded Class Member Access, Cast operator, User-defined Conversions, Overloaded Increment and Decrement, Overloaded Non-member Operator, Overloaded *new* and *delete*

I (9)

UNIT VI

CLASS RELATIONSHIPS

08 hrs

Introduction, Polymorphism, Inheritance

I (10)

UNIT VII

TEMPLATE

07 hrs

Class Template, Member Function Inclusion, Function Template, Parameter Values for Templates, Template Specialization, Template Inheritance, Namespace, Named Namespace, Using Named Namespace, Namespace Alias, Unnamed Namespace, Exception Handling

I (11.2, 11.3)

UNIT VIII

THE STANDARD LIBRARY IN C++

08 hrs

Standard Library Functions – Input and Output, *iostream* class Hierarchy, Class *ios*, Other Stream Classes, Standard Template Library

I (12)

Text Book:

- I. C++ and Object-Oriented Programming Paradigm, Debasish Jana, 2nd Edition, PHI, 2005

Reference Books:

1. Big C++, Cay Horstmann, Timothy A. Budd, Wiley India, 2006.
2. C++ Primer, Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, 4th Edition, Addison Wesley, 2005

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

Reference Books:

1. Computer Organization & Architecture, William Stallings, 8th Edition, PHI, 2010
2. Computer Systems Design and Architecture, Vincent P. Heuring, Harry F. Jordan & T. G. Venkatesh, 2nd Edition, Pearson Education, 2008

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 141 DATA STRUCTURES WITH C & C++ LAB

List of Experiments

1. Write a C program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by a given integer x .
2. Write a C program to print the Floyd's triangle given below
1
2 3
4 5 6
7 8 9 10
11 15
3. Given a number, write a C program using *while* loop to reverse the digits of the number. For eg., the number 12345 should be printed as 54321.
4. Write a C program to read n numbers into an array, and compute the mean, variance and standard deviation of these numbers.
5. Write a C program which will read some text and count all occurrences of a particular word.
6. Use recursive calls to evaluate $f(x) = x - x^3/3! + x^5/5! - x^7/7! + \dots$
7. Write a program to read in an array of names and to sort them in alphabetical order.
8. Write a program to multiply two matrices using array of pointers.
9. Sort a sequence of n integers using Quick sort technique and then search for a key in the sorted array using Binary search technique.
10. Write an interactive C/C++ program to create a linear linked list of customer names and their telephone numbers. The program should be menu-driven and include features for adding a new customer, deleting an existing customer and for displaying the list of all customers.
11. Write a C/C++ program to create a circular linked list so that the input order of data items is maintained. Add the following functions to carry out the following operations on circular linked lists.
 - a. Count the number of nodes.
 - b. Write out the contents.
 - c. Locate and write the contents of a given node.
12. Write a C/C++ program to merge two circular linked lists.
13. Write a C/C++ program that will remove a specified node from a given doubly linked list and insert it at the end of the list. Also write a function to display the contents of the list.
14. Write a C/C++ program to implement a queue in which insertions, deletions and display can be performed.
15. Write a C/C++ program to construct a binary tree and do inorder, preorder and postorder traversals, printing the sequence of vertices visited in each case.

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16. Write a C/C++ program which accepts a graph as an adjacency matrix, and which performs depth first traversal on it and prints out the sequence of vertices visited.

Note:

- All the programs have to be executed using **Turbo C/C++** or similar environment.

AT 107

ENGINEERING MATHEMATICS – II

UNIT I

COMPLEX ANALYSIS

08 hrs

Introduction; Function of complex variable $w = f(z)$; Limit of a complex function; continuity of $w = f(z)$; Derivative of $f(z)$; Analytic function; Cauchy Riemann equations (both in Cartesian and polar form); Harmonic functions; Application to flow problems; construction of Analytic functions using Milne Thomson method; Geometric representation of $w = f(z)$; standard transformation; Bilinear transformation; conformal transformation; Special conformal Transformations. Schwarz-Christoffel Transformation.

I (20.1, 20.2(1), 20.2(2), 20.3(1), 20.3(2), 20.4, 20.5(1), 20.6, 20.7, 20.8, 20.9, 20.10, 20.11)

UNIT II

COMPLEX INTEGRATION

07 hrs

Line integral of $w=f(z)$; Cauchy's theorem; Cauchy's integral formula; Morera's theorem; Series of complex terms; Taylor's and Laurent's series; singularities of analytic function; Types of singularities; Residues, calculation of residues. residue theorem

I (20.12, 20.13, 20.14, 20.15, 20.16, 20.17, 20.18, 20.19)

UNIT III

VECTOR CALCULUS

08 hrs

Introduction to vectors; Differentiation of vectors; curves in space; velocity and acceleration; scalar and vector point functions; vector operator del; Del applied to scalar point functions; Gradient; Del applied to vector point functions; Divergence and curl; Physical interpretation of Divergence and Curl; Del applied twice to point functions and products of point functions; vector identities.

I (8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7(1), 8.7(2), 8.8, 8.9)

UNIT IV

VECTOR INTEGRATION

08 hrs

Integration of vectors; Line integral; surfaces; surface integral; Green's theorem in a plane (only statement and problems); Stoke's theorem (only statement and problems); volume integral; Gauss divergence theorem (only statement and problem).

I (8.10 to 8.16)

UNIT V

NUMERICAL METHODS

07 hrs

Finite differences, Forward and Backward differences, Interpolation, Newton- Gregory Forward and Backward Interpolation, Interpolation with unequal intervals, Lagrange's and Newton general Interpolation formula, Inverse Interpolation, Numerical differentiation using Newton-Gregory Forward and Backward Interpolation formula.

Numerical Integration, Newton-cote's quadrature formula, Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rules.

I (29.1, 29.2, 29.6, 29.9, 29.10, 29.11, 29.12, 29.13, 30.1, 30.2(1), 30.2(2), 30.4, 30.5, 30.6, 30.7, 30.8)

UNIT VI

PARTIAL DIFFERENTIAL EQUATION

07 hrs

Introduction; Formulation of partial differential equations; solutions of a partial differential equations; Equations solvable by direct integration; Lagrange's linear partial differential equation of first order; Solutions of non linear partial differential equations by Charpit's method; Solution of homogenous partial differential equation by the method of separation of variables.

I (17.1, 17.2, 17.3, 17.4, 17.5, 17.7, 18.2)

UNIT VII

THEORY OF PROBABILITY

07 hrs

Introduction; Basic terms and definitions; probability and set notation; theorem of total probability; independent events; theorem of compound probability; conditional probability; Baye's theorem.

I (26.1, 26.2, 26.3, 26.4, 26.5(1), 26.5(2), 26.6)

UNIT VIII

RANDOM VARIABLES

08 hrs

Random Variable; Discrete and continuous random variables; discrete and continuous probability distribution; probability mass and density function; mean and variance of discrete and continuous probability distribution; theoretical distributions; Binomial distribution; constants of the Binomial distribution; Binomial frequency distribution; Poisson's distribution, constants of the Poisson distribution, Normal distribution.

I (26.7, 26.8(1), 26.9, 26.10, 26.14(1), 26.14(2), 26.14(3), 26.14(4), 26.15(1), 26.15(2), 26.15(3), 26.16)

Text Book:

1. Higher Engineering Mathematics –Dr. B.S.Grewal, 41st Edition 2007, Khanna Publishers, Delhi.

Reference books:

1. Advanced Engineering Mathematics- H.K. Dass- 17th Revised Edition 2007, S.Chand & Company Ltd, New Delhi.
2. A Text book of engineering Mathematics – N.P. Bali and Manish Goyal , 8th Edition 2011, Laxmi Publication(P) Ltd.

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 108

MICROPROCESSORS & MICROCONTROLLERS

UNIT I

INTRODUCTION TO MICROPROCESSORS

08 hrs

Evolution of Microprocessors, Fundamentals of a Computer, Number Representation – Unsigned binary integers, Signed binary integers; Fundamentals of Microprocessor – description of 8085 pins, Programmer's view of 8085, Registers A, B, C, D, E, H and L First Assembly Language Program; Instruction set of 8085 – Data transfer group, Arithmetic group, Logical group, NOP and Stack group of instructions

I (1, 2, 3.1, 3.2, 4.2, 4.3, 4.4, 4.5, 5, 6, 7, 8, 9)

UNIT II

INTRODUCTION TO MICROPROCESSORS (CONTD) **08 hrs**
Instruction set of 8085 continued – Branch group, Chip select logic, Addressing of I/O ports, Architecture of 8085 – Details of 8085 architecture, Instruction cycle, Comparison of different machine cycles
I (10, 11, 12, 13.1, 13.2, 13.3)

UNIT III

ASSEMBLY LANGUAGE PROGRAMS **07 hrs**
Exchange 10 bytes, Add 2 multibyte numbers, Add 2 multibyte BCD numbers, Block movement without overlap, Monitor routines, Multiply two numbers
Linear search, Find the smallest number, HCF of two numbers, Convert BCD to binary, Convert binary to BCD
I (14.1 to 14.4, 14.6.1, 16.1, 16.2, 16.3, 16.7.1, 16.7.2, 16.8.1, 16.8.2)

UNIT IV

INTERRUPTS IN 8085 **07 hrs**
Data transfer schemes, 8085 interrupts, EI and DI instructions, INTR and INTA* pins, RST 5.5, RST 6.5, RST 7.5, and TRAP pins, SIM and RIM instructions, 8255 Programmable peripheral interface chip
Description of 8255, Operational modes, Control port of 8255
I (18.1 to 18.7, 18.9, 20.1 to 20.3)

UNIT V

PROGRAMS USING INTERFACE MODULES **07 hrs**
Logic controller interface, Evaluation of Boolean expression, Decimal counter, Simulation of 4-bit ALU, Interfacing of I/O devices.
Interfacing of 7-segment display, Interfacing simple keyboard, Interfacing a matrix keyboard, Intel 8279 Keyboard and Display controller
I (21.1.1, 21.1.3, 21.1.4, 22.1, 22.3, 22.4, 22.6)

UNIT VI

INTEL 8259A- PROGRAMMABLE INTERRUPT CONTROLLER **08 hrs**
Need for interrupt controller, Overview of 8259, Pins of 8259, Registers of 8259, Programming with no slaves – ICW1, ICW2, ICW3, ICW4, OCW1
Intel 8257 – Programmable DMA controller
Concept of DMA, Need for DMA, Description of 8257, Programming the 8257, Pins of 8257, Working of 8257
I (23.1 to 23.4, 23.5.1 to 23.5.5, 24.1 to 24.6)

UNIT VII

INTEL 8253 – PROGRAMMABLE INTERVAL TIMER **08 hrs**
Need for programmable interval timer, Description of 8253, Programming the 8253, Mode 0, Mode 1, Mode 3 operations
Intel 8251A – Universal synchronous asynchronous receiver transmitter
Need for USART, Asynchronous transmission, Asynchronous reception, Synchronous transmission, Synchronous reception, Pin description of 8251, Programming the 8251
I (25.1 to 25.5, 25.7, 26.1 to 26.7)

UNIT VIII

8051 MICROCONTROLLER **07 hrs**
Main features, Functional blocks, Program memory structure, Data memory structure, Programmer's view, Addressing modes, Instruction set, Programming examples
I (29)

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Text Book:

1. The 8085 Microprocessor; Architecture, Programming and Interfacing, K. Udaya Kumar and B. S. Umashankar, Pearson Education, 2008

Reference Books:

1. Microprocessor Architecture, Programming and Applications with the 8085, 5th Edition, R. S. Gaonkar, Penram International Publishing (India), 2011
2. The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, 2nd Edition, Pearson Education, 2009

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 109

UNIX & SHELL PROGRAMMING

UNIT I

INTRODUCTION

08 hrs

The UNIX Operating System, Knowing Your Machine, A Brief Session

THE UNIX ARCHITECTURE AND COMMAND USAGE

The UNIX Architecture, Features of UNIX, POSIX and the Single UNIX Specification, Locating Commands, Internal and External Commands, Command Structure, Flexibility of Command Usage, Man Browsing the Manual Pages On-line, Understanding the man Documentation, Further Help with man –k, apropos and whatis, When Things Go Wrong

THE FILE SYSTEM

The File, What's in a (File)name, The Parent-Child Relationship, The HOME Variable: The Home Directory, pwd: Checking Your Current Directory, cd: Changing the Current Directory, mkdir: Making Directories, rmdir: Removing Directories, Absolute Pathnames, Relative Pathnames, ls: Listing Directory Contents, The UNIX File System

HANDLING ORDINARY FILES

cat: Displaying and Creating Files, cp: Copying a File, rm: Deleting Files, mv: Renaming Files, more: Paging Output, The lp Subsystem: Printing a File, file: Knowing the File Types

I (1.2 to 1.4, 2, 4, 5.1 to 5.7)

UNIT II

BASIC FILE ATTRIBUTES

07 hrs

ls –l: Listing File Attributes, The –d Option: Listing Directory Attributes, File Ownership, File Permissions, chmod: Changing File Permissions, Directory Permissions, Changing File Ownership

THE vi EDITOR

vi Basics, Input Mode-Entering and Replacing Text, Saving Text and Quitting – The ex Mode, Navigation, Editing Text, Undoing Last Editing Instructions, Repeating the Last Command, Searching for a Pattern, Substitution – Search and Replace

I (6, 7)

UNIT III

THE SHELL

08 hrs

The Shell's Interpretive Cycle, Shell Offerings, Pattern Matching –The Wild-cards, Escaping and Quoting, Redirection: The Three Standard Files, /dev/null and /dev/tty: Two Special Files, Pipes, tee: Creating a Tee, Command Substitution, Shell Variables

THE PROCESS

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Process Basics, ps: Process Status, System Processes, Mechanism of Process Creation, Internal and External Commands, Process States and Zombies, Running Jobs in Background, nice: Job Execution with Low Priority, Killing Processes with Signals, Job Control, at and batch: Execute Later, cron: Running Jobs Periodically, time: Timing Processes

CUSTOMIZING THE ENVIRONMENT

The Shells, Environment Variables, The Common Environment Variables, Aliases, Command History, In-line Command Editing, Miscellaneous Features, The Initialization Scripts

I (8, 9, 10)

UNIT IV

MORE FILE ATTRIBUTES

07 hrs

File Systems and Inodes, Hard Links, Symbolic Links and In, The Directory, unmask: Default File and Directory Permissions, Modification and Access Times, find: Locating Files

SIMPLE FILTERS

The Sample Database, pr: Paginating Files, head; Displaying the Beginning of a File, tail: Displaying the End of a File, cut: Slitting a File Vertically, paste: Pasting Files, sort: Ordering a File, uniq: Locate Repeated and Nonrepeated Lines, tr: Translating Characters, An Example: Displaying a Word-count List

I (11, 12)

UNIT V

FILTERS USING REGULAR EXPRESSIONS – grep AND sed

08 hrs

Grep: Searching for a Pattern, Basic Regular Expressions (BRE) – An Introduction, Extended Regular Expressions (ERE) and egrep, sed: The Stream Editor, Line Addressing, Using Multiple Instructions, Context Addressing, Writing Selected Lines to a File, Text Editing, Substitution, Basic Regular Expressions Revisited

I (13)

UNIT VI

ESSENTIAL SHELL PROGRAMMING

07 hrs

Shell Scripts, read: Making Scripts Interactive, Using Command Line Arguments, exit and Exit Status of Command, The Logical Operators && and || - Conditional Execution, The if Conditional, Using test and [] to Evaluate Expressions, The case Conditional, expr: Computation and String Handling, \$0: Calling a Script by Different Names, while: Looping, for: Looping with a List, Set and Shift: Manipulating the Positional Parameters, The Here Document, trap: Interrupting a Program, Debugging Shell Scripts with set -x, Sample Validation and Data Entry Scripts

I (14)

UNIT VII

awk – AN ADVANCED FILTER

07 hrs

Simple awk Filtering, Splitting a Line into Fields, printf: Formatting Output, Variables and Expressions, The Comparison Operators, Numbering Processing, Variables, The -f Option: Storing awk Programs in a File, The BEGIN and END Sections, Built-in Variables, Arrays, Functions, Control Flow – The if Statement, Looping with for, Looping with while

I (18)

UNIT VIII

perl – THE MASTER MANIPULATOR

08 hrs

perl Preliminaries, The chop Function: Removing the Last Character, Variables and Operators, The String Handling Functions, Specifying Filenames in Command Line, \$-:

Regulations and Syllabi for AMIETE (IT) Examination

The Default Variable, Current Line Number and the Range Operator, Lists and Arrays, foreach: Looping Through a List, split: Splitting into a List or Array, join: Joining a List, dec2bin.pl: Converting a Decimal Number to Binary, grep: Searching an Array for a Pattern, Associative Arrays, Regular Expressions and Substitution, File Handling, File Tests, Subroutines

I (19)

Text Book:

1. UNIX Concepts and Applications, 4th Edition, Sumitabha Das, Tata McGraw Hill, 2008

Reference Books:

1. UNIX and Shell Programming, Behrouz A Forouzan and Richard F. Gilberg, Cengage Learning, 2003
2. UNIX Shell Programming, 3rd Edition, Stephan G. Kochan, Patrick wood, Pearson Education, 2009

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

1

2 AT 110 OPERATING SYSTEMS & SYSTEMS SOFTWARE

PART A: OPERATING SYSTEMS

UNIT I

EVOLUTION OF OS FUNCTIONS **07 hrs**

OS Functions, Evolution of OS Functions, Batch Processing Systems, Multiprogramming Systems, Time Sharing Systems, Real Time Operating Systems, OS Structure

PROCESSES

Process Definition, Process Control, Interacting Processes, Implementation of Interacting Processes, Threads

I (9, 10)

UNIT II

SCHEDULING **08 hrs**

Scheduling Policies, Job Scheduling, Process Scheduling

DEADLOCKS

Definitions, Resource Status Modeling, Handling Deadlocks, Deadlock Detection and Resolution, Deadlock Avoidance

I (11.1 to 11.3, 12.1 to 12.5)

UNIT III

PROCESS SYNCHRONIZATION **08 hrs**

Implementing Control Synchronization, Critical Sections, Classical Process Synchronization Problems, Semaphores

FILE SYSTEMS

Directory Structures, File Protection, Allocation of Disk Space, Implementing File Access, File Sharing

I (13.1 to 13.3, 13.5, 17.1 to 17.5)

UNIT IV

MEMORY MANAGEMENT **07 hrs**

Memory Allocation Preliminaries, Contiguous Memory Allocation, Noncontiguous Memory Allocation, Virtual Memory Using Paging, Virtual Memory Using Segmentation

I (15)

PART B: SYSTEM SOFTWARE

UNIT V

LANGUAGE PROCESSORS

07 hrs

Introduction, Language Processing Activities, Fundamentals of Language Processing, Fundamentals of Language Specification, Language Processor Development Tools

DATA STRUCTURES FOR LANGUAGE PROCESSING

Search Data Structures, Allocation Data Structures

I (1, 2)

UNIT VI

SCANNING AND PARSING

08 hrs

Scanning, Parsing

MACROS AND MACRO PROCESSORS

Macro Definition Call, Macro Expansion, Nested Macro Calls

LINKERS

Relocation and Linking Concepts, Design of a Linker, Self-Relocating Programs

I (3, 5.1 to 5.3, 7.1 to 7.3)

UNIT VII

ASSEMBLERS

07 hrs

Elements of Assembly Language Programming, A Simple Assembly Scheme, Pass Structure of Assemblers, Design of A Two Pass Assembler, A Single Pass Assembler for IBM-PC

I (4)

UNIT VIII

COMPILERS AND INTERPRETERS

08 hrs

Aspects of Compilation, Memory Allocation, Compilation of Expressions, Compilation of Control Structures, Code Optimization, Interpreters

I (6)

Text Book:

1. Systems Programming and Operating Systems, D. M. Dhamdhere, Tata McGraw-Hill, Second Revised Edition, 2005

Reference Books:

1. Operating System Concepts by [Abraham Silberschatz](#), [Peter Baer Galvin](#), [Greg Gagne](#), [Peter Baer Galvin](#), International Student Version, 8th Edition, Wiley, 2009
2. Operating Systems Internals and Design Principles, 6th Edition, William Stallings, Pearson Education, 2009
3. Operating Systems Design and Implementation, Third Edition, Andrew S. Tanenbaum, Albert S. Woodhull, Pearson Prentice Hall, 2006

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks, selecting atleast **TWO** questions from each part.

AT 111

COMPUTER GRAPHICS & VISUALIZATION

UNIT I

A SURVEY OF COMPUTER GRAPHICS

08 hrs

Graphs and Charts, Computer-Aided Design, Virtual-Reality Environments, Data Visualizations, Education and Training, Computer Art, Entertainment, Image Processing, Graphical User Interfaces

OVERVIEW OF GRAPHICS SYSTEMS

Video Display Devices, Raster-Scan Systems, Graphics Workstations and Viewing Systems, Input Devices, Hard-Copy Devices, Graphics Networks, Graphics on the Internet, Graphics Software, Introduction to OpenGL

I (1, 2)

UNIT II

GRAPHICS OUTPUT PRIMITIVES

07 hrs

Coordinate Reference Frames, Specifying a Two-Dimensional World-Coordinate Reference Frame in OpenGL, OpenGL Point Functions, OpenGL Line Functions, Line-Drawing Algorithms, Setting Frame-Buffer Values, OpenGL Curve Functions, Pixel Addressing and Object Geometry, Fill-Area Primitives, Polygon Fill Areas, OpenGL Polygon Fill-Area Functions, OpenGL Display Lists, OpenGL Display-Window Reshape Function

I (3.1 to 3.5, 3.7, 3.8, 3.14 to 3.16, 3.23, 3.24)

UNIT III

ATTRIBUTES OF GRAPHICS PRIMITIVES

07 hrs

OpenGL State Variables, Color and Gray Scale, OpenGL Color Functions, Point Attributes, Line Attributes, Curve Attributes, OpenGL Point-Attribute Functions, OpenGL Line Attribute Functions, Fill-Area Attributes, General Scan-Line Polygon-Fill Algorithm, Antialiasing

I (4.1 to 4.10, 4.17)

UNIT IV

GEOMETRIC TRANSFORMATIONS

08 hrs

Basic Two-Dimensional Geometric Transformations, Matrix Representations and Homogeneous Coordinates, Inverse Transformations, Two-Dimensional Composite Transformations, OpenGL Raster Transformation, Geometric Transformations in Three-Dimensional Space, Three-Dimensional Translation, Three-Dimensional Rotation, Three-Dimensional Scaling, Affine Transformations, OpenGL Geometric Transformation Functions

I (5.1 to 5.4, 5.7, 5.9 to 5.13, 5.16, 5.17)

UNIT V

VIEWING

08 hrs

Two-Dimensional Viewing: The Two-Dimensional Viewing Pipeline, The Clipping Window, Normalization and Viewport Transformations, OpenGL Two-Dimensional viewing Functions, Clipping Algorithms, Two-Dimensional Point Clipping, Two-Dimensional Line Clipping – Cohen-Sutherland Line Clipping and Liang-Barsky Line Clipping, Polygon Fill-Area Clipping – Sutherland-Hodgman Polygon Clipping
Three-Dimensional Viewing: Overview of Three-Dimensional Viewing Concepts, The Three-Dimensional Viewing Pipeline

I (6.1 to 6.6, selected topics from 6.7 and 6.8, 7.1, 7.2)

UNIT VI

VISIBLE-SURFACE DETECTION METHODS

07 hrs

Classification of Visible-Surface Detection Algorithms, Back-Face Detection, Depth-Buffer Method, OpenGL Visibility-Detection Functions

ILLUMINATION MODELS AND SURFACE-RENDERING METHODS

Light Sources, Surface Lighting Effects, Basic Illumination Models, Polygon-Rendering Methods, OpenGL Illumination and Surface-Rendering Functions

I (9.1 to 9.3, 9.14, 10.1 to 10.3, 10.10, 10.20)

UNIT VII

INTERACTIVE INPUT METHODS AND GRAPHICAL USER INTERFACES

08 hrs

Graphical Input Data, Logical Classification of Input Devices, Input Functions for Graphical Data, Interactive Picture-Construction Techniques, Virtual-Reality Environments, OpenGL Interactive Input-Device Functions, OpenGL Menu Functions, Designing a Graphical User Interface

I (11)

UNIT VIII

COMPUTER ANIMATION

07 hrs

Raster Methods for Computer Animation, Design of Animation Sequences, Traditional Animation Techniques, General Computer-Animation Functions, Computer-Animation Languages, Key-Frame Systems, Motion Specifications, Articulated Figure Animation, Periodic Motions, OpenGL Animation Procedures

HIERARCHICAL MODELING

Basic Modeling Concepts, Modeling Packages, General Hierarchical Modeling Methods, Hierarchical Modeling using OpenGL Display Lists

I (13, 14)

Text Book:

- I. Computer Graphics with OpenGL, 3rd Edition, Donad Hearn, M. Pauline Baker, Pearson Education, 2009

Reference Book:

1. Computer Graphics Using OpenGL, F. S. Hill, Jr., Stephen M. Kelley, 3rd edition, PHI, 2007

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 112

DATABASE MANAGEMENT SYSTEMS

UNIT I

DATABASES AND DATABASE USERS

08 hrs

Introduction, An Example, Characteristics of Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of using the DBMS Approach.

DATABASE SYSTEM - CONCEPTS AND ARCHITECTURE

Data models, Schemas, and Instances, Three-schema architecture and data independence, Database language and interfaces, The Database system environment, Centralized and Client/server Architectures for DBMS's, Classification of database management system.

DATA MODELING USING THE ENTITY-RELATIONSHIP MODEL

Regulations and Syllabi for AMIETE (IT) Examination

Using High-level Conceptual data models for database design, An Example database application, Entity types, Entity Sets, Attributes, and Keys, Relationship types, Relationship sets, Roles, and Structural Constraints, Weak entity types, Refining the ER design for the company database, E/R diagram, Naming Conventions, and Design Issues.

THE ENHANCED ENTITY-RELATIONSHIP (EER) MODEL

Subclasses, Superclasses, and Inheritance, Specialization and generalization

I (1.1 to 1.6, 2, 3.1 to 3.7, 4.1, 4.2)

UNIT II

THE RELATIONAL DATA MODEL AND RELATIONAL DATABASE CONSTRAINTS

08 hrs

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with the Constraint violations.

THE RELATIONAL ALGEBRA AND RELATIONAL CALCULUS

Unary relational operations: SELECT and PROJECT, Relational Algebra Operations from Set theory, Binary relational operations: JOIN and DIVISION, Additional relational operations, Examples of queries in relational algebra, The Tuple Relational Calculus

I (5, 6.1 to 6.6)

UNIT III

RELATIONAL DATABASE DESIGN BY ER - TO - RELATIONAL MAPPING

08 hrs

Relational database design using ER – to - Relational Mapping

SQL-99: SCHEMA DEFINITION, CONSTRAINTS, QUERIES AND VIEWS

SQL Data Definition and Data Types, Specifying Basic Constraints in SQL, Schema Change Statements in SQL, Basic Queries in SQL, More Complex SQL queries, Insert, Delete and Update Statements in SQL, Specifying Constraints as Assertions and Triggers, Views (Virtual tables) in SQL, Database programming: Issues and techniques, Embedded SQL, Dynamic SQL and SQLJ

I (7.1, 8.1 to 8.8, 9.1, 9.2)

UNIT IV

RELATIONAL DATABASE DESIGN

08 hrs

Informal design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms based on Primary keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Multivalued Dependencies and Fourth Normal Forms, Join Dependencies and Fifth Normal Forms.

I (10, 11.1 to 11.4)

UNIT V

DISTRIBUTED DATABASES AND CLIENT-SERVER ARCHITECTURES

07 hrs

Distributed database concepts, Data fragmentation, Replication, and Allocation techniques for distributed database design. Types of distributed database systems, Query processing in distributed database system. Overview of concurrency control and recovery in distributed databases, An overview of 3-tier client-server architecture.

I (25.1 to 25.6)

UNIT VI

TRANSACTION PROCESSING CONCEPTS

07 hrs

Introduction to Transaction Processing, Transaction and System Concepts - Desirable Properties of Transactions, Characterizing Schedules based on recoverability, Characterizing Schedules based on serializability. Concurrency Control Techniques - Two-phase Locking Techniques for Concurrency control, Concurrency Control based on

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Timestamp Ordering, Multiversion Concurrency Control Techniques, Validation (Optimistic) Concurrency Control Techniques, Granularity of Data Items and Multiple Granularity Locking

I (17.1 to 17.5, 18.1 to 18.5)

UNIT VII

DATABASE RECOVERY TECHNIQUES

07 hrs

Database Recovery Concepts, Recovery techniques – Recovery techniques based on deferred update, Recovery techniques based on immediate update, Shadow paging, The ARIES Recovery Algorithm

I (19.1 to 19.5)

UNIT VIII

SECURITY, ADVANCED MODELING, AND DISTRIBUTION

07 hrs

Introduction to database security issues, Discretionary access control based on granting and revoking privileges. Mandatory access control and role based access control for multilevel security. Introduction to statistical database security.

Introduction to flow control. Encryption and public key infrastructures. Privacy issues and preservation. Challenges of database security.

I (23.1 to 23.8)

Text Book:

1. Fundamentals of Database Systems, Ramez Elmasri, Shamkant B. Navathe, 5th Edition, Pearson Education, 2008

Reference Books:

1. Database System Concepts, Silberschatz, Abraham Korth, Sudarshan S., Fourth Edition, Mc-Graw Hill, 2006
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, Third Edition, Mc-Graw Hill, 2003

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 142

DBMS LAB

List of Experiments

1. Draw an ER diagram to capture the requirements as stated below:
A database is needed to capture information pertaining to the running of various clubs by the recreation cell of an institution.
 - Details such as name, date of birth, gender are needed for each member.
 - Club details are needed such as the activity type (oratorical, music, dance, instrumental music etc) and contact phone number.
 - Team details required to include team name and the days on which the team practices.
 - Tutor details such as tutor name, address and telephone number are also needed, along with details of the skill each tutor is qualified in.
 - Rules governing the involvement of members and tutors in the teams and clubs are as follows:
 - Members may head only one team and every team has to have a head. Tutors teach at least one team and every team has at least one tutor.
 - Every member must belong to at least one team and each team has a number of members.

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- Every team must belong to a club and clubs must have at least one team.
- Every club has a member who is the president but a member may only be president of one club.

Draw the ER Diagram for the above requirement. Map the ER diagram to the Relational Model.

Create tables identified and insert five tuples in each of the tables created. The students are required to carefully take care of the constraints on each of the table.

2. Draw an ER diagram for the registrar's office. to capture the requirements as stated below:

A university registrar's office maintains data about the following entities:

- (a) Courses, including number, title, syllabus and prerequisites;
- (b) Branch, including branch code, year of enrollment, semester, section
- (c) Students, including student –id, name, and program;
- (d) Instructors, including identification no, name, department, subjects.

Draw the ER Diagram for the above requirement. Map the ER diagram to the Relational Model.

Create tables identified and insert five appropriate tuples in each of the tables created. The students are required to carefully take care of the constraints on each of the table.

3. Consider the following three tables – SAILORS, RESERVES and BOATS having the following attributes

SAILORS (Sailid, Salname, Rating, Age)

RESERVES (Sailid, Boatid, Day)

BOATS (Boatid, Boat-name, Color)

Use the above schema and solve the queries using SQL

- i) Find the name of sailors who reserved green boat.
 - ii) Find the colors of boats reserved by "Ramesh"
 - iii) Find the names of sailors who have reserved a red or green boat.
 - iv) Find the Sailid's of sailors with age over 20 who have not registered a red boat.
4. Consider the following three tables MEMBERS, BOOKS, RESERVES having the following attributes

MEMBERS(Member-id, Member-name, Designation, Age, Qualification)

BOOKS(Book-id, Title, Author, Price, Publication)

RESERVES(Member-id, Book-id, Date)

Use the above schema and solve the following queries using SQL

- a. Find names of members who are Professors and over 45 years age.
- b. List the titles of books reserved by Assistant Professors.
- c. Find ids of members who have not reserved books costing more than Rs. 600.
- d. Find the author and title of books reserved on 19-dec-2011.
- e. Find the names of members who have reserved all books.

5. Consider the following relational database schema:

STUDENT (Student_id, Sname, Major, GPA)

FACULTY (Faculty_id, fname, dept, designation, salary)

COURSE (Course_id, Cname, Faculty_id)

ENROL (Course_id, Student_id, grade)

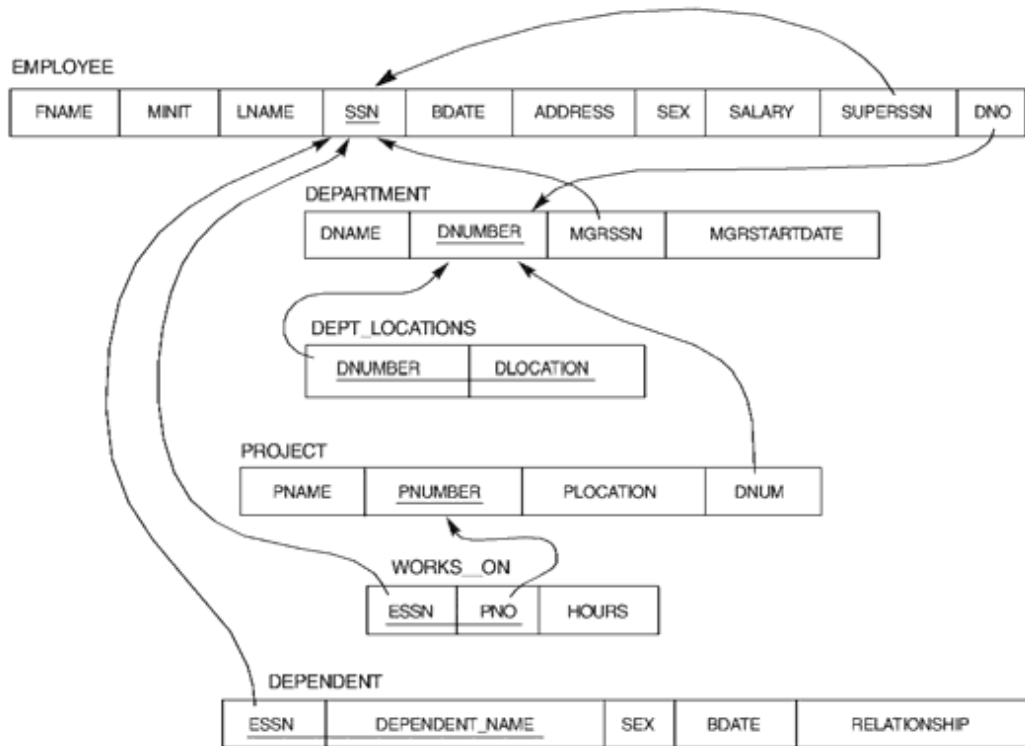
Use the above schema and solve the queries using SQL

- i) List the names of all students enrolled for the courses "CS-53"

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- ii) List the names of students enrolled for the courses “CS-53” and have received “A” grade.
 - iii) List all the departments having an average salary of above Rs20,000.
 - iv) Give a 15% raise to salary of all faculty.
 - v) List the names of all faculty members beginning with “R” and ending with letter “U”.
6. Write the SQL commands to create a database schema for the following relational schema:
- CUSTOMER (CUST_ID, CUST_NAME, ANNUAL_REVENUE, CUST_TYPE)
CUST_ID must be between 100 and 10,000
ANNUAL_REVENUE defaults to \$20,000
CUST_TYPE must be manufacturer, wholesaler, or retailer
- SHIPMENT (SHIPMENT_#, CUST_ID, WEIGHT, TRUCK_#, DESTINATION, SHIP_DATE)
Foreign Key: CUST_ID REFERENCES CUSTOMER, on deletion cascade
Foreign Key: TRUCK_# REFERENCES TRUCK, on deletion set to null
Foreign Key: DESTINATION REFERENCES CITY, on deletion set to null
WEIGHT must be under 1000 and defaults to 10
- TRUCK (TRUCK_#, DRIVER_NAME)
CITY (CITY_NAME, POPULATION)
- Perform the following queries:
- a) What are the names of customers who have sent packages (shipments) to Sioux City?
 - b) What are the names and populations of cities that have received shipments weighing over 100 pounds?
 - c) List the cities that have received shipments from customers having over \$15 million in annual revenue.
 - d) Create views for each of the following:
 - i. Customers with annual revenue under \$1 million.
 - ii. Customers with annual revenue between \$1 million and \$5 million.
 - iii. Customers with annual revenue over \$5 million.
 - e) Use these views to answer the following queries:
 - i. Which drivers have taken shipments to Los Angeles for customers with revenue over \$5 million?
 - ii. What are the populations of cities, which have received shipments from customers with revenue between \$1 million and \$5 million?
 - iii. Which drivers have taken shipments to cities for customers with revenue under \$1 million, and what are the populations of those cities?
7. Consider the following schema for the COMPANY relational database Schema.

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Perform the following (any five) queries:

- a) For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.
- b) For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
- c) Make a list of all project numbers for projects that involve an employee whose last name is 'Smith' as a worker or as a manager of the department that controls the project.
- d) Retrieve the name of each employee who has a dependent with the same first name as the employee. {using Exists and Nested query}
- e) Retrieve a list of employees and the projects each works in, ordered by the employee's department, and within each department ordered alphabetically by employee last name.
- f) Give all employees in the 'Research' department a 10% raise in salary.
- g) For each project on which more than two employees work, retrieve the project number the project name and the number of employees who work on the project.
- h) Retrieve the Name and Address of all Employees who work for the 'Research' Dept.
- i) Find the names of the employees who work on all projects controlled by department number 2.
- j) Retrieve all employees in department '3' whose salary is between 10,000 and 20,000

8. Consider the Insurance database given below. The primary keys are underlined and the datatypes are specified.

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PERSON (driver – id #: String, name: string, address: strong)

CAR (Regno: string, model: string, year: int)

ACCIDENT (report-number: int, date: date, location: string)

OWNS (driver-id #:string, Regno:string)

PARTICIPATED (driver-id: string, Regno:string, report-number:int, damage amount:int)

- a) Create the above tables by properly specifying the primary keys and the foreign keys.
 - b) Enter atleast five tuples for each relation.
 - c) Demonstrate how you
 - i. Update the damage amount for the car with a specific Regno in the accident with report number 12 to 25000.
 - ii. Add a new accident to the database.
 - d) Find the total number of people who owned cars that were involved in accident in 2011.
 - e) Find the number of accidents in which cars belonging to a specific model were involved.
 - f) Generation of suitable reports.
9. Consider the following relations for an order processing database application in a company.
- CUSTOMER (cust #: int, cname: string, city: string)
- ORDER (order #: int, odate: date, cust #: int, ord-Amt: int)
- ORDER – ITEM (order #: int, *Item #*: int, qty: int)
- ITEM (item #: int, unit price: int)
- SHIPMENT (order #: int, warehouse#: int, ship-date: date)
- WAREHOUSE (warehouse #: int, city: string)
- a) Create the above tables by properly specifying the primary keys and the foreign keys.
 - b) Enter atleast five tuples for each relation.
 - c) Produce a listing: CUSTNAME, #oforders, AVG_ORDER_AMT, where the middle column is the total number of orders by the customer and the last column is the average order amount for that customer.
 - d) List the order# for orders that were shipped from all the warehouses that the company has in specific city.
 - e) Demonstrate how you delete item# 10 from the ITEM table and make that field null in the ORDER_ITEM table.
 - f) Generation of suitable reports.
10. Consider the following database of student enrollment in courses and books adopted for each course:
- STUDENT (regno: string, name: string, major: string, bdate:date)
- COURSE (course #:int, cname:string, dept:string)
- ENROLL (regno:string, course#:int, sem:int, marks:int)
- BOOK_ADOPTION (course# :int, sem:int, book-ISBN:int)
- TEXT (book-ISBN:int, book-title:string, publisher:string, author:string)
- a) Create the above tables by properly specifying the primary keys and the foreign keys.
 - b) Enter atleast five tuples for each relation.
 - c) Demonstrate how you add new textbook to the database and make this book be adopted by some department.

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- d) Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for course offered by the 'CS' department that use more than two books.
- e) List any department that has all its adopted books published by a specific publisher.
- f) Generation of suitable reports.
11. The following tables are maintained by a book dealer:
AUTHOR (author-id:int, name:string, city:string, country:string)
PUBLISHER (publisher-id:int, name:string, city:string, country:string)
CATALOG(book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int)
ORDER-DETAILS (order-no:int, book-id:int, quantity:int)
- a) Create the above tables by properly specifying the primary keys and the foreign keys.
- b) Enter atleast five tuples for each relation.
- c) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publications is after 2000.
- d) Find the author of the book, which has maximum sales.
- e) Demonstrate how you increase the price of books published by a specific publisher by 10%.
- f) Generation of suitable reports.
12. Consider the following database for a banking enterprise:
BRANCH(branch-name:string, branch-city:string, assets:real)
ACCOUNT(accno:int, branch-name:string, balance:real)
DEPOSITOR(customer-name:string, accno:int)
COUSTOMER(customer-name:string, customer-street:string, customer-city:string)
LOAN(loan-number:int, branch-name:string, amount:real)
BORROWER(customer-name:string, loan-number:int)
- a) Create the above tables by properly specifying the primary keys and the foreign keys.
- b) Enter atleast five tuples for each relation
- c) Find all the customers who have atleast two accounts at the Main branch.
- d) Find all the customers who have an account at all the branches located in a specific city.
- e) Demonstrate how you delete all account tuples at every branch located in a specific city.
- f) Generation of suitable reports.
13. Consider the following data base
PATIENT(patient-id, patient-name, type-of-patient, address, date-of-admission, date-of-discharge, doctor-id, ward-no)
DOCTOR(doctor-id, doctor-name, specialization)
TREATMENT(treatment-id, treatment-name, cost-of-treatment)
WARD(ward-no, type-of-ward)
- (a) Find all the names of patients in the data base who are under treatment id 2.
- (b) Find all the names of patients and type of patient treated by Dr. Ramprasad.
- (c) Find all the details of patients who are in ICU and treated by Dr. Chandrakanth.

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- (d) Find all the names of doctors who are treating CCU patients.
- (e) Find names of all patients who are under treatment id 49.
- (f) Find the names of patients and names of doctors treating them who are admitted on 20-May-2012.

14. Consider the following employee database:

EMPLOYEE(person-id, person-name, street, city)

WORKS(person-name, company-name, salary)

COMPANY(company-name, city)

MANAGES(person-name, manager-name)

- a. Find the names of all employees who live in the same city and on the same street as do their managers.
- b. Find the names and cities of residence of all employees who work for Infosys.
- c. Find all employees in database who do not work for Syntel.
- d. Find the name, street address, and city of residence of all employees who work for Syntel and earn more than Rs. 30,000.
- e. Assume that the companies may be located in several cities. Find all companies located in every city in which Infosys is located.
- f. Find those companies whose employees earn a higher salary, on average, than the average salary at Syntel.

15. Consider the employee data base in question 14 and solve the following queries using SQL

- a. Modify the database so that Ranjith now lives in Patna.
- b. Give all employees of Syntel a 10 percent raise.
- c. Give all managers of Syntel and IBM 15 percent raise.
- d. Give all managers of Infosys a 10 percent raise unless the salary becomes greater than Rs. 1,00,000; in such cases, give only a 3 percent raise.

Note:

- Insert appropriate tuples for all questions.
- The exercises are to be executed in Oracle, MySQL or similar RDBMS environment.

AT 113 OPERATIONS RESEARCH & ENGINEERING MANAGEMENT

PART A: OPERATIONS RESEARCH

UNIT I

WHAT IS OPERATIONS RESEARCH?

02 hrs

Operations Research Models; Solving the OR Model; Queuing and Simulation Models; Art of Modeling; More Than Just Mathematics; Phases of an OR.

I (1.1 to 1.6)

MODELING WITH LINEAR PROGRAMMING

05 hrs

Two-Variable LP Model; Graphical LP Solution; Selected LP Applications.

I (2.1 to 2.3)

UNIT II

THE SIMPLEX METHOD AND SENSITIVITY ANALYSIS

05 hrs

LP Model in Equation Form; The Simplex Method; Artificial Starting Solution; Special Cases in Simplex Method.

I (3.1, 3.3, 3.4, 3.5, 3.5.1, 3.5.2, 3.5.3, 3.5.4)

DUALITY AND POST-OPTIMAL ANALYSIS

03 hrs

Definition of the Dual Problem; Simplex Tableau Computations.

I (4.1, 4.2.4)

Regulations and Syllabi for AMIETE (IT) Examination

UNIT III

TRANSPORTATION MODEL AND ITS VARIANTS **07 hrs**
Definition of the Transportation Model; Nontraditional Transportation Models; The Transportation Algorithm; The Assignment Model.
I (5.1, 5.2, 5.3, 5.4)

UNIT IV

NETWORK MODELS **08hrs**
Scope and Definition of Network Models; Shortest-Route Problem; CPM and PERT.
I (6.1, 6.3, 6.5)

UNIT V

DECISION ANALYSIS AND GAMES **03 hrs**
Game Theory - Optimal Solution of Two-Person Zero-Sum Games; Solution of Mixed Strategy Games.
I (13.4, 13.4.1, 13.4.2)

QUEUING SYSTEMS **05 hrs**
Why Study Queues?; Elements of a Queuing Model; Role of Exponential Distribution; Pure Birth and Death Models; Generalized Poisson Queuing Model; Specialized Poisson Queues.
I (15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.6.1, 15.6.2, 15.6.3)

PART B: ENGINEERING MANAGEMENT

UNIT VI

INTRODUCTION TO ENGINEERING MANAGEMENT
Engineering and Management **03 hrs**
Preview, Engineering; Management; Engineering Management-A Synthesis;
HISTORICAL DEVELOPMENT OF ENGINEERING MANAGEMENT **04 hrs**
Preview, Origins; The Industrial Revolution; Management Philosophies; Scientific Management; Administrative Management; Behavioral Management; Current Contributions.
II (Chapters 1 and 2)

UNIT VII

Functions of Technology Management PLANNING AND FORECASTING **03 hrs**
Preview; Nature of Planning; Foundations for Planning; Some Planning Concepts; Forecasting; Strategies for Managing Technology.

DECISION MAKING **03 hrs**
Preview; Nature of Decision Making; Management Science; Tools for Decision Making; Computer based Information Systems; Implementation.

ORGANIZING **02 hrs**
Preview; Nature of Organizing; Traditional Organization Theory; Technology and Modern Organization Structures; Teams.
II (Chapters 3, 4 and 5)

UNIT VIII

SOME HUMAN ASPECTS OF ORGANIZING **03 hrs**
Preview; Staffing Technical Organizations; Authority and Power; Delegations; Committees and Meetings.

LEADING TECHNICAL PEOPLE **02 hrs**
Preview; Leadership; Motivation; Motivating and Leading Technical Professionals.

CONTROLLING **02 hrs**
Preview; The Process of Control; Financial Controls.
II (Chapters 6, 7 and 8)

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Text Books:

- I. Operations Research, An Introduction, Hamdy A. Taha, Eighth Edition, PHI, Third Impression 2012.
- II. Managing Engineering & Technology, Lucy C. Morse and Daniel L. Babcock, Pearson Education, Fourth Edition, First Impression 2008.

Reference Books:

1. Introduction to Operation Research, Hiller and Liberman, McGraw Hill Publications.
2. Operations Research, S.D. Sharma, Kedarnath, Ramnath & Co
3. Engineering Management, Fraidon Mazda, Low Price Indian Edition, Addison-Wesley.
4. Management – A Competency Based Approach, Helriegel / Jackson / Slocum, Thomson South Western.

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks, selecting **THREE** questions from Part A and **TWO** from Part B.

AT 114 SOFTWARE ENGINEERING

UNIT I

SOCIO-TECHNICAL SYSTEMS

08 hrs

Emergent System Properties, Systems Engineering, Organizations, People and Computer Systems, Legacy Systems

SOFTWARE PROCESSES

Software Process Models, Process Iteration, Process Activities, The Rational Unified Process, Computer-Aided Software Engineering

PROJECT MANAGEMENT

Management activities, Project planning, Project scheduling, Risk management

I (2, 4, 5)

UNIT II

SOFTWARE REQUIREMENTS

08 hrs

Functional and nonfunctional Requirements, User Requirements, System Requirements, Interface Specification, The Software Requirements Document

REQUIREMENTS ENGINEERING PROCESSES

Feasibility studies, Requirement elicitation and analysis, Requirements validation, Requirements management

SYSTEM MODELS

Context models, Behavioral models, Data models, Object models, Structured Methods

I (6, 7, 8)

UNIT III

RAPID SOFTWARE DEVELOPMENT

07 hrs

Agile Methods, Extreme Programming, Rapid Application Development, Software Prototyping

FORMAL SPECIFICATION

Formal Specification in the Software Process, Sub-system Interface Specification, Behavioral specification

I (17, 10)

UNIT IV

ARCHITECTURAL DESIGN

07 hrs

Architectural Design Decisions, System Organization, Modular Decomposition Styles, Control Styles, Reference Architectures

DISTRIBUTED SYSTEMS ARCHITECTURES

Multiprocessor architectures, Client-Server architectures, Distributed Object architectures, Inter-Organizational Distributed Computing

I (11, 12)

UNIT V

OBJECTED-ORIENTED DESIGN

08 hrs

Objects and Object Classes, An Object-Oriented Design Process, Design Evolution

SOFTWARE REUSE

The Reuse Landscape, Design Patterns, Generator-based Reuse, Application Frameworks, Application System Reuse

COMPONENT-BASED SOFTWARE ENGINEERING

Components and Component Models, The CBSE Process, Component Composition

I (14, 18, 19)

UNIT VI

USER INTERFACE DESIGN

07 hrs

Design Issues, The UI Design Process, User Analysis, User Interface Prototyping, Interface Evaluation

CRITICAL SYSTEMS DEVELOPMENT

Dependable Processes, Dependable Programming, Fault Tolerance, Fault Tolerant Architectures

I (16, 20)

UNIT VII

VERIFICATION AND VALIDATION

08 hrs

Planning Verification and Validation, Software Inspections, Automated static analysis, Verification and Formal Methods

SOFTWARE TESTING

System Testing, Component Testing, Test Case Design Test Automation

SOFTWARE COST ESTIMATION

Software Productivity, Estimation Techniques, Algorithmic Cost Modeling, Project Duration and Staffing

I (22, 23, 26)

UNIT VIII

QUALITY MANAGEMENT

08 hrs

Process and Product Quality, Quality Assurance and Standards, Quality Planning, Quality Control, Software Measurement and Metrics

PROCESS IMPROVEMENT

Process and Product Quality, Process Classification, Process Measurement, Process Analysis and Modelling, Process Change, The CMMI Process Improvement Framework

CONFIGURATION MANAGEMENT

Configuration Management Planning, Change Management, Version and Release Management, System Building, CASE Tools for Configuration Management

I (27, 28, 29)

Text Book:

I. Software Engineering, Ian Sommerville, 8th Edition, Pearson Education, 2007

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Reference Book:

1. Software Engineering, Ian Sommerville, 8th Edition, Pearson Education, 2012
2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Publishing House, 3rd Edition, 2007

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 115 DESIGN & ANALYSIS OF ALGORITHMS

UNIT I

INTRODUCTION

07 hrs

What is an algorithm?, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental Data structures

I (1)

UNIT II

FUNDAMENTALS OF THE ANALYSIS OF ALGORITHM EFFICIENCY

07 hrs

Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical analysis of non-recursive and recursive algorithms, Example: Fibonacci numbers

I (2.1 to 2.5)

UNIT III

BRUTE FORCE

08 hrs

Selection Sort and Bubble sort, Sequential Search and Brute Force String Matching, Exhaustive Search

DIVIDE AND CONQUER

Merge Sort, Quick Sort, Binary Search, Multiplication of Large Integers, Strassen's Matrix multiplication

I (3.1, 3.2, 3.4, 4.1, 4.2, 4.3, 4.5)

UNIT IV

DECREASE AND CONQUER

07 hrs

Insertion Sort, Depth First Search and Breadth First search, Topological Sorting, Algorithms for Generating Combinatorial Objects, Variable Size - Decrease Algorithms

I (5.1 to 5.4, 5.6)

UNIT V

TRANSFORM AND CONQUER

08 hrs

Gaussian elimination, Balanced search trees, Heaps and Heapsort, Horner's rule and Binary Exponentiation, Problem reduction

I (6.2 to 6.6)

UNIT VI

DYNAMIC PROGRAMMING

08 hrs

Computing a Binomial Coefficient, Warshall's and Floyd's Algorithms, The Knapsack problem and Memory Functions

GREEDY TECHNIQUE

Prim's algorithm, Kruskal's algorithm, Dijkstra's algorithm

I (8.1, 8.2, 8.4, 9.1 to 9.3)

UNIT VII

SPACE AND TIME TRADEOFFS

08 hrs

Sorting by counting, Input Enhancement in String matching, Hashing, B-trees

LIMITATIONS OF ALGORITHMIC POWER

Decision Trees. *P*, *NP*, *NP*-complete problems, Challenges of numerical algorithms

I (7, 11.2 to 11.4)

UNIT VIII

COPING WITH LIMITATIONS OF ALGORITHMIC POWER

07 hrs

Backtracking, Branch and Bound, Algorithms for Solving Nonlinear Equations
I (12.1, 12.2, 12.4)

Text Book:

1. Introduction to The Design & Analysis of Algorithms, Anany Levitin, 2nd Edition, Pearson Education, 2009

Reference Book:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, 3rd Edition, PHI, 2010

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 116

MULTIMEDIA SYSTEMS

UNIT I

INTRODUCTION TO MULTIMEDIA

08 hrs

What is Multimedia – Components of Multimedia, Multimedia and Hypermedia – History of multimedia, Hypermedia and Multimedia, Overview of Multimedia Software Tools – Music sequencing and Notation, Digital Audio, Graphics and Image Editing, Video Editing, Animation, Multimedia Authoring

MULTIMEDIA AUTHORIZING AND TOOLS

Some Useful Editing and Authoring Tools – Adobe premiere, Macromedia Director, Macromedia Flash, Dreamweaver, VRML – Overview, Animation and Interactions, VRML Specifics

GRAPHICS and image data representation

Graphics/Image Data types – 1-Bit Images, 8-Bit Gray – Level Images, Image Data Types, 24-bit Color Images, 8-Bit Color Images, Color Lookup Tables (LUTs), Popular File Formats – GIF, JPEG, PNG, TIFF, EXIF, Graphics Animation files, PS and PDF, Windows BMP

I (1.1, 1.2, 1.4, 2.2, 2.3, 3.1, 3.2)

UNIT II

COLOR IN IMAGE AND VIDEO

08 hrs

Color Science – Light and Spectra, Human Vision, Spectral Sensitivity of the Eye, Image Formation, Camera systems, Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, YCbCr Color Model

FUNDAMENTAL CONCEPTS IN VIDEO

Types of Video Signals – Components Video, Composite Video, S-Video, Analog Video – NTSC Video, PAL Video, SECAM Video, Digital Video – Chroma Sub sampling, CCIR Standards for Digital Video, High Definition TV (HDTV)

I (4.1, 4.2, 4.3, 5.1 to 5.3)

UNIT III

BASICS OF DIGITAL AUDIO

08 hrs

Digitization of Sound - What is Sound, Digitization, Nyquist Theorem, Signal-to- Noise Ratio(SNR), Signal-to-Quantization-Noise ratio(SQNR), Audio Quality versus Data Rate, MIDI – MIDI Overview, Hardware Aspects of MIDI, Structure of MIDI Messages,

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Quantization and Transmission of Audio – Coding of Audio, Pulse Code Modulation, Differential Coding of Audio, Lossless predictive Coding, DPCM, ADPCM

LOSSLESS COMPRESSION ALGORITHMS

Introduction , Basics of Information Theory, Run-length Coding, Variable Length Coding - Huffman Coding, Adaptive Huffman Coding, Dictionary Based Coding, Arithmetic Coding. Lossless Image Compression- Differential Coding Images, Lossless JPEG.

I (6.1 to 6.3, 7.1 to 7.7)

UNIT IV

LOSSY COMPRESSION ALGORITHMS

07 hrs

Introduction, Transform coding – Discrete Cosine Transform, Karhunen-Loeve Transform, Wavelet-Based Coding – Introduction, Continuous Wavelet Transform Discrete Wavelet Transform

IMAGE COMPRESSION STANDARDS

The JPEG Standard – Main Steps in JPEG Image Compression, JPEG Modes, A Glance at the JPEG BitStream, The JPEG2000 Standard

I (8.1, 8.5, 8.6, 9.1)

UNIT V

BASIC VIDEO COMPRESSION TECHNIQUES

08 hrs

Introduction to Video Compression, H.261 – Intra-Frame (I-Frame) Coding, Inter-Frame (P – Frame) predictive coding, Quantization in H.261, H.261 encoder and Decoder, H.263 – Motion Compensation in H.263, Optional H.263 Coding Modes, H.263+ and H.263++

MPEG VIDEO CODING I – MPEG-1 and 2

Overview , MPEG -1 – Motion Compensation in MPEG – 1, other major differences form H.261, MPEG-1 Video Bitstream, MPEG-2 – Supporting interlaced Video , other major differences from MPEG-1

I (10.1, 10.4, 10.5, 11.1, 11.2, 11.3)

UNIT VI

MPEG VIDEO II – MPEG-4, 7, and Beyond

07 hrs

Overview of MPEG-4, Object-Based Visual Coding in MPEG-4, MPEG-7, MPEG-21

I (12.1, 12.2, 12.6, 12.7)

UNIT VII

BASIC AUDIO COMPRESSION TECHNIQUES

07 hrs

ADPCM in Speech Coding – ADPCM, G.726 ADPCM, Vocoders

MPEG AUDIO COMPRESSION

MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithm

I (13.1 to 13.3, 14.2)

UNIT VIII

MULTIMEDIA NETWORK COMMUNICATION AND APPLICATIONS

07 hrs

Quality of Multimedia Data Transmission – Quality of service (QoS) , Multimedia over IP – IP – Multicast , RTP (Real-time Transport Protocol), Real-time Control protocol(RTCP), Resource ReSevation protocol (RSVP), Real-Time Streaming protocol (RTSP), Internet Telephony, Multimedia over ATM Networks - Video Bitrates over ATM, ATM Adaptation Layer (AAL), Multicast over ATM, Transport of MPEG – 4 , Media on Demand

I (14.2, 16.1 to 16.3)

Text Book:

- I. Fundamentals of Multimedia, Ze-Nian Li and Mark S. Drew, Prentice Hall, Edition – 2007

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Reference Books:

1. Multimedia Fundamentals: Volume 1 – Media Coding and Content Processing, Ralf Steinmetz, Klara Narsted, 2nd Edition, Pearson Education/PHI, 2003
2. Multimedia System Design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 2003
3. Principles of Multimedia, Ranjan Parekh, Tata McGraw-Hill, Edition 2006

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 117

LINUX INTERNALS

UNIT I

LINUX-THE OPERATING SYSTEM

07 hrs

Main Characteristics, Linux Distributions

COMPILING THE KERNEL

Where Is Everything?, Compiling, Additional Configuration facilities

I (1.1, 1.2, 2.1, 2.2, 2.3)

UNIT II

INTRODUCTION TO THE KERNEL

08 hrs

Important Data Structures, Main Algorithms, Implementation of System Calls

I (3.1 to 3.3)

UNIT III

MEMORY MANAGEMENT

08 hrs

The Architecture-Independent memory model, The Virtual Address space of a Process, Block Device Caching, Paging under Linux

I (4.1 to 4.4)

UNIT IV

INTER-PROCESS COMMUNICATION

08 hrs

Synchronization in the Kernel, Communication via Files, Pipes, Debugging Using *ptrace*, System V IPC, IPC with Sockets.

I (5.1 to 5.6)

UNIT V

THE LINUX FILE SYSTEM

07 hrs

Basic Principles, The Representation of File Systems in the Kernel, The *Ext2* File System, The *Proc* File System

I (6.1 to 6.4)

UNIT VI

DEVICE DRIVERS UNDER LINUX

07 hrs

Character and Block Devices, Hardware, Polling, Interrupts and Waiting Queues, Implementing a Driver, Dynamic and Static Drivers

I (7.1 to 7.5)

UNIT VII

NETWORK IMPLEMENTATION

07 hrs

Introduction and Overview, Important Structures, Network Devices under Linux,

I (8.1 to 8.3)

UNIT VIII

MODULES AND DEBUGGING

08 hrs

What are Modules?, Implementation in the Kernel, The Meaning of Object Sections for Modules and Kernels, Parameter Transfer and Examples, What can be Implemented as a Module?, The *kernel* Daemon, Simple Data Swapping between Modules, An Example Module, Debugging.

MULTI-PROCESSING

The Intel Multi-processor Specification, Problems with Multi-processor Systems, Changes to the Kernel
I (9.1 to 9.9, 10.1 to 10.3)

Text Book:

1. Linux Kernel Internals, Michael Beck, Harald Bohme, et al, Pearson Education, 2nd Edition.

Reference Books:

1. The Design of the UNIX Operating Systems, Maurice. J. Bach, PHI, 1998
2. Operating System Concepts by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Peter Baer Galvin, International Student Version, 8th Edition, Wiley, 2009

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 143

ANALYSIS & DESIGN OF ALGORITHMS LAB

List of Experiments

1. Perform recursive binary and linear search.
2. Print Fibonacci numbers using recursive procedure.
3. Sort a given set of elements using Heap sort technique.
4. a. Sort a given set of elements using Merge sort technique.
b. Check whether a graph is connected using Depth first technique.
5. Sort a given set of elements using Selection sort technique.
6. a. Obtain the topological ordering of vertices in a given digraph.
b. Sort a given set of elements using Insertion sort technique.
7. Implement 0/1 knapsack problem using memory function dynamic programming.
8. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
9. Sort a given set of elements using Quick sort technique.
10. Find minimum cost spanning tree of a given undirected graph using Kruskal's algorithm.
11. a. Print all the nodes reachable from a given starting node in a digraph using Breadth first search technique.
b. Implement all pair shortest paths problem using Floyd's algorithm.
12. Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d . A suitable message is to be displayed if the given problem instance does not have a solution.
13. a. Implement Horspool algorithm for string matching.
b. Find the binomial coefficient using dynamic programming.
14. Find minimum cost spanning tree for a given undirected graph using Prim's algorithm.
15. a. Print all the nodes reachable from a given starting node in a given digraph using Depth first search technique.
b. Compute the transitive closure of a given directed graph using Warshall's algorithm.
16. Implement n -Queens problem using backtracking technique.

Note:

All Programs can be written in C or C++ and executed in Turbo C++ or similar environment

AT 118 SOFTWARE ARCHITECTURE

UNIT – I

ENVISIONING ARCHITECTURE 07 hrs

The Architecture Business Cycle: Where do architectures come from?, Software processes and the architecture business cycle, What makes a “good” architecture? What is Software Architecture?: What software architecture is and what it is not, Other points of view, Architectural patterns, reference models and reference architectures, Why is software architecture important, Architectural structures and views

I (1, 2)

UNIT – II

UNDERSTANDING QUALITY ATTRIBUTES 08 hrs

Functionality and architecture, Architecture and quality attributes, System quality attributes, Quality attribute scenarios in practice, Other system quality attributes, Business qualities, Architecture qualities

ACHIEVING QUALITIES

Introducing tactics, Availability tactics, Modifiability tactics, Performance tactics, Security tactics, Testability tactics, Usability tactics, Relationship of tactics to architectural patterns, Architectural patterns and styles

I (4, 5)

UNIT – III

ARCHITECTURAL PATTERNS 07 hrs

Introduction, From mud to structure: Layers, Pipes and Filters, Blackboard

II (2.1, 2.2)

UNIT – IV

ARCHITECTURAL PATTERNS contd. 08 hrs

Distributed Systems, Broker, Interactive Systems, MVC, Presentation-Abstraction-Control

II (2.3, 2.4)

UNIT – V

ARCHITECTURAL PATTERNS contd. 08 hrs

Adaptable Systems, Microkernel, Reflection

II (2.5)

UNIT – VI

DESIGN PATTERNS 07 hrs

Introduction, Structural decomposition, Whole – Part, Organization of work, Master – Slave, Access Control, Proxy

II (3.1 to 3.4)

UNIT – VII

DESIGNING THE ARCHITECTURE 08 hrs

Architecture in the life cycle, Designing the architecture, Forming the team structure, Creating a skeletal system

DOCUMENTING SOFTWARE ARCHITECTURES

Uses of architectural documentation, Views, Choosing the relevant views, Documenting a view, Documentation across views

I (7, 9.1 to 9.5)

UNIT – VIII

BUILDING SYSTEMS FROM OFF-THE-SHELF COMPONENTS

07 hrs

Impact of components on architecture, Architectural mismatch, Component-based design as search,

SOFTWARE ARCHITECTURE IN THE FUTURE

The architecture business cycle revisited, Creating an architecture, Architecture within the life cycle, The impact of commercial components

I (18.1 to 18.3, 19)

Text Books:

- I. Software Architecture in Practice, 2nd Edition, Len Bass, Paul Clements, Rick Kazman, Pearson Education, 2003
- II. Pattern-Oriented Software Architecture A System of Patterns, Volume 1, Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal, Wiley-India, 2008

Reference Book

1. Documenting Software Architectures Views and Beyond, 2nd Edition, Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Reed Little, Paulo Merson, Robert Nord, Judith Stafford, Addison-Wesley Professional, 2010

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 119

DATA COMMUNICATION AND COMPUTER NETWORKS

UNIT I

DATA COMMUNICATIONS, DATA NETWORKING, AND THE INTERNET

04 hrs

Data Communications and Networking for Today's Enterprise; A Communications Model; Data Communications; Networks; The Internet.

I (1.1, 1.2, 1.3, 1.4, 1.5)

PROTOCOL ARCHITECTURE, TCP/IP, AND INTERNET-BASED APPLICATIONS

03 hrs

The Need for a Protocol Architecture; the TCP/IP Protocol Architecture; the OSI Model; Standardization within a Protocol Architecture.

I (2.1, 2.2, 2.3, 2.4)

UNIT II

DATA TRANSMISSION

05 hrs

Concepts and Terminology; Analog and Digital Data Transmission; Transmission Impairments; Channel Capacity.

I (3.1, 3.2, 3.3, 3.4)

TRANSMISSION MEDIA

03hrs

Guided Transmission Media; Wireless Transmission.

I (4.1, 4.2)

UNIT III

SIGNAL ENCODING TECHNIQUES **05 hrs**

Digital Data, Digital Signals; Digital Data, Analog Signals; Analog Data, Digital Signals; Analog Data, Analog Signals.

I (5.1, 5.2, 5.3, 5.4)

DIGITAL DATA COMMUNICATION TECHNIQUES **03 hrs**

Asynchronous and Synchronous Transmission; Types of Errors; Error Detection; Line Configurations.

I (6.1, 6.2, 6.3, 6.5)

UNIT IV

DATA LINK CONTROL PROTOCOLS **03 hrs**

Flow Control; Error Control; High-Level Data Link Control (HDLC).

I (7.1, 7.2, 7.3)

MULTIPLEXING **04 hrs**

Frequency-Division Multiplexing; Synchronous Time-Division Multiplexing; Statistical Time-Division Multiplexing.

I (8.1, 8.2, 8.3)

UNIT V

CIRCUIT SWITCHING AND PACKET SWITCHING **02 hrs**

Switched Communications Networks; Circuit Switching Networks; Packet-Switching Principles.

I (10.1, 10.2, 10.5)

ROUTING IN SWITCHED NETWORKS **03 hrs**

Routing in Packet-Switching Networks; Least-Cost Algorithms.

I (12.1, 12.3)

CONGESTION CONTROL IN DATA NETWORKS **02 hrs**

Effects of Congestion; Congestion Control; Traffic Management; Congestion Control in Packet-Switching Networks.

I (13.1, 13.2, 13.3, 13.4)

UNIT VI

LOCAL AREA NETWORK OVERVIEW **04 hrs**

Background; Topologies and Transmission Media; LAN Protocol Architecture; Bridges.

I (15.1, 15.2, 15.3, 15.4)

HIGH-SPEED LANS **02 hrs**

The Emergence of High-Speed LANs; Ethernet.

I (16.1, 16.2)

WIRELESS LANS **02 hrs**

Overview; Wireless LAN Technology; IEEE 802.11 Architecture and Services.

I (17.1, 17.2, 17.3)

UNIT VII

INTERNETWORK PROTOCOLS **07 hrs**

Basic Protocol Functions; Principles of Internetworking; Internet Protocol Operation; Internet Protocol; IPv6.

I (18.1, 18.2, 18.3, 18.4, 18.5)

UNIT VIII

INTERNETWORK OPERATION **03 hrs**

Multicasting; Routing Protocols.

I (19.1, 19.2)

TRANSPORT PROTOCOLS **02hrs**

TCP; UDP.

I (20.2, 20.4)

INTERNET APPLICATIONS

03 hrs

Electronic Mail: SMTP and MIME; Internet Directory Service: DNS.

I (22.1, 23.1)

Text Book:

1. Data and Computer Communications, Eight Edition, William Stallings, Pearson Education Low Price Edition.

Reference Book:

1. Data Communications and Computer Networks (2012), C.Murali, Reed Elsevier India Private limited (Fillip Learning, Bangalore).

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 120

JAVA & WEB PROGRAMMING

PART A: JAVA

UNIT I

THE HISTORY, EVOLUTION AND OVERVIEW OF JAVA

07 hrs

Java's Lineage, The creation of Java, How Java changed the Internet, Java's magic – Byte code, The Java Buzzwords, The evolution of Java, The Three OOP principles, A First Simple Program, Lexical Issues

DATA TYPES, VARIABLES AND ARRAYS

The Primitive types, Integer Types, Floating-Point Types, Character Type, Booleans, Literals, Variables, Type Conversion & Casting, Automatic Type Promotion in Expressions, Arrays

OPERATORS

Arithmetic operators, The Bitwise operators, Relational operators, Boolean Logical operators, The Assignment Operator, The ? Operator, Operator Precedence, Using Parenthesis

CONTROL STATEMENTS

Java's Selection Statements, Iteration Statements, Jump Statements

I (1, 2, (Selected topics), 3, 4, 5)

UNIT II

INTRODUCING CLASSES

07 hrs

Class fundamentals, Declaring objects, Introducing methods, Constructors, The *this* keyword, Garbage collection, The *finalize()* method, Overloading methods, Understanding *static*, Introducing *final*, Using command line arguments

INHERITANCE

Inheritance Basics, Using *super*, Method overriding, Dynamic Method Dispatch, Using Abstract Classes

PACKAGES & INTERFACES

Packages - Defining a Package, Access Protection, Importing Packages, Interfaces – Defining an Interface, Implementing Interfaces

I (6 to 9 (Selected topics))

UNIT III

EXCEPTION HANDLING

07 hrs

Exception handling fundamentals, Exception Types, Uncaught Exceptions, Using *try* and *catch*, multiple catch clauses, nested *try* statements, *throw*, *throws*, *finally*, Java's Built-in exceptions, Creating your own exception sub classes

MULTITHREADED PROGRAMMING

Java Thread Model, Creating a Thread – Implementing Runnable, Extending Thread, Creating Multiple Threads, Thread Priorities, Synchronization – using synchronized methods, Interthread Communication, Suspending, resuming and Stopping Threads

I (10, 11 (Selected Topics))

UNIT IV

I/O, APPLETS

08 hrs

I/O Basics, Reading Console Input – Reading characters, Reading Strings, Reading & Writing files, Applet Fundamentals, File - Directories, The Stream Classes, The Byte streams – InputStream, OutputStream, FileInputStream, FileOutputStream, Buffered Byte streams-BufferedReader, BufferedWriter, The Character streams - Reader, Writer, FileReader, FileWriter, BufferedReader, BufferedWriter

STRING HANDLING

The String Constructors, String Length, Special String Operations - String Literals, String Concatenation, Character Extraction - *charAt()*, *getChars()*, String Comparison - *equals()* and *equalsIgnoreCase()*, *compareTo()*, Searching Strings, Modifying a String, StringBuffer – StringBuffer Constructors, *length()* and *capacity()*, *append()*, *insert()*, *delete()*, *deleteCharAt()*, *replace()*

I (13, 19, 15 (Selected topics))

UNIT V

THE COLLECTIONS FRAMEWORK

08 hrs

Collections Overview, The Collection Interfaces – The Collection Interface, The List Interface, The Set Interface, The SortedSet Interface, The Queue Interface, The Collection classes – The ArrayList class, The LinkedList class, The HashSet class, The Legacy Classes and Interfaces -The Enumeration Interface, Vector, Stack, Dictionary, Hashtable

INTRODUCING THE AWT

AWT classes, Window fundamentals – Component, Container, Panel, Window, Frame, Working with Frame Windows, Creating Frame, Creating a Frame Window in an Applet, Working with Graphics – Drawing lines, Drawing Rectangles, Drawing Ellipses & Circles, Drawing Arcs, Drawing Polygons, Understanding Layout Managers – FlowLayout, BorderLayout, GridLayout, CardLayout, GridBagLayout

INTRODUCING SWING

The Origins of Swing, Two Key Swing Features, Components & Containers - Components, Containers, The Swing Packages, A Simple Swing Application, Sreate a Swing Applet, Exploring Swing - JLabel, JTextField, the Swing Buttons, Trees, JTable

I (17, 23, 24, 29, 30 (Selected topics))

PART B: WEB PROGRAMMING

UNIT VI

WEB BASICS AND OVERVIEW

08 hrs

The Web, Content Types, Putting Information on the Web, What is HTML?, Web Hosting, Domain Registration, What are Name Servers, Looking up Host Information, The Web Development Process, Dynamic Generation of Web Pages, HTTP Briefly.

CREATING WEB PAGES: XHTML

HTML Basics, Creating Your First Web Page, Elements & Entities, A Brief History of HTML, XHTML Syntax, Core Attributes, Heading and Paragraphs, White Spaces and Line Wrapping, Inline Elements, Controlling Presentation Styles, Length Units, Colours, Text Fonts, Lists, List Styles, Hyperlinks, Images, Positioning Inline Images, Image Maps, Editing HTML.

II (1.4 to 1.14, 2)

UNIT VII

ADVANCED XHTML

08 hrs

Character Encoding, Special Symbols and HTML Entities, Tables, Cell Content Alignment, Displaying Tables, Formatting Tables, Positioning Tables, Table Width and Height, Grouping Rows and Columns, Forwarding Pages, Frames, Server-side Includes, Internationalization, Common Page errors, Page Checking and Validation.

DESIGN BASICS

What is Design?, Design and Perception, Elements of Design, Unity and Variety, Emphasis, Focal Point, and Hierarchy, Contrast, Visual Balance.

INFORMATION ARCHITECTURE AND PAGE LAYOUT

Layout Overview, Web Site Architectures, Information Architecture, Client Identity, Organizational Framework, Layout Grids, Web Page Layout Grids, Designing Layout Grid Systems

II (3.1 to 3.9, 3.15, 3.18 to 3.22, 4.1, 4.2, 4.4 to 4.8, 5.1, 5.2, 5.3, 5.5, 5.6, 5.12, 5.13, 5.14)

UNIT VIII

CSS, FORMS AND FORM PROCESSING

07 hrs

What is CSS?, Overall Styling of a Page, What is a Form?, Form Basics, Text Input, User Selections, Submit Buttons, File Uploading, Other Input Elements, HTTP Basics, HTTP Message Format, CGI Overview, Outline of a CGI Program, Getting Started with CGI Programming, Deploying CGI Programs

CLIENT-SIDE SCRIPTING: JAVASCRIPT

Getting Started, Embedding JavaScript in a Web Page, JavaScript Objects, Windows, Form Checking, Events and Event Objects, Testing and Debugging

II (6.1, 6.2, 8.1, 8.3 to 8.8, 8.11 to 8.16, 9.1, 9.2, 9.11, 9.12, 9.15, 9.17, 9.19)

Text Books:

- I. The Complete Reference Java, Herbert Schildt, TMH, Seventh Edition, 2007
- II. An Introduction to Web Design + Programming, Paul S. Wang and Sanda S. Katila, Thomson Course Technology, India Edition, 2008

Reference Book:

The Java Hand Book, Patrick Naughton, TMH, Eleventh Reprint, 2002

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks, selecting **THREE** questions from Part A and **TWO** from Part B.

AT 144

JAVA & WEB PROGRAMMING LAB

List of Experiments

1. Write a Java program to find the area & volume of a room. Use a class named *Room* with the following members.

Data members

- length
- breadth
- height

Methods

- to assign initial values
- to find the area
- to find the volume

2. Write a class that has three overloaded methods for calculating the area of the following geometric shapes

- Circles: $\text{area} = \pi r^2$
- Rectangles: $\text{area} = \text{width} * \text{length}$
- Cylinders: $\text{area} = \pi r^2 h$

Demonstrate the class in a complete Java program

3. Write a Java program to find the area and volume of a room. Use a base class *rectangle* with a constructor and a method for finding the area. Use its subclass *room* with a constructor that gets the value of length and breadth from the base class and has a method to find the volume. Create an object of the class *room* and obtain the area and volume.
4. Write a Java program to read data from keyboard up to N names, sort in alphabetical order using Bubble sort.
5. Write a Java program to count the number of tokens, given a string and a separator.
6. Write a Java program to find the average of n numbers. Use the input through the keyboard during runtime. The program must read the value of n first. If the input happens to be zero or negative a suitable user defined exceptions should be thrown. If it is not possible to convert the input into an integer, then *NumberFormatException* must be thrown. Use suitable try-catch blocks. After reading n value successfully, we must read the integer values of the array *a[]*. Each input string must be converted into integer. So use *NumberFormatException* appropriately.
7. Write a Java program to perform a file copy operation using the file streams of Java.
8. Write a Java program to find the number of characters, words, lines in a given input file.
9. Write a Java program to find the distance between two points whose coordinates are given.
The coordinates can be 2-dimensional or 3-dimensional. (For computing the distance between a 2D and a 3D point, the 3D x and y components must be divided by z).
Demonstrate method overriding in this program.
10. Write a Java program to create an applet named *JSum* that allows the user to enter two integers into two separate *JTextFields*. When the user clicks a *JButton*, the sum of the integers is displayed in a third *JTextField*.
11. Write a Java program using swing to demonstrate trees that presents the hierarchical view of data implemented by *JTree* class, where the user has the ability to expand or collapse individual sub trees in this display.
12. Create a basic web page in the following set pattern:
Your page should have the following elements:

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- Your name as a level one header
 - "About me" as a level two header
 - A short paragraph describing something interesting about yourself
 - A level two heading saying something like "My Favorite things on the Internet"
 - A paragraph describing the things you like to do on the Internet
13. Create a copy of the last page you made. Modify this new copy with basic CSS designations. Use Cascading Style Sheets technology to improve the colors and layout of your page.

You will be defining the style that explains how the text should be displayed.

- Add a CSS section to the header area
- Add a style for heading levels one and two, paragraphs, and the body
- If you have other HTML elements in your page, you can add CSS descriptors for them as well

Your CSS should contain at least one example of each of the following:

- color
- background-color
- text-align
- font-family

For question 12 and 13, your page must meet the following minimum criteria:

- It must validate to XHTML 1.0 Strict. Use the W3C validator to check your page as described in class.
 - Try to write professionally. Use an online dictionary if necessary to check your spelling
 - Use notepad or another basic text editor to create your page. Pages written in a GUI browser (like FrontPage or DreamWeaver) will not be accepted.
14. Write a CGI program that collects the name and email address of a person from an XHTML form and responds with a "Hello" message.
15. Create a JavaScript – enriched XHTML form with the following fields: First name, Last name, email, phone and check whether the user has filled in text fields before the form is submitted and prints out the values the user filled in. Make sure that, for fields the entry conforms to the following rules:
- Telephone number should include area code
 - Email should include two strings separated by "@"
16. Develop and demonstrate a XHTML file that includes Javascript script for the following problem.
- a) Input: A number n obtained using prompt.
Output: The first n Fibonacci numbers.
- b) Input: A number n obtained using prompt
Output: A table of numbers from 1 to n and their squares using alert

Note:

- To develop and run Java programs on windows platform, use the NetBeans/Eclipse IDE (latest version) and latest java development kit.
- Develop and execute CGI Program on Linux platform having apache web server & perl interpreter.

AT 121

C# & .NET

UNIT I

**INTRODUCING C# AND THE .NET PLATFORM
THE PHILOSOPHY OF .NET**

08 hrs

Understanding the previous state of affairs, The .NET solution, Introducing the building blocks of the .NET platform (the CLR, CTS, and CLS), Additional .NET-Aware programming languages, An overview of .NET assemblies, Understanding the common type system, Understanding the common language specification, Understanding the common language runtime, The assembly/namespace/type distinction, Exploring an assembly using ildasm.exe, Exploring an assembly using reflector, Deploying the .NET runtime, The platform-independent nature of .NET

BUILDING C# APPLICATIONS

The role of the .NET framework 4.0 SDK, Building C# applications using csc.exe, Building .NET applications using Visual C#2010 Express

I (1, 2 (listed topics))

UNIT II

CORE C# PROGRAMMING CONSTRUCTS

07 hrs

The anatomy of a simple C# program, An interesting aside: Some additional members of the System.Environment class, The System.Console class, System data types and C# shorthand notation, Working with string data, Narrowing and widening data type conversions, Understanding implicitly typed local variables, C# iteration constructs, Decision constructs and the relational/equality operators, methods and parameter modifiers, Understanding C# arrays, Understanding the Enum type, Understanding the Structure type, Understanding value types and reference types, Understanding C# nullable types

I (3, 4)

UNIT III

DEFINING ENCAPSULATED CLASS TYPES

07 hrs

Introducing the C# class type, Understanding constructors, The role of the this keyword, Understanding the static keyword, Defining the pillars of OOP, C# access modifiers, The first pillar: C#'s encapsulation services, Understanding automatic properties, Understanding object initializer syntax, Working with constant field data, Understanding partial types

I (5)

UNIT IV

UNDERSTANDING INHERITANCE AND POLYMORPHISM

08 hrs

The basic mechanics of inheritance, Revising Visual Studio class diagrams, The second pillar of OOP: The details of inheritance, Programming for containment/delegation, The third pillar of OOP: C#'s polymorphic support, Understanding base class/derived class casting rules, The master parent class: System.Object

UNDERSTANDING STRUCTURED EXCEPTION HANDLING

Ode to errors, bugs, and exceptions, The role of .NET exception handling, The simplest possible example, Configuring the state of an exception, System-level exceptions (System.SystemException), Application-level exceptions (System.ApplicationException), Processing multiple exceptions, Who is throwing what?, The result of unhandled exceptions

I (6, 7(listed topics))

UNIT V

UNDERSTANDING OBJECT LIFETIME

07 hrs

Classes, objects, and references, The basics of object lifetime, The role of application roots, Understanding object generations, Concurrent garbage collection under .NET 1.0

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– 3.5, Background Garbage collection under .NET 4.0, The System.GC type, Building finalizable objects, Building disposable objects, Building finalizable and disposable types, Understanding lazy object instantiation

I (8)

UNIT VI

WORKING WITH INTERFACES

08 hrs

Understanding interface types, Defining custom interfaces, Implementing an interface, Invoking interface members at the object level, Interfaces as parameters, Interfaces as return values, Arrays of interface types, Implementing interfaces using Visual Studio 2010, Resolving name clashes via explicit interface implementation, Designing interface hierarchies, Building enumerable types (IEnumerable and IEnumerator), Building cloneable objects (ICloneable), Building Comparable objects (IComparable)

I (9)

UNIT VII

UNDERSTANDING GENERICS

07 hrs

The issues with non-generic collections, The role of generic type parameters, The System.Collections.Generic Namespace, Creating custom generic methods, Creating custom generic structures and classes, Constraining type parameters

I (10)

UNIT VIII

DELEGATES, EVENTS, AND LAMBDA

08 hrs

Understanding the .NET delegate type, Defining a delegate type in C#, The System.MulticastDelegate and System.Delegate base classes, The simplest possible delegate example, Sending object state notifications using delegates, Method group conversion syntax, Understanding delegate covariance, Understanding generic delegates, Understanding C# events, Understanding C# anonymous methods, Understanding lambda expressions

I (11)

Text Book:

1. Pro C# 2010 and the .NET 4 Platform, 5th Edition, Andrew Troelsen, Wiley India, 2010

Reference Book:

1. C# 4.0 The Complete Reference, Herbert Schildt, Tata McGraw Hill Edition, 2010

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 122

DATA MINING & WARE HOUSING

UNIT I

INTRODUCTION

07 hrs

Why Data Mining?, What is Data Mining?, What Kinds of Data Can Be Mined?, What Kinds of Patterns Can Be Mined?, Which Technologies Are Used?, Which Kinds of Applications Are Targeted?, Major Issues in Data Mining

I (1)

UNIT II

GETTING TO KNOW YOUR DATA

08 hrs

Data objects and attributes, Basic statistical description of data, Data visualization, Measuring data similarity and dissimilarity

DATA PREPROCESSING

An overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization

I (2.1 to 2.4, 3.1 to 3.5)

UNIT III

DATA WAREHOUSE AND OLAP TECHNOLOGY – AN OVERVIEW

08 hrs

Data Warehousing: Basic concepts, Data Warehouse modeling: Data Cube and OLAP, Data Warehouse: Design and Usage, Data Warehouse Implementation

I (4.1 to 4.4)

UNIT IV

DATA CUBE COMPUTATION AND DATA GENERALIZATION

07 hrs

Data Cube Computation: Preliminary concepts, Data Cube Computation Methods, Processing Advanced Kinds of Queries by Exploring Cube Technology, Multi-dimensional Data Analysis in Cube Space

I (5.1 to 5.4)

UNIT V

MINING FREQUENT PATTERNS AND ASSOCIATIONS

08 hrs

Basic Concepts, Frequent Itemset Mining Methods, Which Patterns are Interesting

I (6.1 to 6.3)

UNIT VI

CLASSIFICATION: BASIC CONCEPTS

07 hrs

Basic concepts, Decision Tree Induction, Bayes Classification Methods, Rule based classification

I (8.1 to 8.4)

UNIT VII

CLUSTER ANALYSIS

08 hrs

Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density based Methods, Grid based methods

I (10.1 to 10.5)

UNIT VIII

DATA MINING TRENDS AND RESEARCH FRONTIERS

07 hrs

Mining Complex Datatypes, Other Methodologies of Data Mining, Data Mining Applications, Data Mining and Society, Data Mining Trends

I (13.1 to 13.5)

Text Book:

1. Data Mining, Concepts and Techniques, Jiawei Han and Micheline Kamber, Elsevier M K, 3rd Edition, 2012

Reference Books:

1. Principles of Data Mining, David Hand, Heikki Mannila, Padhraic Smyth, PHI, 2004
2. Data Mining: Introductory and Advanced Topics, Margaret H Dunham, Pearson Education, 2006
3. Introduction To Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education, 2006

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 123

ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

UNIT I

OVERVIEW OF ARTIFICIAL INTELLIGENCE

07 hrs

Introduction, History of AI, Applications of AI, Objectives of AI, Artificial Intelligence Programming, Criticism of AI, Future of AI

I (1)

UNIT II

SYMBOLIC LOGIC

07 hrs

Introduction, Logic, Propositions, Normal Forms in Propositional Logic, Logical Consequences, Resolution Principle, Predicate Calculus, Well-Formed Formulas (WFFs), Clausal Form, Rules of Inference, Unification, Resolution, Rule-Based Expert Systems, The Prolog Language

I (2)

UNIT III

KNOWLEDGE ACQUISITION AND REPRESENTATION

07 hrs

Introduction, Machine Intelligence, Knowledge Engineering, Procedure for Knowledge Acquisition, Knowledge Representation, Logical Representation Schemes, Procedural Representation Schemes, Network Representation Schemes, Structured Representation Schemes

I (3)

UNIT IV

REASONING AND KRR SYSTEMS

08 hrs

Introduction, Reasoning, Knowledge Representation and Reasoning (KRR) System, Knowledge Representation (KR) Languages, Domain Modeling, Semantic Nets (Associative Networks) Reasoning Systems, Frame Based Systems, Hybrid Representation Systems

UNCERTAINTY

Introduction, Non-monotonic and Monotonic Reasoning, Confidence Factor, Bayes Theorem, Dempster and Shafer's Theory of Evidences, Non-classical Logics, Default Logic, Bayesian Networks, Fuzzy Logic

I (4, 5)

UNIT V

SEARCH TECHNIQUES

08 hrs

Introduction, Problem Representation, Definitions, Representation Schemes, Problem Solving in AI, Blind Search Techniques, Heuristic Search Techniques, Game Searches

I (6.1 to 6.8)

UNIT VI

EXPERT SYSTEMS

08 hrs

Introduction, Skill Versus Knowledge, Basic Characteristics of an Expert System, Brief History of Expert Systems, Knowledge Engineering, Inferencing

NEURAL NETWORKS

Introduction, Difference between Human and Machine Intelligence, Features of Biological Neural Networks, How the Human Brain Learns?, From Human Neurons to Artificial Neurons, How Neural Networks Learn?, Learning Algorithms

I (8.1 to 8.6, 9.1 to 9.7)

UNIT VII

NEURAL NETWORKS (CONTD.)

08 hrs

Different Network Architectures and their Applications, Some Simple Networks, Comparison of Neural Networks and Rule-Based Methods, Comparison of Neural Networks and Expert System, Benefits of Neural Computing, Limitations of Neural Computing

I (9.8 to 9.13)

UNIT VIII

APPLICATIONS OF ARTIFICIAL INTELLIGENCE

07 hrs

Introduction, AI in E-commerce, AI in E-Tourism, AI in Industry, AI in Medicine

I (12)

Text Book:

1. Introduction to Artificial Intelligence, Rajendra Akerkar, PHI, 2005

Reference Books:

1. Artificial Intelligence – A Modern Approach, Stuart Russell, Peter Norvig, 2nd Edition, Pearson Education, 2009
2. Artificial Neural Networks – An Introduction, Kevin L. Priddy, Paul E. Keller, PHI, 2007

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 124

UNIX SYSTEMS PROGRAMS

UNIT I

INTRODUCTION

08 hrs

Introduction, Unix Architecture, Logging in, Files and directories, Input and Output, Programs and Processes, Error Handling, User Identification, Signals, Time Values, System Calls and Library Functions

FILE I/O

Introduction, File Descriptors, *open* function, *creat* function, *close* function, *lseek* function, *read* function, *write* function, I/O Efficiency, File Sharing, Atomic Operations, *dup* and *dup2* Functions, *sync*, *fsync*, and *fdatasync* Functions, *fcntl* Function, *ioctl* Function, */dev/fd*

I (1.1 to 1.11, 3.1 to 3.16)

UNIT II

FILES AND DIRECTORIES

07 hrs

Introduction, *stat*, *fstat*, and *lstat* Functions, File Types, Set-User-ID and Set-Group-ID, File access Permissions, Ownership of New Files and Directories, *access* Function, *Umask* Function, *chmod* and *chmod* Functions, Sticky Bit, *chown*, *fchown*, and *lchown* Functions, File Size, File Truncation, File systems, *link*, *unlink*, *remove* and *rename* Functions, Symbolic Links, *symlink* and *readlink* Functions, File Times, *utime* Function, *mkdir* and *rmdir* Functions, Reading Directories, *chdir*, *fchdir* and *getcwd* Functions, Device Special Files, Summary of File Access Permission bits

I (4.1 to 4.24)

UNIT III

STANDARD I/O LIBRARY

07 hrs

Introduction, *Streams* and *FILE* Objects, Standard input, Standard Output and Standard Error, Buffering, Opening a Stream, Reading and writing a Stream, Line-at-a time I/O,

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Standard I/O Efficiency, Binary I/O, Positioning a Stream, Formatted I/O, Implementation Details, Temporary Files, Alternatives to Standard I/O

SYSTEM DATA FILES AND INFORMATION

Introduction, Password File, Shadow Passwords, Group Files, Supplementary Group IDs, Implementation Differences, Other Data Files, Login Accounting, System Identification, Time and date Routines

I (5.1 to 5.14, 6.1 to 6.10)

UNIT IV

PROCESS CONTROL

08 hrs

Introduction, Process Identifiers, *fork* Function, *vfork* Function, *exit* Function, *wait* and *waitpid* Functions, *waitid* Function, *wait3* and *wait4* Functions, Race Conditions, *exec* Functions, Changing User IDs and Group IDs, Interpreter Files, *system* Function, Process Accounting, User Identification, Process Times.

I (8.1 to 8.16)

UNIT V

PROCESS RELATIONSHIPS

08 hrs

Introduction, Terminal Logins, Network Logins, Process Groups, Sessions, Controlling Terminal, *tcgetpgrp*, *tcsetpgrp* and *tcgetsid* Functions, Job Control, Shell Execution of Programs, Orphaned Process Groups

THE ENVIRONMENT OF A UNIX PROCESS

Introduction, *main* Function, Process Termination, Command-line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, *setjmp* and *longjmp* Functions, *getrlimit* and *setrlimit* Functions

I (9.1 to 9.10, 7.1 to 7.11)

UNIT VI

SIGNALS

07 hrs

Introduction, Signal Concepts, *signal* Function, Unreliable Signals, Interrupted System Calls, Reentrant Functions, SIGCLD Semantics, Reliable Signal terminology and Semantics, *kill* and *raise* Functions, *alarm* and *pause* Functions, Signal Sets, *sigprocmask* Function, *sigpending* Function, *sigaction* Function, *sigsetjmp* and *siglongjmp* Functions, *sigsuspend* Function, *abort* Function, *system* Function, *sleep* Function, Job Control signals, Additional Features

I (10.1 to 10.21)

UNIT VII

TERMINAL I/O

08 hrs

Introduction, Overview, Special Input Characters, Getting and setting Terminal Attributes, Terminal Option Flags, *stty* command, Baud rate Functions, Line Control Functions, Terminal Identification, Canonical Mode, Noncanonical Mode, Terminal Window Size, *termcap*, *terminfo* and *curses*

DAEMON PROCESSES

Introduction, Daemon Characteristics, Coding Rules, Error Logging, Single-Instance Daemons, Daemon Conventions, Client -Server Model

I (18.1 to 18.13, 13.1 to 13.7)

UNIT VIII

INTER PROCESS COMMUNICATION

07 hrs

Introduction, Pipes, *popen* and *pclose* Functions, Coprocesses, FIFOs, XSI IPC, Message Queues, Semaphores, Shared Memory, Client-Server Properties.

I (15.1 to 15.10)

Regulations and Syllabi for AMIETE (IT) Examination

Text Book:

- I. Advanced Programming in the UNIX Environment, W. Richards Stevens, Stephan A. Rago, 2nd Edition, Pearson Education, 2005

Reference Book:

1. Advanced UNIX Programming, Marc J. Rochkind, Pearson Education, 2nd Edition, 2004.

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 125 SOFTWARE TESTING

UNIT I

BASICS OF SOFTWARE TESTING **07 hrs**

Humans, errors, and testing, Software quality, Requirements, behavior, and correctness, Correctness versus reliability, Testing and debugging, Test metrics, Software and hardware testing, Testing and verification, Defect management, Execution history.

I (1.1 to 1.10)

UNIT II

BASICS OF SOFTWARE TESTING *contd.* **08 hrs**

Test-generation strategies, Static testing, Model-based testing and model checking, Control-flow graph, Dominators and Postdominators, Program-dependence graph, Strings, languages, and regular expressions, Types of testing, The saturation effect.

I (1.11 to 1.1.19)

UNIT III

TEST GENERATION FROM REQUIREMENTS **07 hrs**

Introduction, The test-selection problem, Equivalence partitioning, Boundary-value analysis, Category-partitioning method.

I (2.1 to 2.5)

UNIT IV

TEST GENERATION FROM REQUIREMENTS *contd.* **08 hrs**

Cause-effect graphing, Test generation from predicates.

I (2.6 & 2.7)

UNIT V

TEST ADEQUACY: ASSESSMENT USING CONTROL FLOW **08 hrs**

Test adequacy: Basics, Adequacy criteria based on control flow.

I (6.1 & 6.2)

UNIT VI

TEST ADEQUACY: ASSESSMENT USING DATA FLOW **07 hrs**

Data-flow concepts, Adequacy criteria based on data flow, Control flow versus data flow, The subsumes relation, Structural and functional testing, Scalability of coverage measurement.

I (6.3 to 6.8)

UNIT VII

TEST ADEQUACYASSESSMENT USING PROGRAM MUTATION **07 hrs**

Introduction, Mutation and mutants, Test assessment using mutation, Mutation operators, Design of mutation operators, Founding principles of mutation testing, Equivalent mutants, Fault detection using mutation, Types of mutants

I (7.1 to 7.9)

UNIT VIII

TESTING OF OBJECT-ORIENTED SYSTEMS

08 hrs

Introduction, Differences in OO Testing: Unit testing a set of classes, Putting classes to work together – Integration testing, System testing and interoperability of OO systems, Regression testing of OO systems, Tools for testing of OO systems

I (11.1 & 11.3)

Text Book

- I. Foundations of Software Testing, Aditya P. Mathur, Pearson Education, 2008

Reference Books

1. Software Testing: Principles and Practices, Srinivasan D and Gopalswamy R, Pearson Education, 2006
2. Software Testing: Techniques and Applications, Arun Kumar Khannur, Pearson Education, 2011
3. Software Testing Foundations, 2nd Edition, Andreas Spillner, Tilo Linz, Hans Schaefer, Shroff Publishers and Distributors, 2007

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 126

MOBILE APPLICATION DEVELOPMENT

PART A

UNIT I

INTRODUCTION TO ANDROID

07 hrs

What Is Android? Android Versions, Features of Android, Architecture of Android, Android Devices in the Market.

ACTIVITIES AND INTENTS

Understanding Activities: Applying Styles and Themes to Activity, Hiding the Activity Title, Displaying a Dialog Window, Displaying a Progress Dialog, Linking Activities Using Intents: Resolving Intent Filter Collision, Returning Results from an Intent, Passing Data Using an Intent Object, Calling Built-In Applications Using Intents: Understanding the Intent Object, Using Intent Filters, Adding Categories , Displaying Notifications.

I (1, 2)

UNIT II

INTRODUCING ANDROID USER INTERFACE

08 hrs

Understanding the Components of a Screen: Views and ViewGroups, LinearLayout, AbsoluteLayout, TableLayout, RelativeLayout, FrameLayout, ScrollView, Adapting to Display Orientation: Anchoring Views, Resizing and Repositioning, Managing Changes to Screen Orientation, Persisting State Information during Changes in Configuration, Detecting Orientation Changes, Controlling the Orientation of the Activity: Creating the User Interface Programmatically: Listening for UI Notifications : Overriding Methods Defined in an Activity, Registering Events for Views.

DESIGNING USER INTERFACE USING VIEWS

Basic Views: TextView View, Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views, ProgressBar View, AutoCompleteTextView View, Picker Views, TimePicker View, Displaying the TimePicker in a Dialog Window, DatePicker View, Displaying the DatePicker View in a Dialog Window, List Views: ListView View, Customizing the ListView, Using the Spinner View.

I (3, 4)

UNIT III

DISPLAYING PICTURES AND MENUS WITH VIEWS

08 hrs

Using Image Views to Display Pictures: Gallery and ImageView Views, ImageSwitcher, GridView, Using Menus with Views: Creating the Helper Methods, Options Menu, Context Menu, Some Additional Views: AnalogClock and DigitalClock Views, WebView.

DATA PERSISTENCE

Saving and Loading User Preferences: Using getSharedPreferences(), Using getPreferences(), Persisting Data to Files: Saving to Internal Storage, Saving to External Storage (SD Card), Choosing the Best Storage Option, Using Static Resources, Creating and Using Databases: Creating the DBAdapter Helper Class, Using the Database Programmatically: Adding Contacts, Retrieving All the Contacts, Retrieving a Single Contact, Updating a Contact, Deleting a Contact, Upgrading the Database, Pre-Creating the Database, Bundling the Database with an Application.

CONTENT PROVIDERS

Sharing Data in Android: Using a Content Provider, Predefined Query String Constants, Projections, Filtering, Sorting, Creating Your Own Content Providers, Using the Content Provider

I (5, 6, 7)

UNIT IV

MESSAGING AND NETWORKING

07 hrs

SMS Messaging: Sending SMS Messages Programmatically, Getting Feedback After Sending the Message Sending SMS Messages Using Intent, Receiving SMS Messages, Updating an Activity from a Broadcast Receiver, Invoking an Activity from a Broadcast Receiver, Caveats and Warnings, Sending E-Mail: Networking: Downloading Binary Data, Downloading Text Files, Accessing Web Services, Performing Asynchronous Calls.

LOCATION BASED SERVICES

Displaying Maps: Creating the Project, Obtaining the Maps API Key, Displaying the Map, Displaying the Zoom Control, Changing Views, Navigating to a Specific Location, Adding Markers, Getting the Location That Was Touched, Geocoding and Reverse Geocoding, Getting Location Data: Monitoring a Location.

I (8, 9)

UNIT V

ANDROID SERVICES

07 hrs

Creating Your Own Services: Performing Long-Running Tasks in a Service, Performing Repeated Tasks in a Service, Executing Asynchronous Tasks on Separate Threads Using Intent Service Communicating between a Service and an Activity: Binding Activities to Services.

HARDWARE SENSORS

Using Sensors and the Sensor Manager: Supported Android Sensors, Introducing Virtual Sensors, Finding Sensors, Monitoring Sensors, Interpreting Sensor Values, Monitoring a Device's Movement and Orientation, Determining the Natural Orientation of a Device, Introducing Accelerometers, Detecting Acceleration Changes, Creating a Gravitational Force Meter, Determining a Device's Orientation, Understanding the Standard Reference Frame, Calculating Orientation Using the Accelerometer and Magnetic Field Sensors, Remapping the Orientation Reference Frame, Determining Orientation Using the Deprecated Orientation Sensor, Creating a Compass and Artificial Horizon, Introducing the Gyroscope Sensor, Introducing the Environmental Sensors: Using the Barometer Sensor, Creating a Weather Station.

I (10); II (12)

PART B
UNIT VI

INVADING THE HOME SCREEN

07 hrs

Introducing Home Screen Widgets: Creating App Widgets, Creating an Earthquake Widget, Introducing Collection View Widgets, Introducing Live Folders, Creating Live Folders, The Live Folder Content Provider, The Live Folder Activity, Creating an Earthquake Live Folder, Surfacing Application Search Results Using the Quick Search Box, Surfacing Search Results to the Quick Search Box, Adding the Earthquake Example Search Results to the Quick Search Box, Creating Live Wallpaper.

II (14)

UNIT VII

AUDIO, VIDEO, AND USING CAMERA

08 hrs

Playing Audio and Video, Manipulating Raw Audio, Creating a Sound Pool, Using Audio Effects, Using the Camera for Taking Pictures, Recording Video, Using Media Effects, Adding Media to the Media Store.

BLUETOOTH, NFC, NETWORKS, AND WI-FI

Using Bluetooth, Managing Network and Internet Connectivity, Managing Wi-Fi, Transferring Data Using Wi-Fi Direct, Near Field Communication.

II (15, 16)

UNIT VIII

ADVANCED ANDROID DEVELOPMENT

08 hrs

Paranoid Android, Introducing Cloud to Device Messaging, Implementing Copy Protection Using the License Verification Library, Introducing In-App Billing, Using Wake Locks, Using AIDL to Support Inter-Process Communication for Services, Dealing with Different Hardware and Software Availability, Optimizing UI Performance with Strict Mode.

MONETIZING, PROMOTING, AND DISTRIBUTING APPLICATIONS

Signing and Publishing Applications, Distributing Applications, An Introduction to Monetizing Your Applications, Application Marketing, Promotion, and Distribution Strategies, Analytics and Referral Tracking.

II (18, 19)

Text Books:

- I. Beginning Android Application Development, Wei-Meng Lee, Wiley India, 2011
- II. Professional Android 4 Application Development, Reto Meier, Wiley India, 2012

Reference Books:

1. Hello, Android, Ed Burnette, Pragmatic Programmers Publications, 2010
2. Learning Android, Marko Gargenta, O'reilly Media Publications, 2011
3. Android Cookbook, Ian F. Darwin, O'reilly Media Publications, 2012

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks, selecting **THREE** questions from **Part A** and **TWO** from **Part B**.

AT 127

E-COMMERCE

UNIT I

HISTORY OF E-COMMERCE

07 hrs

Early Business Information Interchange Efforts, Emergence of the Internet, Emergence of the World Wide Web, The Milestones, Advantages of E-commerce, Disadvantages of E-commerce, Online Extension of a BAM Model

BUSINESS MODELS FOR E-COMMERCE

E-business Models Based on the Relationship of Transaction Parties, E-business Models Based on the Relationship of Transaction Types

I (1, 2 (Selected topics))

UNIT II

ENABLING TECHNOLOGIES OF THE WORLD WIDE WEB

07 hrs

Internet Client-Server Applications, Networks and Internets, Software Agents, Internet Standards and Specifications, Internet Service Provider (ISP), Broadband Technologies, Hypertext, JavaScript, XML

I (3)

UNIT III

E-MARKETING

07 hrs

Traditional Marketing, Identifying Web Presence Goals, The Browsing Behaviour Model, Online Marketing, E-advertising, Internet Marketing Trends, Target Markets, E-branding, Marketing Strategies

I (4)

UNIT IV

E-SECURITY

08 hrs

Security on the Internet, E-business Risk Management Issues

E-PAYMENT SYSTEMS

History's Lesson about Payments: People Drive Change, Digital Payment Requirements, Digital Token-based E-payment Systems, Classification of New Payment Systems, Properties of Electronic Cash (E-cash), Cheque Payment Systems on the Internet, Risk and E-payment Systems, Designing E-payment Systems, Digital Signature

I (5, 6 (Selected topics))

UNIT V

E-CUSTOMER RELATIONSHIP MANAGEMENT

08 hrs

Customer Relationship Management, Typical Business Touch-points

E-SUPPLY CHAIN MANAGEMENT

Supply Chain

I (7, 8 (Selected topics))

UNIT VI

E-STRATEGY

08 hrs

Information and Strategy, The Virtual Value Chain, Seven Dimensions of E-commerce Strategy, Value Chain and Strategy, Planning the E-commerce Project, E-commerce Strategy and Knowledge Management, E-Business Strategy and Data Warehousing and Data Mining

I (9 (Selected topics))

UNIT VII

MOBILE COMMERCE

07 hrs

What is Mobile Commerce, Wireless Applications, Success Stories of Mobile Commerce Technologies for Mobile Commerce, Origins of WAP, WAP Programming Model, Wireless Technologies, Different Generations in Wireless Communication, Security Issues Pertaining to Cellular Technology

I (10 (Selected topics))

UNIT VIII

CUSTOMER-EFFECTIVE WEB DESIGN

08 hrs

Requirements of Intelligent Websites, Setting Website Goals and Objectives, Strategies for Website Development

LEGAL AND ETHICAL ISSUES

Scenario 1, 2, & 3, Computers as Targets for Crime, Computers as Storage Devices, Computers as Communications Tools, Cyberstalking, Privacy is at Risk in the Internet Age, Phishing, Copyright, Internet Gambling, Threats to Children, The Special Nature of Computer Ethics

I (11, 12)

Text Book:

I. E-Commerce – An Indian Perspective, P. T. Joseph, S. J., 3rd Edition, PHI, 2009

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 128

INTERNET APPLICATIONS

UNIT I

HYPertext MARKUP LANGUAGE

08 hrs

Basic HTML, The Document Body, Text, Hyperlinks, Adding More Formatting, Lists, Using Colour and Images, Images

MORE HTML

Tables, Multimedia Objects, Frames, Forms – Toward Interactivity, The HTML Document Head in Detail, XHTML – An Evolutionary Markup

I (2, 3)

UNIT II

CASCADING STYLESHEETS

07 hrs

Introduction, Using Styles: Simple Examples, Defining Your Own Styles, Properties and Values in Styles, Style Sheets – Worked Example, Formatting Blocks of Information, Layers

CASCADING STYLESHEETS 2

The Design of CSS2, Styling for Paged Media, Using Aural Representation, Counters and Numbering

I (4, 5)

UNIT III

AN INTRODUCTION TO JAVASCRIPT

08 hrs

What is Dynamic HTML?, JavaScript, JavaScript – The Basics, Variables, String Manipulation, Mathematical Functions, Statement, Operators, Arrays, Functions

OBJECTS IN JAVASCRIPT

Data and Objects in JavaScript, Regular Expressions, Exception Handling, Built-in Objects, Cookies, Events

I (6, 7)

UNIT IV

DYNAMIC HTML WITH JAVASCRIPT

07 hrs

Data Validation, Opening a New Window, Messages and Confirmations, The Status Bar, Writing to a Different Frame, Rollover Buttons, Moving Images, Multiple Pages in a Single Download, A Text-only Menu System, Floating Logos

I (8)

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UNIT V

PROGRAMMING IN PERL 5

07 hrs

Why Perl, Online Documentation, The Basic Perl Program, Scalars, Arrays, Hashes, Control Structures, Processing Text, Regular Expressions, Using Files, Subroutines, Bits and Pieces

I (9)

UNIT VI

CGI SCRIPTING

08 hrs

What is CGI?, Developing CGI Applications, Processing CGI, Introduction to CGI.pm, CGI.pm Methods, Creating HTML pages Dynamically, Using CGI.pm – An Example, Adding Robustness, Carp, Cookies

BUILDING WEB APPLICATIONS WITH PERL

Uploading Files, Tracking Users with Hidden Data, Using Relational Databases, Using lib www, Template based Sites with HTML::Mason, Creating and Manipulating Images

I (10, 11)

UNIT VII

AN INTRODUCTION TO PHP

08 hrs

PHP, Introducing PHP, Including PHP in a Page, Data Types, Program Control, Arrays, User-defined Functions, Built-in Functions, Regular Expression, Using Files

BUILDING WEB APPLICATIONS WITH PHP

Tracking Users, Using Databases, Handling XML

I (12, 13)

UNIT VIII

XML: DEFINING DATA FOR WEB APPLICATIONS

07 hrs

Basic XML, Document Type Definition, XML Schema, Document Object Model, Presenting XML, Handling XML with Perl, Using XML::Parser, Handling the DOM with Perl

I (14)

Text Book:

1. Web Programming – Building Internet Applications, Chris Bates, Third Edition, Wiley Student Edition, 2006.

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 129

CYBER CRIMES & IPR

PART A: CYBER CRIMES

UNIT I

INTRODUCTION

03 hrs

I (Chapter I complete)

CYBER CRIMES – THEIR KINDS AND CLASSIFICATION

05 hrs

I (Chapter II complete)

UNIT II

MODES & TECHNIQUES OF CYBER CRIME

05 hrs

I (Chapter III complete)

UNIT III

CYBER CRIME AND IPR VIOLATION

06 hrs

I (Chapter IV complete)

UNIT IV
INTERNATIONAL PROSPECTIVE OF CYBER CRIMES 07 hrs
I (Chapter VI complete)

UNIT V
PREVENTION OF CYBER CRIMES 06 hrs
I (Chapter VII complete)

PART B: INTELLECTUAL PROPERTY RIGHTS

UNIT VI
INTRODUCTORY 01 hrs
II (Part I complete)
COPYRIGHT 03 hrs
II (Part II complete)
TRADEMARKS 04 hrs
II (Part III complete)

UNIT VII
PATENTS – HISTORICAL OVERVIEW OF PATENT LAW, CONCEPT OF PATENT 02 hrs
II (Part IV-Chapters I and II complete)
PATENTS - PATENTABLE INVENTIONS 02 hrs
II (Part IV-Chapter III complete)
PATENTS - PROCEDURE FOR OBTAINING PATENT 02 hrs
II (Part IV-Chapter IV complete)
PATENTS – SPECIAL CATEGORY 02 hrs
II (Part IV-Chapter VI complete)

UNIT VIII
PATENTS – INFRINGEMENT AND REMEDIES 02 hrs
II (Part IV-Chapters VII complete)
PATENTS – OFFENCES AND PENALTIES 01 hrs
II (Part IV-Chapters VIII complete)
INDUSTRIAL DESIGNS 02 hrs
II (Part V complete)
GEOGRAPHICAL INDICATIONS 02 hrs
II (Part VII complete)

THE INFORMATION TECHNOLOGY ACT, 2000 02 hrs
II (Part XII complete)

Text Books:

1. Cyber Crimes & Law, Dr. Vishwanath Paranjape, Central Law Agency, Allahabad, 2010.
- II. Text book on Intellectual Property Rights, N. K. Acharya, 6th Edition, Asia law House, Hyderabad, 2012.

Reference Book:

1. Intellectual Property Law, P. Narayanan, 3rd Edition, Eastern Law House, 2012.

Web References:

- (a) Using the internet for non-patent prior art searches, Derwent IP matters, July 2000.
www.ipmatters.net/features/000707_gibbs.html
- (b) Patents by N R Subbaram, Pharma book syndicate.
- (c) www iptoday.com
- (d) <http://www.wipo.int/portal/index.html.en>

Note:

- I. Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying **20 marks**, selecting **THREE** questions from **Part A** and **TWO** from **Part B**.
- II. There will be no objective questions section for this theory subject.

AT 130

COMPILER DESIGN

UNIT I

INTRODUCTION

08 hrs

Language processors, The Structure of a compiler, The evolution of programming languages, The science of building a compiler, Applications of compiler technology, Programming language basics.

LEXICAL ANALYSIS

The Role of lexical analyzer, Input buffering.

I (1.1 to 1.6, 3.1 to 3.4)

UNIT II

LEXICAL ANALYSIS CONTD.

07 hrs

Specifications of tokens, Recognition of tokens.

SYNTAX ANALYSIS

Introduction, Context-free grammars, Writing a grammar.

I (3.3 to 3.4, 4.1 to 4.3)

UNIT III

SYNTAX ANALYSIS CONTD.

07 hrs

Top-Down parsing, Bottom-up parsing.

I (4.4 to 4.5)

UNIT IV

SYNTAX ANALYSIS CONTD.

08 hrs

Introduction to LR parsing: Simple LR, More powerful LR parsers (excluding Efficient construction of LALR parsing tables and Compaction of LR parsing tables), Using ambiguous grammars, Parser generators.

I (4.6 to 4.9)

UNIT V

SYNTAX-DIRECTED TRANSLATION

07 hrs

Syntax-directed definitions, Evaluation order for SDD's, Applications of syntax-directed translation; Syntax- directed translation schemes.

I (5.1 to 5.4)

UNIT VI

INTERMEDIATE CODE GENERATION

08 hrs

Variants of syntax trees, Three address codes, Types and Declarations, Translation of expressions, Type checking, Control flow, Back patching.

I (6.1 to 6.7)

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UNIT VII

RUN-TIME ENVIRONMENTS

07 hrs

Storage organization, Stack allocation of space, Access to non-local data on the stack, Heap management.

I (7.1 to 7.4)

UNIT VIII

CODE GENERATION

08 hrs

Issues in the design of code generator, The target language, Addresses in the target code, Basic blocks and Flow graphs, Optimization of basic blocks, A simple code generator.

I (8.1 to 8.6)

Text Book:

- I. Compilers- Principles, Techniques and Tools – Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman – 2nd Edition, Addison-Wesley, 2007.

Reference Books:

1. Engineering a Compiler – Keith Cooper, Linda Torczon – 2nd Edition, Morgan Kaufmann, Elsevier, 2011.
2. Crafting a Compiler with C – Charles N. Fischer, Richard J. leBlanc, Jr., Pearson Education, 1991.
3. Modern Compiler Implementation in C – Andrew W Apple Cambridge University Press, 1997.
4. Compiler Construction Principles & Practice – Kenneth C Loudon – Thomson Education, 1997.

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 131

CLOUD COMPUTING

UNIT I

CLOUD COMPUTING BASICS

08 hrs

Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud

YOUR ORGANIZATION AND CLOUD COMPUTING

When you can use Cloud Computing, Benefits, Limitations, Security Concerns, Regulatory Issues

I (1, 2)

UNIT II

THE BUSINESS CASE FOR GOING TO THE CLOUD

07 hrs

Cloud Computing Services, How those Applications help your Business, Deleting your Datacenter. Examples: Salesforce.com, Thomson Reuters

I (4)

UNIT III

CLOUD COMPUTING TECHNOLOGY

07 hrs

Hardware and Infrastructure: Clients, Security, Network, Services
Accessing the Cloud: Platforms, Web Applications, Web APIs, Web browsers

I (5, 6)

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UNIT IV

CLOUD COMPUTING TECHNOLOGY contd. **08 hrs**
Cloud Storage: Overview, Cloud Storage Providers
Standards: Application, Client, Infrastructure, Service
I (7, 8)

UNIT V

CLOUD COMPUTING AT WORK **07 hrs**
Software as a Service: Overview, Driving Forces, Company Offerings, Industries
Software Plus Services: Overview, Mobile Device Integration, Providers, Microsoft
Online
I (9, 10)

UNIT VI

CLOUD COMPUTING AT WORK contd. **07 hrs**
Developing Applications: Google, Microsoft, Development, Troubleshooting, Application
Management
Local Clouds and Thin Clients: Virtualization in your organization, Server Solutions, Thin
Clients
I (Selected topics from 11 and 12)

UNIT VII

MIGRATING TO THE CLOUD **08 hrs**
Cloud Services for Individuals, Cloud Services aimed at Mid-market, Enterprise-class
Cloud Offerings, Migration
I (13)

UNIT VIII

BEST PRACTICES AND THE FUTURE OF CLOUD COMPUTING **07 hrs**
Analyze your service, Best Practices, How Cloud Computing might Evolve
USING THE MOBILE CLOUD
Working with Mobile Devices
I (14, 20)

Text Book:

1. Cloud Computing – A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert
Elsenpeter, Tata McGraw- Hill, 2010

Reference Book:

1. Cloud Computing Bible, Barrie Sosinsky, Wiley India, 2011

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set
from each unit carrying 16 marks.

AT 132 CRYPTOGRAPHY & NETWORK SECURITY

UNIT I

INTRODUCTION **07 hrs**
Security Goals, Attacks, Services and Mechanism, Techniques
MATHEMATICS OF CRYPTOGRAPHY
Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence, Primes, Primality
testing, Factorization, Chinese Remainder Theorem, Quadratic Congruence,
Exponentiation and Logarithm
I (1, 2, 9)

UNIT II	
TRADITIONAL SYMMETRIC-KEY CIPHERS	07 hrs
Introduction, Substitution Ciphers, Transposition Ciphers, Stream and Block Ciphers	
INTRODUCTION TO MODERN SYMMETRIC-KEY CIPHERS	
Modern Block Ciphers, Modern Stream Ciphers	
I (3, 5)	
UNIT III	
DATA ENCRYPTION STANDARD (DES)	08 hrs
Introduction, DES Structure, DES Analysis, Multiple DES, Security of DES, Differential Cryptanalysis, Linear Cryptanalysis of DES	
I (6, Appendix N)	
UNIT IV	
ENCIPHERMENT USING MODERN SYMMETRIC-KEY CIPHERS	08 hrs
Use of Modern Block Ciphers, Use of Stream Ciphers, Other Issues	
ASYMMETRIC-KEY CRYPTOGRAPHY	
Introduction, RSA Cryptosystem	
I (8, 10.1, 10.2)	
UNIT V	
MESSAGE INTEGRITY AND MESSAGE AUTHENTICATION	08 hrs
Message Integrity, Message Authentication	
CRYPTOGRAPHIC HASH FUNCTIONS	
Introduction, SHA-512	
I (11.1, 11.3, 12.1, 12.4)	
UNIT VI	
DIGITAL SIGNATURE	07 hrs
Comparison, Attacks on Digital Signature	
KEY MANAGEMENT	
Symmetric-key Distribution, Kerberos, Symmetric- Key Agreement, Public- Key Distribution - Public Announcement, Trusted Center, Controlled Trusted Center, Certification Authority	
I (13.1, 13.4, 15.1, 15.2, 15.3, 15.4.1 to 15.4.4)	
UNIT VII	
SECURITY AT THE APPLICATION LAYER	07 hrs
E-Mail, PGP, S/MIME	
I (16)	
UNIT VIII	
SECURITY AT THE TRANSPORT LAYER	08 hrs
SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security	
I (17)	

Text Book:

1. Cryptography & Network Security, Behrouz A. Forouzan, Debdeep Mukhopadhyay, 2nd Edition, Special Indian Edition, Tata McGraw Hill, 2011

Reference Books:

1. Cryptography and Network Security, William Stallings, 5th Edition, Pearson Education, 2011
2. Atul Kahate, Cryptography and Network Security, Tata Mc Graw Hill, 2007

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

AT 133 SYSTEM MODELING & SIMULATION

UNIT I

INTRODUCTION TO DISCRETE-EVENT SYSTEM SIMULATION **08 hrs**
Introduction to Simulation: When simulation is the appropriate tool, When simulation is not appropriate, Advantages and disadvantages of Simulation, Areas of application, Systems and system environment, Components of a system, Discrete and continuous systems, Model of a system, Types of Models, Discrete-Event System Simulation, Steps in a Simulation Study
Simulation Examples: Simulation of Queuing Systems, Simulation of Inventory Systems
I (1, 2.1, 2.2)

UNIT II

GENERAL PRINCIPLES **07 hrs**
Concepts in Discrete-Event Simulation, List processing
SIMULATION SOFTWARE
Simulation in Java, Simulation in GPSS
I (3, 4.4, 4.5)

UNIT III

STATISTICAL MODELS IN SIMULATION **08 hrs**
Review of terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions, Poisson process, Empirical distributions
I (5)

UNIT IV

QUEUEING MODELS **07 hrs**
Characteristics of queuing systems, Queuing notation, Long-run measures of performance of queuing systems, Steady-state behavior of Infinite-Population Markovian Models, Steady-state behavior of Finite-Population Models, Networks of Queues
I (6)

UNIT V

RANDOM-NUMBER GENERATION **08 hrs**
Properties of random numbers, Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for Random Numbers
RANDOM-VARIATE GENERATION
Inverse transform technique, Acceptance-Rejection technique, Special properties.
I (7, 8)

UNIT VI

INPUT MODELING **07 hrs**
Data Collection, Identifying the distribution with data, Parameter estimation, Goodness-of-Fit Tests, Fitting a non-stationary Poisson process, Selecting input models without data, Multivariate and Time-Series input models
I (9)

UNIT VII

VERIFICATION AND VALIDATION OF SIMULATION MODELS **08 hrs**
Model Building, Verification, and Validation, Verification of Simulation Models, Calibration and Validation of Models

OUTPUT ANALYSIS FOR A SINGLE MODEL

Types of simulations with respect to output analysis, Stochastic nature of output data, Measures of Performance and their Estimation, Output analysis for terminating simulations, Output analysis for steady-state simulations
I (10, 11)

UNIT VIII

COMPARISON AND EVALUATION OF ALTERNATIVE SYSTEM DESIGNS 07 hrs

Comparison of two system designs, Comparison of several system designs, Metamodeling, Optimization via simulation

I (12)

Text Book:

- I. Discrete-Event System Simulation, 4th Edition, Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, P. Shahabudeen, Pearson Education, 2007

Reference Book:

1. Simulation Modeling and Analysis, 4th Edition, Averill M. Law, Tata McGraw-Hill, 2008

Note: Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 16 marks.

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GENERAL GUIDELINES for AMIETE Project work and Seminar

PROJECT WORK

3 Eligibility

For eligibility students may refer to the website www.iete.org

4

The project will consist of hardware/software, design/development, experimental / theoretical work of a contemporary topic or a combination of these. There will be no joint project work.

The students may work for the project in any industry, in any educational institution or in R&D laboratory. The student will be required to have a project guide from one of these places who can supervise and guide. In case of difficulties, the students may contact the local centre.

Pass marks for the project will be 5 CGPA. Students not getting 5 CGPA marks will be required to re-register for the project following the usual procedure. The students will have the option of taking up a new project or continue with the earlier project.

5 AT 135 Project work

Eligible students are required to forward their applications for registration of Project Work to the respective IETE Centres/Sub Centres where the examinations are conducted. The applications should include the synopsis of the Project Work, guide's bio-data and his willingness letter to guide the student, along with requisite project fees.

Project guide

Project guide can be chosen from any one of the following categories

- (a) An academic person with a Master's qualification in Engineering having atleast 5 years of experience
- (b) A person working in industry/institution with a Bachelor's degree in Engineering having atleast 10 years of experience
- (c) IETE corporate member with 10 years of experience

AT 135 Project work

6 Execution of the Project Approved and Submission of Project Reports

A student is expected to put in at least 6 hours/week spread over a period of 12 weeks for the project after the same has been approved.

Two bound copies of the project report are required to be submitted by the student (one copy for Evaluation board & one copy for IETE HQ record) to their respective local Centres who will intimate the date, time and venue for appearing before the Evaluation Board & presentation of the Project Work by the student.

7 Evaluation Board

The Regional Evaluation Board already set up for scrutinizing of the proposals will also form the Evaluation Board for assessment of the final Project Reports with one of the member acting as Chairman of the Evaluation Board. **IETE Centre will only act as facilitator and are not to be associated with the Examination Work.**

Evaluation is for 200 Marks (8 Credits)

The following points are required to be checked by the Evaluation Board at the time of assessment of the Project Reports.

- (a) **Time Limit;** The Project Report is required to be completed within a period of one year.
- (b) **Project Report;** The Project Report should contain the following certificate from the guide:

8 CERTIFICATE

This is to certify that this is a bonafide record of the Project Work done satisfactorily at

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_____ by Mr/Ms. _____ in partial fulfillment of his/her AMIETE Examination. This report has not been submitted for any other examination and does not form part of any other course undergone by the candidate.

(Signature, Name, Designation and Address of the Guide with the seal of the Organization/Institution/Laboratory)

9

10 Project Fee

Project Fee of Rs.1500/- is required to be submitted by the student while forwarding his/her application for the project work. The DD of requisite amount is to be drawn in favor of the IETE Centre.

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Eligibility:

For eligibility students may refer to the website www.iete.org

Registration:

Eligible students are required to submit their applications for the registration of seminar to the respective Centres/Sub-Centres where the examinations are conducted with a brief write up of the topic selected for approval. Seminar topic should be selected from the emerging technologies in ET,CS,IT only. Students who have undergone industrial training may make their presentation of their training report.

Scrutiny/Approval of Seminar proposals:

The members of Regional Evaluation Board will approve the topic of seminar. The students should make presentation on approved topics only.

Seminar Fees:

Each student is required to pay Rs.600/- Seminar fee to the respective IETE Centre/Sub-Centre.

Examination/Evaluation:

The IETE Centre / Sub-Centre will fix up a suitable date immediately after the main examination for the conduct of Seminar. The students should make Power Point presentation on the approved topic. In addition, they have to submit a complete report on the Seminar topic presented.

Evaluation is for 100 Marks (4 Credits)

AT 138 (WRITTEN) COMMUNICATION SKILLS AND TECHNICAL WRITING

UNIT I

COMMUNICATION: ITS TYPES AND SIGNIFICANCE 06 hrs

What is Communication; Process of Communication; Types of communication; The Media of Communication; Barriers in Communication; Effective Communication.

I (1.1, 1.2, 1.3, 1.4, 1.5, 1.6)

UNIT II

GRAMMAR 07 hrs

Synonyms; Antonyms; Words used as different parts of Speech; Spotting errors; Concord; Principle of proximity between subject and verb.

I (4.1, 4.2, 4.3, 4.6, 4.7, 4.8)

UNIT III

SYNTAX 06 hrs

Sentence Structure; Combination of Sentences; Transformation of Sentences; Verb Patterns in English.

I (5.1, 5.2, 5.3, 5.4)

UNIT IV

READING SKILLS 07 hrs

The Purpose of Reading; The Process of Reading; How to get Concentration in Reading; How to Develop Reading Skills; Reading Strategies; Reading Comprehension; Paraphrase; Preparing outlines.

I (2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.10, 2.11)

UNIT V

WRITING SKILLS 07 hrs

Effective Writing; Job Application, Bio-data, Personal Resume and Curriculum Vitae; Agenda and Minutes of a Meeting; Back office job for organizing a conference/seminar; Writing Styles; Scientific and Technical Writing; Precise Writing; Writing Sum and Substance; Writing paragraphs; Writing Essays.

I (3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.11)

UNIT VI

LISTENING SKILLS 04 hrs

The Process of listening; Two Styles of Communication; Soft Skills; Feedback Skills; Essentials of Good Communications; Types of Listening; Barriers to Listening; Note taking and Note making Listening.

I (8.1, 8.2, 8.3, 8.4, 8.6, 8.7, 8.8, 8.9, 8.10)

SPEAKING SKILLS 03 hrs

Skills of Effective Speaking; The Components of an Effective Talk; Tone of Voice; Body Language; Timing and Duration of Speech; Audio-Visual Aids in Speech.

I (9.1, 9.2, 9.4, 9.5, 9.6, 9.7)

UNIT VII

TECHNICAL REPORT AND SCIENTIFIC REPORT 06 hrs

Writing a good report; Types of Report; Structure of Reports; Collecting Data; Technical Proposals; Visual Aids; General Tips for Writing Reports.

I (15.1, 15.2, 15.3, 15.4, 15.5, 15.8, 15.9)

UNIT VIII

CAMPUS RECRUITMENT, INTERVIEW AND GROUP DISCUSSION 03 hrs

Main Features of Campus Recruitment; Tips for giving an Interview; Body language for Interviews; Group Discussion.

I (10.1, 10.2, 10.3, 10.4)

MEETINGS NEGOTIATIONS, PHONE AND MOBILE PHONE SKILLS **03 hrs**
Conducting Meetings, Skills for Participating in a Meeting; Attending Telephonic Calls;
Soft Skills for Global Leadership.
I (11.1, 11.2, 11.5, Chapter 16)

Text Book:

1. The Functional Aspects of Communication Skills, Prajapati Prasad, S. K. Kataria & Sons, New Delhi, Fifth Edition, July 2011-12.

Reference Books:

1. Business Communication, Sinha K. K, S. Chand, New Delhi.
2. Business Communication, Asha Kaul, Prentice Hall of India.
3. Business Correspondence and Report Writing: A Practical Approach to Business and Technical Communication, Sharma, R.C. and Krishna Mohan, Tata McGraw-Hill.
4. A New Approach to English Grammar for High Schools, Madan Sabina, Spectrum Books, New Delhi.

NOTE: Examination procedure.

(a) Theory: Consists of written examination for 80 marks.

(b) Students have to answer **FIVE** full questions out of **EIGHT** questions to be set from each unit carrying 12 marks.

AT 137 (ORAL)

Oral Test: Consists of an Oral Test to test the Communication Skills which includes an oral presentation on any subject, of the choice of students (e.g. About IETE, General knowledge topics etc.). This presentation need not be on technical subject. This test carries 20 marks.

AT 139 Quality Assurance & Reliability *

The dynamic nature of electronic Industry in terms of introduction of new technologies at rapid pace, increasing consumer awareness and the imperatives of stiff competition demand that the products being developed and released into the market meet the stringent Quality & Reliability assurance requirements.

The proposed course at undergraduates level aims to address the following topics of interest to electronics and computer engineers.

- Fundamentals of Quality assurance & Reliability.
- Specific QA requirements of Electronics products
- Component selection
- Design for reliability (FMECA, Derating, worst case analysis...)
- Process control for electronics fabrication
- Electro static discharge Control
- Product evaluation including environmental testing
- Reliability Assurance – Definitions, apportionment, prediction and demonstration.
- Applicable Standards
- Software assurance fundamentals
- Special requirements of Hi-rel application(Space, defence etc.,)
-

The emphasis will be more on familiarizing the tools necessary to inculcate quality awareness and provide further guidance, incase some one likes to pursue specific topics of interest. Insight into the existing analytical tools, current practices and their application potential will be highlighted.

*(Elective which will be included)

**RECOGNITION BY GOVERNMENT OF INDIA
STATE GOVERNMENTS/UNIVERSITIES/INSTITUTIONS**

The following State Governments/Universities/Institutions have recognized the Graduate-ship Examination AMIETE for the purpose of Recruitment to Superior Services/Posts/Higher Education.

State Governments

1. Govt. of Kerala - Gazette No. 7 dt.14 February 1978
Part I General administration (Rules
Department) G O (P) No.60/78 GAD.
2. Govt. of Uttar Pradesh - Pravidhik Shiksha Vibhag,
Lucknow (UP) No.
2031 – F/89-18 dt. 01 April 1989.
Office Memorandum.
3. Govt. of Nepal - Nepal Public Service Commission
letter dated 10.05.1990.

Universities

1. Association of Indian Universities - No. EV/II (515)/2010/1307 dated
30 Sept 2010
2. Anna University, Madras - Letter No. 26869/AA1/88 dt.
4.02.89 from the Registrar
3. Andhra University, Waltair - Letter No. LII(3)/19 15/90 dt.
08.07.1992
4. Amaravati University - Gazette Notification No. 46/1992
dt. 14th May, 1992
5. Banaras Hindu University, Varanasi- No. IT/ACD/GEN/VI – 7/689
dt. 21.09.1994.
6. Bharatidasan University, Tiruchirapali- No. 10656/D2/93 dt. 28.10.1993
7. Bombay University, Mumbai - Letter no. E1/C/8155 dt. 22
November, 1988 from the
Registrar.
8. Calcutta University - Resolution No. 319/75 Secy dt.
10.06.1991

Regulations and Syllabi for AMIETE (IT) Examination

9. Cochin University of Science and Technology - University Order No. AC, 3/213559/84 dt. 05.09.1984.
10. University of Indore (Now Devi Ahilya Viswavidyalaya) - No. ACM-II (195)/79 dt. 11.01.1980
11. Goa University, Goa - No. GU/1/Recog/Engg/130/94 18259 dt. 09.12.1994
12. Gulbarga University, Gulbarga - Notification No. UOG/ACA/92-93/2569 dt.17.10.1992
13. Gurunanak Dev University Amritsar - D.O. No. 3688 dt. 11.02.1986
14. HNB Garhwal University - No. UOG/Acad/92/2657 dt. 11.02.1992
15. Hyderabad University - Acad/U2/Recog/3941(1) dt. 23.08.1990
16. Indira Gandhi Nation Open University- No. B.IV/6/(8)/93/1155 dt. 6.06.1993.
17. Kakatiya University Warangal (AP) - No. 868/81/1985 dt. 26.07.1985.
18. Kerala University, Trivandrum - No. Acad. AIII/3/3 300/94 dt. 12.08.1994
19. Kurukshetra University Kurukshetra - No. ACM.II/267/92/32413 dt. 26.12.1992
20. Kuvempu University - No. KU/AC/BOS-I/2929/93-94 dt. 28/29.07/1993.
21. University of Madras - No. CR III/Recog/2029 dt. 23rd March 1978
22. Mother Teresa Women's University, - No. 2/EC/WU/R/1992. Dt 18.11.92 (Resolution Chennai No. 1992-113)
23. Mysore University - No. AC5/R5/407/87-88 dt. 28.05.91
24. Maharshi Dayanand University Rohtak- Resolution. No. 50 of 25.09.1989
25. Marathwada University - Ex/EQUI-Misc-41/89-90/50660-92 dt 18.09.1989.
26. Nagpur University - Exam/Recog/4276 dt. 05.09.1984
27. Nirma University, Ahmedabad - No. NU/AC/Equivalence/IT/10-1078 dt:30.07.2010

Regulations and Syllabi for AMIETE (IT) Examination

- | | | | |
|-----|--|---|--|
| 28. | Pondicherry University | - | No. PU/Aca-2/3/5681 dt. 26.02.1993 |
| 29. | Punjab University | - | No. 2724/GM dt. 03.12.1991 ST 996 dt18.02.1986 |
| 30. | Rani Durgavati Viswa Vidyalaya, Jabalpur | - | Notifications No. GS/89/66 |
| 31. | University of Roorkee (Now IIT, Roorkee) | - | No. Acd/1160/R-122 (Recog.) dt. 10.06.92 |
| 32. | Sardar Patel University | - | DB/38 dt. 25.04.1994. |
| 33. | Shivaji University, Kolhapur | - | Letter No. SU/Eligi/340 dt. 30 May 1989 |
| 34. | Tribhuvan University Kathmandu, Nepal- | - | Letter No. 107/041 dt. 31 st July 1984 |
| 35. | Sri Venkateswara (Tirupati) University- | - | Letter No. 27-826-C 1 (2)/89 dt. 16.11.1989. |
| 36. | Visva Bharati | - | No. G/D 43/163 dt. 13.11.1992 |
| 37. | Bharathiar University, Coimbatore | - | No. 1603/B/2/95/Recog. Dt. 18.09.1995 |
| 38. | Bangalore University | - | No. ACA-I/R2/Prof. Course/ AMIETE/96-97 dt 28.01.1997. |
| 39. | Sambalpur University | - | Notification No. 10420/Acad I dt. 10.07.1978. |
| 40. | Bengal Engg. College, Howrah | - | Notification – Admission to Post Graduate (Deemed University) Programme 1999-2000. |
| 41. | GGs Indraprastha University, Delhi | - | No. F IPV-3/10(1)/99/6246 dt 23/24-10-2000. |
| 42. | University of Jammu | - | Letter No. F Acad/V/122/2001/8548-49 dt |
| 43. | Gujarat University | - | No. Exam / 3A / Eli / 6370 / 2002 dt. 12.09.2002. |
| 44. | UP Technical University, Lucknow | - | No. U.P.T.U./ K.S.K./ 2003 / 1815 dt. 22.05.2003.10.03.2001. |

Regulations and Syllabi for AMIETE (IT) Examination

Institutions

1. Indian Institute of Science, Bangalore- As per IISC advertisement.
2. Indian Institute of Technology Delhi - BPGS/75/96/207 and Item No. 2 of the minutes of 38th Senate meeting at 18.10.1975.
3. Indian Institute of Technology, Chennai- Letter No. F /Acad/ACU/M2/86/658 dt.17.06.1986.
4. Indian Institute of Technology, Mumbai- D-III/1-9/94/523 dt 21.07.1994.
5. Indian School of Mines, Dhanbad - Letter No. 29.6/2/AC/84 dt. 14.06.1984
6. Thapar Instt. of Engg & Tech., Patiala- Letter No. EE/702/32 dt. 02 February 1990.
7. Institution of Engineers (I) - Letter No. EEA/AD/7 dt 29.04.1998.

Regulations and Syllabi for AMIETE (IT) Examination

Annexure - I

No.F.18-13/73-T-2.
Government of India
Ministry of Education & Social Welfare
Department of Education

.....

New Delhi-110001, dated the 28th June, '75.

OFFICE MEMORANDUM

Subject: Recognition of Technical and
Professional Qualifications.

In continuation of this Ministry's O.M.No.18-94/61-T-2, dated 17th December, 1969 (copy enclosed), this is to inform that on the recommendations of the Board of Assessment for Educational Qualifications, the Government of India have decided that a pass in the examinations of the Indian Professional Bodies/Institutions partly by exemption and partly by examination would continue to be treated as recognised for purposes of recruitment to superior posts and services under the Central Government.

V.R.
(V. R. Reddy)
Deputy Educational Adviser(T)

To
All Ministries/Departments of the
Government of India/State Governments, etc.

INDIA

No. F.18-4/85-T.7
Government of India
Ministry of Human Resource Development,
(Department of Education)

New Delhi, the
26th February, 1986.

To
The Assistant Secretary,
Institution of Electronics and
Tele-communication Engineers,
2 Institutional Area,
Lodi Road,
New Delhi

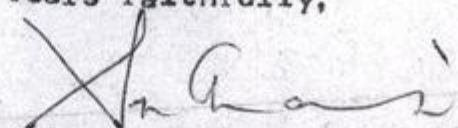
~~Mr~~ Shri K. Thomas Kora,
President,
The Institution of Electronics and
Tele-communication Engineers,
2, Institutional Area, Lodi Road,
New Delhi - 110003.

Sub:- Recognition of Educational Qualifications

Sir,

With reference to your letter No. IETE/738/
Exam/85 dated 20th December, 1985 on the subject
cited above, I am directed to confirm that a pass
in the Examination of the Indian Professional bodies/
Institution partly by exemption and partly by
examination should be treated as recognised by the
Govt. of India for the purpose of recruitment to
superior posts and services under the Central Govt.
and the recognition still holds good for the above
purpose.

Yours faithfully,


(S.N. Chakrabarti)
Deputy Educational Adviser (Tech.)

TELEX ()

SCOLUIN

Regulations and Syllabi for AMIETE (IT) Examination

Annexure - III

No.F.17/2/76-E.I(B).
UNION PUBLIC SERVICE COMMISSION
DHOLPUR HOUSE
.....

New Delhi-110011, the

31/12/77
2/1/78

To

The Secretary,
The Institution of Electronics and Tele-
Communication Engineers,
2, Institutional Area,
Lodi Road, New Delhi-110003.

Subject: -Graduateship Examination of the Institution
of Electronics and Tele-communication Engineers -
Question of eligibility of candidates with the
qualification for admission to the IAS etc.
and other Examinations conducted by the UPSC.

Sir,

In continuation of this office letter of
even number dated the 28th October, 1976, on the
subject noted above, I am directed to enclose a
copy of the Press Note regarding the recognition
of technical and professional qualifications for the
purpose of admission to the IAS etc. ~~and~~ and other
Examinations conducted by the Union Public Service
Commission for recruitment to non-technical Services
and posts under the Central Government.

Yours faithfully,


(B. DASGUPTA)

Under Secretary,
Union Public Service Commission.
.....



भारतीय विश्वविद्यालय संघ

ए आई यू हाउस, 16, कॉमरेड इन्द्रजीत गुप्ता मार्ग
(कोटला मार्ग) नई दिल्ली-110002

Association of Indian Universities

AIU House, 16, Comrade Indrajit Gupta Marg (Kotla Marg)
New Delhi 110 002

NO: EV/II(515)/2010/ 1307
September 30, 2010

The Secretary General,
Institution of Electronics &
Telecommunication Engineering
2 Institutional Area, Lodhi Road
New Delhi -110003.

Dear Sir,

This has reference to your letter No. IETE/738/2010/Recog-AMIET dated September 17, 2010 seeking clarification on the parity of Associate Membership Examination of Institution of Electronics and Telecommunication, New Delhi.

We would like to mention that 'Associate Membership (Graduateship) Examination of Institution of Electronics and Telecommunication Engineers (IETE), Lodhi Road, New Delhi has been recognized by the Government of India for purpose of employment where Bachelor degree in Engineering is prescribed qualification.

As IETE Examinations are recognized by the Government of India, we do not foresee any difficulty in acceptance of the qualifications at Indian Universities, on merits of admission to higher courses.

Thanking you,

Yours faithfully,

Sambhav Srivastava
Section Officer (Ev)

7

उत्तर प्रदेश शासन
प्राविधिक शिक्षा अनुभाग - 1
संख्या-2031-एक/89-18-प्रा.वि.शे-1-4/79.
लखनऊ, दिनांक 15 जुलाई, 1989

कार्यालय-ज्ञाप

अधोहस्ताक्षरी को संकेत करने का निर्देश हुआ है कि राज्यपाल महोदय इन्स्टीट्यूट ऑफ इंजिनियरिंग एण्ड टेक्नोलॉजिकल एजुकेशन इंजीनियर्स नई दिल्ली द्वारा आयोजित एंड-आइ-टी-ईओ परीक्षा को राज्य सेवाओं में, जिनमें एंड-आइ-टी-ईओ की अर्हता निर्धारित हो, को भी समान पात्रता प्रदान किये जाने की आवश्यकता प्रदान करते हैं।

पूजिता कुमार,
सचिव।

संख्या-2031-एक/89-18-प्रा.वि.शे-1-4/79, तददिनांक

प्राविधिक शिक्षा अनुभाग को सूचनाएँ एवं आवश्यक कार्यवाही हेतु
व्यक्तिगत :-

- 111. सचिव, इन्स्टीट्यूट ऑफ इंजिनियरिंग एण्ड टेक्नोलॉजिकल एजुकेशन इंजीनियर्स, 2 इन्स्टीट्यूट ऑफ इंजिनियरिंग एण्ड टेक्नोलॉजिकल एजुकेशन, लोधी रोड, नई दिल्ली - 110003 को उनके पत्र संख्या-आइ-टी-ईओ/738/111/89/इकाईम दिनांक 7-4-89 के सन्दर्भ में।
- 112. सचिव, लोक सेवा आयोग, उत्तर प्रदेश, इलाहाबाद को संयुक्त सचिव, लोक सेवा आयोग के आचार्य सं-566/34/तिस-7/83-84, दिनांक 23-5-84 के सन्दर्भ में।
- 113. निदेशक, प्राविधिक शिक्षा, उत्तर प्रदेश, कानपुर।
- 114. कुल सचिव, स्वामी विवेकानंद विश्वविद्यालय, स्वामी।
- 115. प्रधानाचार्य, राजकीय केंद्रीय पत्र संस्थान, कानपुर।
- 116. प्रधानाचार्य, राजकीय वास्तुशास्त्र महाविद्यालय, लखनऊ।
- 117. प्रधानाचार्य, महत मोहन मालवीय इंजीनियरिंग कॉलेज, गोरखपुर।
- 118. प्रधानाचार्य, पुस्तकालय इंजीनियरिंग कॉलेज, झांसी।
- 119. निदेशक, इन्स्टीट्यूट ऑफ इंजीनियरिंग एण्ड टेक्नोलॉजी, लखनऊ।
- 1110. निदेशक, कर्पूरा नेहरू इन्स्टीट्यूट ऑफ टेक्नोलॉजी, मुल्तानगर।
- 1111. प्रधानाचार्य, जोती बाल नेहरू राजनल इंजीनियरिंग कॉलेज, इलाहाबाद।
- 1112. निदेशक, एच.टी.टी.आइ, कानपुर।
- 1113. डीन, उच्च जालेज ऑफ टेक्नोलॉजी, पतनगर, चैनीताल।
- 1114. रजिस्ट्रार, दयालनगर इंजीनियरिंग कॉलेज, आगरा।
- 1115. सचिवालय के सहायक अनुभाग।
- 1116. सचिव, उत्तर प्रदेश राज्य विद्युत परिषद, लखनऊ।

आज्ञा से
पूजिता कुमार
17.7.89

नरेन्द्र कुमार श्रीवास्तव
असि सचिव।

24 JUL 1989

Regulations and Syllabi for AMIETE (IT) Examination

Extracts of the Recognitions Granted to Graduateship Examination (AMIETE) by Government of India

Ministry of Scientific Research and Cultural Affairs
(now Ministry of HRD) O.M.

No.F.18.62.57.T.5 dated 24th June 1959

Subject Recognition of Technical and Professional Qualifications

The undersigned is directed to say that the Government of India, on the recommendations of the Board of Assessment for Technical and Professional Qualifications, have decided that a pass in the Graduate membership Examination of the *Institution of Telecommunication Engineers (India) be recognized for purposes of recruitment to superior posts and services under the Central Government.

Sd/
DVNarsimhan
Deputy Educational Adviser (Tech.)

* Now known as The Institution of Electronics & Telecommunication Engineers (IETE)

Recognition of Graduateship Examination by UPSC

(Extract of the press note regarding the recognition of Technical and Professional Qualification for the purpose of Admission to the IAS etc. and other examination conducted by the Union Public Service commission for Recruitment to Non-technical Service and posts under the Central Government).

Vide letter No.F.17/2/76 (B) dated 31 st December, 1977 the Union Public Service Commission have decided that professional and technical qualifications such as a pass in Section A and B of the AMIETE Graduateship Examination of Institution of Electronics and Telecommunication Engineers, etc. which are recognized by the Government as equivalent to degree in engineering for purpose of recruitment to superior Services/Posts under the Central Government should also be recognized for purposes of admission to competitive examinations conducted by them for recruitment to non-technical services/posts (viz., the IAS etc. Assistant's Grade and Combined Defence Service Examination) for admission to which a degree of recognized University or equivalent has been prescribed as the basic educational qualification .

Association of Indian Universities: Recognition of AMIETE

(No EV/II (515)/93/42311 dated June 10, 1993)

We thankfully acknowledge your letter NO.IETE/38/93 dated April 19, 1993 addressed to our Secretary General.

We are happy to know that IETE, the country's premier professional body devoted to progress in Electronics and Telecommunication Engineers have conducted three examination of 'C' Level (M.Tech. Level) in Computer science which carries the accreditation of the Ministry of Human Resource Development, Govt. of India. We are also aware that AMIETE conducted by the Institution is already recognised by the Govt. of India and is accepted by national level GATE. As IETE Examinations are recognised are recognised by Govt. of India, we do not foresee any difficulty in acceptance of the Institution qualifications at Indian Universities, on merits for purpose of admission to higher courses.

We should be glad to write to any university in case of any difficulty to IETE Graduates.

Thanking you,

Yours faithfully,
Sd/
K.C.Kalra
Deputy Secretary

Present Status of Recognition of IETE Courses by MHRD

Current status in respect of IETE writ petition No. W.P.(C.) N. 3239/2013 & CM Appl. 6125/2013 in respect of recognition of its Courses by MHRD.

The above writ petition filed by IETE HQ in Delhi High Court on 13 May 2013 came up for 5th hearing on 09 Jan 2014.

The Hon'ble High Court directed the parties to complete the pleadings before the Joint Registrar on 23 Apr 2014 before the next date of hearing. The Joint Registrar is directed to list these matters before the Court after completion of the pleadings. **Interim Order will continue (Stay).**

Issued by
Secretary General
For and on behalf of The Institution of Electronics and
Telecommunication Engineers (IETE)

Status in respect of recognitions granted for the examinations conducted by IETE.

A writ petition was filed by the Institution in Delhi High Court on 13 May 2013 for quashing the orders of MHRD dated 10 July 2012 and 06 Dec 2012 withdrawing the recognition in perpetuity for equivalence in Central Govt jobs after 31 May 2013. The writ petition came up for hearing on 17 May, 21 May and 23 May 2013.

The Hon'ble High Court, Delhi is pleased to stay the orders of the Ministry of Human Resource Development dated 06 Dec. 2012 with respect to the dead line of 31 May 2013 till the next date of hearing i.e. 06 Aug 2013. However, the admissions, which are made, will be subject to final orders, which will be passed in the writ petition.

The matter came up for further hearing before the Delhi High Court on 06 Aug 2013.

On the last date of hearing of our Writ Petition in Hon. High Court Delhi, following order has been issued

- (i) The case listed for next hearing on 9th January 2014.
- (ii) The OM dated 6/12/2012 with respect to the dead line of

31/05/2013 qua the petitioners shall remain stayed till further of the Court.

The above statement does not affect students who have passed & enrolled for IETE courses before 31st May 2013.

The last date of hearing of our case regarding recognitions of our courses from MHRD was 9th Jan 2014 in Hon'ble High Court of Delhi. The Hon'ble High Court has decided the interim orders to continue.

Issued by

Secretary General
The Institution of Electronics and Telecommunication Engineers (IETE)

Status in respect of recognitions granted for the examinations conducted by IETE.

A writ petition was filed by the Institution in Delhi High Court on 13 May 2013 for quashing the orders of MHRD dated 10 July 2012 and 06 Dec 2012 withdrawing the recognition in perpetuity for equivalence in Central Govt jobs after 31 May 2013. The writ petition came up for hearing on 17 May, 21 May and 23 May 2013.

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However, the admissions, which are made, will be subject to final orders, which will be passed in the writ petition.

The matter has now been fixed for further hearing before the Delhi High Court on 06 Aug. 2013.

Issued by

Secretary General
The Institution of Electronics and Telecommunication Engineers (IETE)

MISCELLANEOUS INFORMATION

AWARD FOR AMIETE

• **Eligibility**

To be eligible to get AMIETE a student is required to score a minimum grade D in individual subjects and minimum grade C in Project, Seminar & Lab examinations, and should have CGPA of 5 or more.

• **Procedure for obtaining Certificate of passing AMIETE Section A and B examinations.**

Once all requirements to complete AMIETE are met, students are eligible for award of certificate. Provisional Certificate/Consolidated Grade Sheet is issued on receipt of

(a) A declaration that the student would not appear for any improvement in future.

(b) A Bank draft of requisite fee for AMIETE Certificate.

Final Degree Certificate is sent to the student within 6 months time or handed over during Convocation Ceremony (usually held in December every year with prior information.)

A student on completion of AMIETE and after paying requisite fee is automatically enrolled as Associate Member .

• **Bonafide Certificate**

Bonafide certificate authenticating student's registration with IETE, is issued to those who are yet to complete the course on a payment of Rs 100/-.

Migration & Character Certificate

For the purpose of admission to other Universities for higher studies, Migration & Character certificate are also issued from IETE HQ on payment of Rs.100/-(US \$20) for each

• **Transcripts**

Transcripts (certifying written records), student's details, recognition of course passed, duration of the course, medium of instructions, required by Universities abroad. Can be obtained from IETE HQ on payment of Rs.100/- (US \$ 20) for each transcript.

• **Duplicate Final Grade Sheet and Certificate**

A student is required to submit an application with the details of membership no., year of completion, stream etc. along with the following documents, in case he requires duplicate Grade Sheet /Certificate

(a) Fee in the form of (DD) in favour of **IETE, and New Delhi**, for Rs 500/- each for Grade sheet and certificate.

(b) An affidavit (on stamp paper of Rs 10/-) affirming and verifying the loss etc. duly signed by a notary.

• **Semester Grade Sheet**

Duplicate Grade Sheet for the past semester examinations can be obtained on payment of Rs 100/- per semester.

Regulations and Syllabi for AMIETE (IT) Examination

Last Date for Enrolment for June exam is 28 February and for December exam is 31 August. Please submit your application preferably 15 days before these dates.

Form IETE-2

THE INSTITUTION OF ELECTRONICS AND TELECOMMUNICATION ENGINEERS (IETE)

2, Institutional Area, Lodhi Road, New Delhi-110 003

Phone: 011-43538858/41/55/56

Email: membership@iete.org

Signature of the candidate



A	B
Size of photograph 3.5x3.5cm exact.	
*Paste within the box ABCD.	
*To be attested by the gazette Officer/ Corporate Member of IETE	
C	D

To,
The Secretary General, IETE
2, Institutional Area,
Lodhi Road, New Delhi-110 003

Sir

- I wish to enroll myself as a Student Member of (Please tick ✓ the course opted by you carefully out of the following)

AMIETE : Information Technology (IT)
(Degree level)

- Name _____
(In Capital Letters) (Name should be written as per High School Certificate)

- Date of Birth _____
- Father's/Husband Name _____

- Correspondence Address _____
(In Capital Letter)
- Permanent Address _____
(In Capital Letter)

_____ Dist _____

_____ Dist _____

State _____ PIN _____

State _____ PIN _____

- Phone No. (O) _____ (R) _____ Mobile _____

Fax _____ Email _____

FOR OFFICE USE ONLY

- Accepted
- Withheld/ Rejected with reason
- Remarks

Mem No.

Signature _____

Regulations and Syllabi for AMIETE (IT) Examination

8. Educational Qualifications

(Attach attested copies of certificates Age/ Qualification/ Training/ Study etc.)

Examination Passed	Subjects	Board/ University	Year of Passing	Initial of Proposer(s)
Class 10 with General Science and Maths				
10+2/ Intermediate (Physics and Maths)				
Diploma				
B.Sc / M.Sc/ BE / B.Tech				

9. I enclose herewith Bank Draft NoDatedfor Rs.6000/- Drawn on in favour of IETE, New Delhi.(Please see SI No.10 of Instructions to applicants)

If you are using downloaded form, Please Send a **Photograph (3.5x3.5cms) and Separate Bank Drafts** in the name of IETE, Delhi.

*Rs.350/- - Cost of Regulation. Detailed Syllabus and Postage

*Rs.6000/- - Enrollment Fee

10. Certificate Practical Experience/Training/Study to be filled in by the Head of Dept/ Institution/ Organization (See Bylaw 17 Refer para 2, on page No 4 of the Regulation of DIPIETE Examination) or (See Bylaw 15 / Bylaw 16 on page no.4 of the Regulation & Syllabi of AMIETE Examination). I/ We certify that has been studying / working/ engaged(Write the field of his working/ study) since

Seal of Dept/ Org.

Signature & Date.....

Name

Designation

11. *PROPOSAR'S RECOMMENDATION (TO BE FILLED BY A CORPORATE MEMBER OF IETE ONLY)
Having satisfied myself in respect of the applicant's qualification and experience, I recommend him/ her to the Council as being in every way a fit and proper person to be admitted as a STUDENT MEMBER of the Institution, in accordance with Byelaw 17 (for DIPIETE) or Bylaw 15 / Bylaw 16 (for AMIETE).

Mem. No.....

Signature & Date.....

Name of the Proposer.....

DECLARATION BY THE CANDIDATE

I declare that the information given in this form is accurate to the best of my knowledge. Obligation duly signed is given on the Card enclosed.

Name of the Candidate.....

Signature of the Candidate.....

Date

IMPORTANT

1. The institution of Electronics & Telecommunication Engineers (IETE) neither recognizes nor accepts affiliations of any Private Coaching Institute/ College.
2. Membership form IETE-2 forms part of the Regulation & Syllabi of DIPIETE/AMIETE Examination
3. * In Case candidate is finding difficulty in getting his application proposed, he may send his application to HQ, IETE directly for necessary assistance.
4. Student member are advised to ensure that they do not accept the membership form (IETE-2) without the copy of the Regulation and syllabi of DIPIETE/ AMIETE Examination.
5. Fees once paid will neither be adjusted nor be refunded under any circumstances.

Regulations and Syllabi for AMIETE (IT) Examination

INSTRUCTIONS TO APPLICANTS (To be retained by the student)

(To be read in conjunction with Regulations & Syllabi for AMIETE Examination)

1. a) There are two streams available to a candidate for enrolment in DipIETE viz. Electronics & Telecommunication Engineering and Computer Science & Engineering. Applicant is required to write his enrolment option in Column 1.
- b) There are three streams available to a candidate for enrolment in AMIETE viz. Electronics & Telecommunication Engineering, Computer Science & Engineering and Information Technology. Applicant is required to write his enrolment option in Column 1.
2. Applicants are advised to submit their forms duly filled in direct to the IETE HQ. IETE neither recognizes nor accepts affiliation of any private coaching institution. Col 10 if filled and certified by these institutions will not be accepted. Incomplete application form will be rejected.
3. One shall be allowed to appear in the DipIETE/ AMIETE Examination only after one's enrolment as a Student member with the Institution. Only those Student members who get enrolled on or before 28th February and 31st August will be allowed to appear in the next DipIETE/ AMIETE Examination, held in June and December respectively. Processing of application takes minimum 15 days, therefore to get enrolled, the application completed in all respect must reach IETE HQ well before 14th February for June examination and 14th August for December Examination. Time period for LAB practice examination is counted from the date of enrollment, therefore, students are advised not to wait for last dates but get enrolled as early as possible.
4. Candidates are advised to submit all documents such as Membership Form, Identity Card, IETE Membership Card, self addressed envelope duly filled in, Qualification Certificates, Mark Sheet, Date of Birth Certificate and Experience Certificate (attested copies are required to be submitted) along with, the declaration on the reverse of the Membership Card duly signed by the candidate to IETE HQ only.
5. Membership No. will be allotted by IETE HQ Office. Candidates are advised to leave these columns blank. Membership No will be mentioned while corresponding with IETE HQ.
6. Candidates are advised to paste their stamp size photograph and fill in other columns of the Identity Card and IETE Membership Card. The photographs pasted (not stapled) on the application and Membership Card should be attested by either a Corporate member of the Institution or a Gazetted Officer, with his membership No./ Stamp affixed on it. They must write their complete address with Pin Code No.
7. Membership number, Identity card, receipt of amount paid and examination form will be sent to the applicant within 8-10 weeks of receipt of the application in IETE HQ.
8. FEE FOR ENROLMENT

	Members in India (Rs)	Members Abroad (US \$)
Admission Fee	200.00	40.00
Application Fee	200.00	40.00
Building-cum-Library Fee	1300.00	260.00
Composite Subscription (for 5 years)	2500.00	360.00
Lab Infrastructure Fee	600.00	100.00
Development Fee	500.00	100.00
Establishment Fee	700.00	100.00
Total	6000.00	1000.00
Enrolment Form submission Fee	250.00	

9. Once the candidate is enrolled, the enrolment fee will not be refunded under any circumstances.
10. All remittances shall be made by crossed Bank Draft, drawn in favour of "Secretary General, IETE, New Delhi". MONEY ORDER, CHEQUES, IPO or CASH WILL NOT BE ACCEPTED.

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11. Any change in the mailing address should be notified immediately. This will help the Office to keep its database up-to-date, and mail important Circulars/Notices/Letters and Journals of Education at the correspondence address.
12. The IETE neither recognizes nor accepts affiliations of any private coaching institution.
13. The student membership will be valid for 10 consecutive examinations from the date of enrollment. Thereafter, the student members not completing their DIPIETE/ AMIETE Examination are to seek re-enrollment by remitting applicable amount before or immediately after the expiry of the membership period to continue their membership to enable them to appear in the remaining papers and complete DipIETE/ AMIETE. Any examination chance not availed by a student due to whatsoever reason will be counted within 10 examinations. No Notice for renewal of membership will be sent.
14. A student is required to complete DipIETE/ AMIETE Examination within 2 enrollment periods from the date of initial enrollment. The student will, therefore, be permitted to seek only one renewal of membership. Renewal is to be applied for before or immediately after the expiry of initial enrollment with continuity of enrollment maintained by the student. Missed chances will be counted towards total number of examinations and no relaxation in this regard will be permissible. If the request for renewal is made after the stipulated period of two enrollments, admission will be treated as a fresh enrollment and no benefit in terms of exemptions in respect of subject(s) passed or exempted during the earlier enrolment will be granted. Students must renew their membership in time. Otherwise they will not be allowed to appear in the DipIETE/ AMIETE examination.
15. All Legal cases concerning IETE HQ shall lie within jurisdiction of Delhi courts only.
16. Every Student member successfully completing Sections A&B subjects including lab examinations with project work, seminar and a course in Communication Skills & Technical Writing of AMIETE Examination as per regulations prescribed by the Council from time to time shall be eligible to become a Associate Member (AMIETE). On payment of requisite fee for membership, he/she will be awarded a certificate of having passed the AMIETE examination of the institution and shall then be eligible for transfer to the class of AMIETE. To pass AMIETE Examination, a student is required to score a minimum grade of "D" having a grade point of 4 for each subject and having an aggregate of 5 CGPA. However for Project, Seminar and lab examinations he/she should get a minimum grade of "C" having a grade point of 5.
17. First examination application form as per the stream opted by the student will be dispatched to him/her along with the identity card at the time of enrolment.

Regulations and Syllabi for AMIETE (IT) Examination



The Institution of Electronics and Telecommunication Engineers
2, Institutional area, Lodhi Road, New Delhi-110 003.

EXEMPTION APPLICATION FORM

Dear Sir/Madam,

1. I student membership No.....Name.....of stream.....request you to grant me exemption based on my qualification in the following subject.

	Sub Code	Subject	Qualification based on which exemption asked from Univ./Institution should be mentioned correctly
(a)	<input type="text"/>	<input type="text"/>	<input type="text"/>
(b)	<input type="text"/>	<input type="text"/>	<input type="text"/>
(c)	<input type="text"/>	<input type="text"/>	<input type="text"/>
(d)	<input type="text"/>	<input type="text"/>	<input type="text"/>

(For more subjects, use photo copy of this from)

2. A DD of Rs.....bearing machine no.....ofis enclosed herewith as exemption fee.

3. I am enclosing following documents (Photo-copies duly attested)

- (a) Final/Provisional certificate.
- (b) Marksheets of all semesters.
- (c) Copy of the syllabus of the course.(Marked on it subject code for which exemption of the subject is applied.
- (d) Any other document.

4. Email address :.....

5. Phone No.....

(Signature of Student)

Note :

- 1. Fee for exemption for AMIETE is Rs 800/- where as for DipIETE, it is Rs 700/-
- 2. This application is not to be clubbed with exam form.
- 3. Relevant sufficient syllabus matching upto 80% mentioning the Textbooks & Reference Books should be enclosed.