

Information Brochure-cum-Application Form
Advanced Level Course
In
Computer Science



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The Institution of Electronics and Telecommunication Engineers
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ABOUT THE INSTITUTION

INTRODUCTION

The Institution of Electronics and Telecommunication Engineers (IETE) was founded in the year 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 a National Apex body and its activities are manifold for furthering the cause of development in the key sectors of national economy-namely Electronics, Telecommunication, Computer Engineering, Information Technology and other allied disciplines. The emphasis of 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 developmental needs of aspiring professionals. The IETE also provides a platform for meaningful interaction among professionals from the Industry, R&D organisations, Educational Institutions and Government Departments.

Membership

The IETE is the National Apex Professional body of Electronics and Telecommunication Engineers and is headed by Council, elected from its corporate members. 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, Associates and Student Member. Organisation Membership is also open to public/private sector companies, Institutions, R&D Laboratories and Government Organisations.

Objectives

The IETE focuses on advancing the science and technology of Electronics, Telecommunications, Computers, Information Technology and related areas. To achieve this, the IETE conducts and sponsors technical meetings, conferences (National & International), symposia, exhibitions, workshops, tutorials, etc. all over the country, the most important being the Annual Technical Convention (ATC) held in September/October and the Mid term Symposium (MTS) held in March/April. The Institution publishes Technical papers in the above areas and provides continuing education to update its members. IETE members are key professionals engaged in all development aspect of its discipline in India and abroad.

Recognition

IETE is recognised by the Govt. of India as Educational Institution of National Eminence. The IETE has also been recognised by the Govt. of India, Ministry of Science and Technology, Department of Scientific and Industrial Research as a Scientific and Industrial Research Organisation (SIRO).

Examinations

The IETE conducts the AMIETE (Graduate Membership) Examination a pass in which is recognised for purpose of recruitment to superior posts and services under the Central Government by Ministry of Scientific Research and Cultural Affairs (Now Ministry of HRD) vide O.M. No. F.18.62.57.T.5 dated 24th June 1959, Union Public Service Commission and several State Governments, Universities, and Institutions in India and abroad. IETE also conducts a 3-year Diploma Level Examination in Electronics and Telecommunication Engineering and related fields in order to make available trained technical personnel especially at the shop floor level in these fields. Pass in this Diploma Level examination is recognised by the Department of Education, Ministry of Human Resource Development, Government of India for recruitment subordinate posts.

The IETE also conducts a Post Graduate Advanced Level Course in Computer Science (ALCCS) in order to make available trained technical personnel in the higher level in the field of Computer Science.

ADVANCED LEVEL COURSE IN COMPUTER SCIENCE (ALCCS)

The ALCCS is a Three-Year (Six Semester) Part-time evening Course. **The course is recognised by the Department of Education, Ministry of Human Resources Development, Govt. of India vide their letter No. F.1-56/88.T.13/Td-V(.) dated 4th May 1990** for appointment to superior posts and services under the Central Government where M. Tech Degree in Computer Science is the prescribed qualification for recruitment, effective from 1987.

- **The course has also been recognised by Jawaharlal Nehru Technology University, Hyderabad vide their letter no.A1/1640/2008 dated 06/05/2008.**
- **The course has also been recognized by Guru Gobind Singh Indraprastha University vide letter no. GGSIPU/SO(AA)/2008-09/286 dated 2nd January 2009.**

This course is designed to impart training in various areas of software development The course includes several advanced courses e.g. Parallel Computing, Object Oriented Programming, Multimedia Information Systems, Computer Networks and Computer Vision. It also provides adequate background for taking up advanced level studies in the area of Computer Science. After qualifying the course, one should be able to function as :

- Project leader in large Computerisation Projects
- System Specialist/Manager in large Computer installation
- Consultant
- R&D Scientist.

Advanced Level Course in Computer Science (ALCCS) at present is conducted at Delhi and Hyderabad and is likely to start at Ahmedabad shortly. Lab and Library facilities appropriate to the curriculum are provided at these Centres.

ELIGIBILITY

A candidate seeking admission to this course should have either of the following

B.E./B.Tech/AMIETE/AMIE or any other equivalent qualification recognised by the Council of the IETE.

OR

MCA/MSc – Computer Science, Electronics, Physics, Mathematics, Statistics, Operation Research.

DURATION

The duration of the course is three years covering six semesters. The first five semesters are spent in the course work. During the last two semesters, students work on a dissertation /thesis duly approved the competent authority under the supervision of an expert who acts as a project Guide. Since most of the students are working, students are expected to find an expert in the area in which they wish to carry out work under his supervision. Students are permitted to carry over their papers to subsequent semesters, however, they must finish all their requirements including dissertation/thesis within FIVE years.

ADMISSION PROCEDURE

An advertisement announcing the commencement of the course and calling for application for admission will be notified in the leading newspaper/s at New Delhi and Hyderabad. Eligible candidates are required to appear at written/oral test and interview on the notified dates. (Refer Schedule I)

An application Form for admission is attached at the end of this booklet. The candidates are advised to fill the Form and attach the relevant documents/certificates before submission.

ENTRANCE TEST

Entrance Test will be of academic nature and will cover syllabus of BE (Electrical & Electronics), BE (Computer Science). The question paper will consist of Questions - Electronics (30), Maths (30) and Computers/IT (30). Thus, there will be 90 objective questions of one mark each. Duration of the test will be 150 minutes. A candidate may attempt any number of questions. There will be negative marking for wrong answers. Merit list will be drawn on the basis of marks. The Candidates obtaining marks above cut off will be called for the interview. Suitable consideration will be given to SC/ST and physically handicapped candidates. They may also be considered at par if they get 10 percent less marks

Entrance Test is usually conducted on 2nd or 3rd Sunday in July every year. The date and time of the Test is notified in the admission notification. The venue of Test at Delhi is, IETE Delhi Local Centre, 16/1-2 Institutional Area, Pankha Road, Janakpuri, New Delhi –110058 while at Hyderabad it is the IETE Local Centre, Hyderabad.

ADMIT CARD

Eligible candidates will be issued admit card for admission in the entrance test. Admit Card form is annexed to the Application Form. The same should be filled in by the candidate and be attached to the Application form to be submitted. Please confirm date and time of the entrance Test on last date of submission of the application form.

Efforts will be made to mail the Admit Cards to the candidates approx 10 days before the Entrance Test. In case the Admit Card is not received in time, the candidate should report a day in advance of the date of examination notified to avoid any last minute inconvenience. The Institution shall not be responsible for non-receipt of admit card.

RESULT OF THE ENTRANCE TEST

Efforts will be made to declare the result of the Entrance Test within 2 to 3 weeks' time from the date of the test. The list of the candidates short-listed for interview will be displayed on the notice board of the Institution. The short listed candidates are advised to remain in touch with the Institution for the date and time of the interview. Intimation is sent to all the short list candidates by mail. However IETE will not be responsible for no-delivery or late delivery of the mail and no claim whatsoever in this regard will be entertained later on. In case a candidate fails to appear for interview on the said date and time, the next candidate will be given the chance and no request for another interview will be entertained.

RIGHT OF ADMISSION

Right of admission is reserved. Appearing in entrance test and interview does not mean admission has been granted.

MEMBERSHIP OF IETE

All students admitted to IETE ALCCS Programme shall have to enroll themselves as a Student Member of IETE. In addition to normal fee, they will be required to pay, the fee applicable towards PG Studentship of IETE.

PAYMENT OF FEE

All candidates cleared for admission to the Course are required to pay requisite fees along with other charges as applicable from time to time. For detail please refer to Schedule II.

Admission Fee and 1st Semester Fees

All candidates appearing for interview are advised to bring DD for the requisite amount in favour of the Secretary General, IETE New Delhi, or cash at the time of interview. Cheques are not accepted. If admission is granted, one has to pay the requisite fee on the spot.

Semester Fee other than 1st Semester

Fee for 2nd, 4th, and 6th Semester is to be paid latest by 1st March whereas 3rd and 5th Semester fee is payable by 1st September every year. A grace period of one month from the above dates are given with a late fee of Rs.100/- Thereafter, the names of the defaulters shall be displayed on the Notice Board. They will not be allowed to attend the classes and their names will be struck off from the roll of the ALCCS. A readmission fee of Rs.500/- will be payable if someone desires to get re-enrolled.

TIMINGS OF THE CLASSES AND ATTENDANCE

Classes are usually held in the evenings from 1815 hours to 2015 hours regularly. However the schedule of the classes will be informed by the concerned Centres from time to time.

Note : **A MINIMUM of 70%** attendance is mandatory for the students to appear in the Semester end examinations. Students not meeting the attendance requirements may not allowed to appear for the Semester end examinations.

COMPUTER LAB TIMINGS

Details of Computer facilities available and timings to use them will be provided by the concerned Centres. Students are advised to contact their centre for the same.

LIBRARY FACILITIES

Library facilities are available at IETE HQ from 1000 hrs to 1900 hours in the evenings on all working days and Sundays. Library remains closed on Saturdays. For ALCCS students, Library facility will be available for max of 3 years. Beyond 3 years and upto 5 years, students desirous of using Library facilities shall have to pay library fee as applicable from time to time. Students at Delhi are advised to find out the details of Library facilities at Delhi Centre at Janakpuri, New Delhi, whereas Students at Hyderabad may contact IETE Hyderabad Centre, Osmania University Campus, at Hyderabad.

EVALUATION PROCESS

The Assessment is done in two parts – Internal Assessment and External Assessment. The weightage of assessment is as follows:

Internal Assessment	:	40%
External Assessment	:	60%

Internal Assessment comprises of Minor Tests and Lab Practice/Assignments. The weightage of Minor tests is 15% and for Lab Practice/assignments it is 25%.

Two Minor Tests are conducted during the semester and best of two is counted for while computing the final results. First Minor test is conducted usually after 8 lectures and second after 16 lectures. Assignments (both the Theory and Lab) are assigned and evaluated by the concerned faculty from time to time.

External assessment is made by holding major examinations at the end of the semester. The major examinations are usually conducted in January/February and July/August every year depending on when the classes for the semester end. Examinations are held only during day time i.e. between 1000 hrs to 1700 hrs. Major Examinations are the responsibility of the IETE HQs.

Passing Marks (Regular Semester)

Passing marks in the individual subject will be 40% and to complete ALCCS Programme one must obtain 50% in aggregate.

After each semester end examination, all candidates will be given an interim mark sheet showing all papers appeared for whether pass or fail on the basis of following grading.

- A $\geq 75\%$
- B $\geq 60\%$ and $< 75\%$
- C $\geq 50\%$ and $< 60\%$
- F $< 50\%$ or $< 40\%$ marks in major

A candidate who does not make the grade in a paper may be permitted to reappear in that paper in the subsequent examinations (outer limit is 5 years) subject to payment of examination fee as applicable from time to time.

Internal Assessment marks will be carried forward till the student passes the examination until and unless the student desires to reappear for internal assessment.

PROJECT WORK

All students who register for 5th Semester are eligible to register for Project work subject to the condition that they have cleared all the subjects upto 4th Semester and there is no back paper. Special dispensation could be given at the discretion of the competent authority. Project work is to be carried out in two parts

Project Work I – Analysis and Design part

Project Work II – Implementation part.

Project Work I is to be carried out during 5th Semester whereas Part II during 6th Semester. All students registered for the project work are to look for an area in which they are interested and also look for a guide who is an expert in that area and willing to supervise the project. The expert is expected to be having sufficient experience in software development and should be at a Professor/Asst Professor level at any Institution/University or at a very senior managerial level in Industry.

The candidate has to put up a project proposal for approval of the authority on a prescribed format. The proposal should have a synopsis of about 200 words and bio-data of the Project Supervisor with a letter of consent from him. The Project proposal will be presented by the student before a committee for its approval. At times, the project may be approved provisionally and final approval is granted at the time of mid term evaluation.

Mid term evaluation of the project is done after about 2 months after the date of approval of the project work wherein the experts examine the progress so far done by the candidate. The Project can also be rejected at this stage and the candidate may be advised to change the Project/guide.

Unbound Project Report (in a prescribed format) is to be submitted before/on the expiry of 6 months from the date of approval. Once Project Report is submitted, the candidate will be called for final evaluation. If the report is not submitted within the stipulated time, the candidate shall have to re-register the project subject to eligibility by remitting a fee applicable from time to time.

SEMESTER LEAVE

Semester leave, is generally, not granted. However, under special circumstances, the leave may be granted on merit of the case, in accordance with the rules laid down by the Institution from time to time. The candidate has to put up an application justifying the reasons with necessary supporting documents before leaving. No request for re enrolment will be considered after leave has been availed.

AWARD OF CERTIFICATE

A certificate will be awarded after successful completion of all the requirements of the prescribed programme and enrollment AS LIFE ASSOCIATE/ ASSOCIATE MEMBER/ MEMBER OF THE INSTITUTION.

TIME LIMIT

The total period to complete ALCCS including project work should not exceed FIVE YEARS from the date of admission. However, there is a provision of one time only re-enrolment for the Course, if someone fails to complete the course within the prescribed time limit. Beyond ten years no re-enrolment is permitted.

IMPORTANT

The Institution reserves the right to change/alter/amend various procedures of Admissions, Examinations, Syllabus, Fees and/or any other proposals concerning the Advanced Level Course in Computer Science. The Institution also reserves the right for admission for this course.

LEGAL MATTERS

Adjudication in respect of legal cases concerning IETE HQ will be as per byelaw 95 of the Institution which is reproduced below:

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

DISCIPLINE

All students while undergoing training at IETE are required to adhere to timing of classes and have regular attendance. They should be properly dressed and behave in a manner befitting the organisation. The Institution reserves the right to suspend students from the course for indiscipline or misbehavior.

Anyone found using unfair means will be debarred from the course.

Students will be informed of the course curriculum that is to be followed before commencement of classes. However, the course curriculum that is likely to be followed from Sept 2009 is as given below.

	<u>No of Credits</u>		<u>Total</u>
	<u>Theory</u>	<u>Assignment/Lab</u>	
<u>Semester 1</u>			
CS11 Data Structure through 'C' LA11	3	1	4
CS12 Computer Architecture LA12	3	1	4
CS13 Data Base Management Systems LA13	3	1	4
	Total Semester 1		12
<u>Semester 2</u>			
CS21 Object Oriented Technology using Java LA21	3	1	4
CS22 Discreet Structure LA22	3	1	4
CS23 Elective 1	3	-	3
	Total Semester 2		11
<u>Semester 3</u>			
CS31 Operating System	3	1	4
CS32 Computer Networks	3	1	4
CS33 ECS 2	3	-	3
	Total Semester 3		11
<u>Semester 4</u>			
CS41 Software Engineering	3	1	4
CS42 Design and Analysis of Algorithm	3	1	4
CS43 IT Management	3	-	3
	Total Semester 4		11

Semester 5

CS51 Web Technology	3	1	4
CS52 ECS3	3	-	3
CS 53 Project 1	4	-	4
	Total Semester 5		11

Semester 6

ECS 4	3	-	3
PROJECT II	8	-	8
	Total Semester 6		11

Grand Total 67 Credits

Electives

- (a) Artificial Intelligence
- (b) Computer Graphics
- (c) Image Processing
- (d) Embedded Systems
- (e) Data Ware Housing and Data Mining
- (f) Micro Electronics and VSI Design
- (g) Telecom Management
- (h) Mobile Computing
- (i) Soft Computing

SYLLABUS FOR THE ENTRANCE TEST FOR ADMISSION TO ALCCS PROGRAMME

Mathematics

Linear Algebra : Determinants, Algebra of matrices, Rank, Inverse, linear transformation, System of linear equations, Eigen values and eigen vectors, Cayley-Hamilton theorem, Diagonalisation, Hermitian, Skew-Hermitian and Unitary matrices, Quadratic forms, Vector algebra and Calculus.

Real Analysis : Sequences and series, Continuity, Differentiability, Riemann integral, Power series, Fourier series, Functions of several variables, Maxima, Minima, Multiple integrals, Line, Surface and volume integrals, Laplace transforms.

Complex Analysis : Analytic functions, Conformal mapping, Bilinear transformation, Cauchy's integral formula, Maximum modulus principle, Taylor's and Laurent's series, Residue theorem and applications.

Differential Equations : First order ordinary differential equations, System of linear first order ordinary differential equations, Linear ordinary differential equations of higher order with constant coefficients, Method of Laplace transforms, Linear second order ordinary differential equations with variable coefficient, Series solutions, First order linear partial differential equations.

Probability and Statistics : Probability, Conditional probability, Bay's theorem, Standard distributions and their properties, Joint distributions. Central limit theorem, estimation, Testing of hypothesis.

Electronics

Circuit Principles : Kirchoffs Laws, Network Theorems - Maximum Power Transfer, Reciprocity, Superposition, Thevenin' s and Norton's theorem. Dual Networks. Natural and forced response. Two-port network parameters -Z, Y, h and A,B,C,D parameters.

Signals and System Concepts : Linearity, time invariance, lumped and distributed systems, Periodic and aperiodic signal representation -Fourier Analysis. Power and energy in signals. Impulse response and convolution. Laplace transforms. Sampling theorem. Distortionless filter. Lowpass, highpass, bandpass and bandstop filters. Characterization of random signals, time and ensemble averages, stationary and ergodic processes. Thermal and shot noise, noise figure.

Semiconductor diodes, Junction transistors, Field effect transistors. Diode circuits : rectifiers, d.c. power supply, clippers, clampers. Transistor circuits - BJT and FET biasing, small signal amplifiers and their frequency response, large signal amplifiers - class A,B,C power amplifiers. Feedback amplifiers. General concept of feedback – open loop and closed loop transfer functions. Concept of stability of linear systems. Oscillators. Differential amplifiers. OPAMP parameters. OPAMP circuits - Adders, integrators, differentiators, clippers, filters, A/D and D/A Converters, analog computing circuits. Digital electronics – logic gates, realization of gates using diodes and transistors, flip-flops, combinational and sequential circuits.

Data Communications : Analog modulations - Amplitude, Frequency and Phase modulations and detection. Radio receiver. Pulse code modulation, differential Pulse code Modulation, Delta Modulation. Amplitude, Frequency and Phase shift keying. ASK, FSK, PSK, DPSK and QAM modems. Equalization. Channel capacity and Shannon's theorem for noisy channels.

Computer Science

Computer Hardware : Logic families, flip-flops, logic function minimization techniques, design of combinational and sequential circuits, design with integrated circuits, A/D and D/A converters, microprocessor architecture, programming, interfacing with memory and I/O devices, modes of data transfer and their implementation, serial and parallel communication interfaces (detailed knowledge of Intel 8085 will be assumed)

Computer Organization : Number representation and arithmetic, functional organization, machine instructions and addressing modes, ALU, hardwired and microprogrammed control, memory organization, input/output, concepts of assembly language (8085).

Data Structures & Algorithms : Structured programming with Pascal/C, arrays, stacks, strings, queues, lists, graphs, trees and sets, graph and tree traversals, connected components, spanning trees, shortest paths, tree balancing, hashing, file structures, sorting and searching, algorithm design techniques, big 'oh' notation, solution of simple recurrence relations that arise in the analysis of algorithms.

System Programming : Assemblers, loaders, linkers, macroprocessor, text editors, programming languages:lexical analysis, parsing, scope rules and parameter passing mechanisms, syntax directed translation, run time environment, machine code generation, interpreters.

Operating Systems : Batch, multi-programming and time-sharing systems, processor, memory, device and file management, virtual memory, process scheduling, interprocessor communication I/O redirection and pipes process synchronization and concurrency, deadlocks, protection.

Discrete Structures : Propositional logic, Principle of mathematical induction, sets, relations, functions, groups, partial orders, lattices and Boolean algebra.

Theory of Computation : Regular and context free languages, finite state machines and pushdown automata, turning machines and undecidability.

Model Questions for the Entrance Test for the Advanced Level Course in Computer Science (ALCCS)

Note : In the ALCCS entrance test exam, there will be 90 objective questions of equal marks covering maths, electronics & computer science. The model questions given below are only illustrative.

PART A

- Q. The non-convex set among the following is
- (A) $\{(x,y): 2x + 3y = 7\}$; (B) $\{(x,y,z) : 2x - y + z \leq 4\}$
(C) $\{(x,y): 4x^2+5y^2 \leq 10\}$ (D) $\{(x,y,z): x+y+z = 2, x = 0,1\}$
- Q. Two numbers are chosen at random in the interval (0,1). The probability that they differ by $\frac{1}{2}$ is
- (A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{1}{\sqrt{2}}$
- Q. The vector space $V = \{ (x,y,z) : x+y-z = 0 \}$ under usual addition and scalar multiplication has the dimension
- (A) 1 (B) 2 (C) 3 (D) None of these
- Q. Two eigenvalues of a 3×3 matrix whose determinant is 6 are -1,3, then its third eigenvalue is
- (A) -2 (B) -4 (C) 2 (D) 4
- Q. The linear programming problem
- Min $x_1 - x_2$
Subject to $x_1 + x_2 \leq 1,$
 $2x_1 + 3x_2 \geq 6$
 $x_1 \geq 0, x_2 \geq 0$ has
- (A) only one optimal solution (B) no feasible solution
(C) infinity many optimal solutions (D) unbounded solution

PART C

Q. The output of the following program fragment:

```
for i := 1 to 2 do
  for j := 1 to 2 do
    write('*');
  writeIn; write('+++');
```

is

- (a) **
**
+++
- (b) ****+++
- (c) ****
+++
- (d) None of the above

Q. Hexadecimal equivalent of 2742_{10}

- (A) AB6 (B) AB2 (C) BA6 (D) AB4

Q. RISC stands for

- (a) Reduced Instruction Set Computer
- (b) Rapid Instruction Set Computer
- (c) Reliable Intelligent Super Computer
- (d) Ruby Integrated Silicon Chip

Q. An operating system uses the First In First Out technique for page replacement. If the number of main memory frames for a process are increased, then the number of page faults for that process

- (a) always decrease
- (b) always increase
- (c) always remain the same
- (d) may increase

Q. An object oriented programming language must support

- (a) abstract data types
- (b) overloading and dynamic binding
- (c) inheritance
- (d) all of the above

ANNEXURE

PAYMENT OF FEES:

All candidates are required to pay fees with other charges as given below. The dues are to be paid by means of Crossed Bank Draft in favour of "The Secretary General, IETE, New Delhi". Fees are however subject to revision at any time without notice.

onward	(Amount in Rupees)	
	At the time of Admission	2 nd Semester (per Semester)
Tuition Fee	7,500=00	7,500=00
Registration & Admission Fee	500=00	—
Library Fee	500=00	500=00
Caution Fee(Refundable)	1,000=00	—
Lab Charges	2,000=00	2,000=00
Total	11,500=00	10,000=00

(The fee structure given above is tentative and may be revised)

ADVANCED LEVEL COURSE IN COMPUTER SCIENCE

Tentative Schedule

Last date for receipt of completed forms	-	July 19,2009
Date of Entrance Test	-	July 26,2009(Sunday)
Time of the Test	-	10.30 AM
Venue of the Test	-	IETE Delhi Centre, Janak Puri New Delhi
Tentative data of personal interview	-	August 09,2009**
Tentative date of commencement of classes	-	August 23, 2009**

** Subject to confirmation

**Government of India
Ministry of Human Resource Development
Department of Education
New Delhi**

4th May, 1990

NOTIFICATION NO. (26)

No. F. 1-56/88 T. 13/TD-V(.) On the recommendation of the Board of Assessment for Educational Qualifications, the Government of India has been pleased to recognise provisionally the three year part time Advanced Level Course in Computer Science (ALCCS) awarded by the Institution of Electronics and Telecommunication Engineers, New Delhi for appointment to superior posts and services under the Central Government where M. Tech Degree in Computer Science is the prescribed qualification for recruitment, effective from 1987.

**Sd/-
(M. M. Choudhury)
Asstt. Educational Adviser (T)**