PROFICIENCE
CONTINUING EDUCATION PROGRAMME

PROFESSIONAL INSTITUTIONS
INDIAN INSTITUTE OF SCIENCE

COURSE INFORMATION

ON

REGULAR COURSES &
INTERNET BASED COURSES

JANUARY-MAY 2006

CONTENTS

INTRODUCTION

Rapid strides in science and technology make it imperative that the education of professionals be continued over their entire career rather than be confined to a single stretch. What is needed is a complete integration of education with work during their productive life span, which will be adequate to help them cope with new demands. Continuing Education embraces all the processes of education that one undergoes throughout a working life and which have a relevance to the practical problems likely to be encountered in one's career. It may be realised through formal and informal modes of teaching, or through mass media. In recent years, there has been a growing awareness on the part of Universities that imparting knowledge to people beyond their boundaries is an equally important part of their service to the community. With this broad perspective of their function in society, Universities have begun to seek ways of reaching out to professionals. The Indian Institute of Science (IISc) has evolved several mechanisms to make the expertise and facilities available to qualified technical people in industries, Universities and research establishments. The need for forging links between academic institutions and industries and R&D organisations has been a goal set for the IISc by its illustrious founder, J.N. Tata.

PROFICIENCE was established with the objective of providing a sustained and rigorous continuing education program offering courses on subject of topical interest to scientists and engineers in and around Bangalore. This program, believed to be the first of its kind in the country, is a joint venture between IISc and several Professional Institutions/Societies in Bangalore. The program name signifies the coming together of Professional Institutions and the Indian Institute of Science. It was started on an experimental basis in 1980 and has proved to be extremely popular and has attracted wide attention in academic and professional circles. The demand for some courses, especially on computers, microprocessors and management is so overwhelming that it has not been possible to admit all the eligible applicants. Every year, there has been a steady increase in the number of students as well as the types of courses offered indicative of the growing popularity of this Program.

IISc is the custodian of the academic standards of all **PROFICIENCE** courses. It has the responsibility of evolving appropriate teaching norms, providing the venue and facilities for conducting courses, organising the tests and examinations and issuing certificates to the successful participants. These tasks are coordinated by the Centre for Continuing Education (CCE).

COURSES

The continuing education program organised under PROFICIENCE offers semester long courses in areas of topical interest. The courses are organised during evening hours so that working professionals can participate without getting their normal work affected. All courses are normally at the postgraduate level and many of these are in fact offered to the IISc students regularly. Participants in certain selected courses are provided practical training in computer and other laboratories, as appropriate. The course contents are regularly upgraded on the basis of feedback from the faculty and the participants. Courses are offered during the period **AUG-DEC** and **JAN-MAY** and around 15-20 courses are scheduled during each semester.

Each course has lectures at the rate of two or three hours per week depending upon the number of course credits. Tests and examinations are conducted according to the IISc norms. A series of courses leading to different specialisations are offered in a sequential manner, especially in the area of Computer Science and Engineering. This would enable the participants who start with the entry level courses progress towards more advanced ones and specialise in one of the streams.

EVALUATION

The total marks for assessment will be equally distributed between the sessional work and end semester examination. The sessional work consists of class tests, midsemester examination, homework assignments etc. as determined by the instructor. The participants who maintain a minimum of 75% attendance both in the theory and computer/laboratory classes will be evaluated based on the combined performance in the end semester examination and sessional work and assigned a letter grade.

NO RE-EXAMINATION SHALL BE CONDUCTED UNDER ANY CIRCUMSTANCES.

The letter grades carry a qualitative assessment as indicated below:

S-Outstanding; **A-**Excellent; **B-**Very Good; **C-**Good; **D-**Satisfactory; **F-**Fail.

CERTIFICATES

Certificates will be issued to only those who get at least a ‘D’ grade. Attendance certificates shall not be issued to any one. This being a continuing education program meant especially for self improvement, the credits accumulated cannot be equated with the credits earned through formal education. There shall be no claims for PROFICIENCE credits being counted towards partial fulfillment of credit requirements towards any degree/diploma or other formal recoginitions offered by IISc.

Formal Course completion certificates will not be issued under any circumstances to any candidate.

FACULTY

The instructors for the courses are mostly Institute Faculty. However, competent professionals from other R&D organisations and industries are also involved in teaching some of the courses.

FACILITIES

Computer Lab: A Computer Laboratory with 32 Intel-Pentium machines,4 Celeron machines, 2 Unix PC-Servers and a Silicon Graphics work station with a variety of latest software has been set up for the PROFICIENCE program. All these machines have been locally networked. A good collection of video cassettes pertaining to several courses is also available for viewing at the Centre for the participants. The Computer Laboratory is located at the Centre for Continuing Education (CCE) Building.

Library: PROFICIENCE participants can avail of the facility of IISc Main Library and they can also make use of the books in CCE. The books at both the IISc Main Library and CCE are meant only for **reference**. The participants can avail of this facility by producing their ID card issued by **PROFICIENCE**.

Timings: IISc Library - 8.00 a.m. - 9.00 p.m.
CCE Library - 2.00 p.m. - 8.00 p.m.

INSTRUCTIONS

ELIGIBILITY:

PROFICIENCE courses are open to those holding a graduate degree in engineering or postgraduate degree in relevant discipline. Specific qualification for the course and pre-requisites are listed along with the course description.

HOW TO APPLY:

Applications should be made in the prescribed forms which can be obtained from PROFICIENCE Office.

Candidates can apply for a maximum of **four** courses only. However, on selection, admission will be granted for a maximum of **two** courses, in the order of preference indicated in the check sheet.

Separate applications should be submitted for each course. For example, if one is applying for two courses, there must be two separate applications. The applicants should explicitly mention how they meet the pre-requisite in the respective column as this information will be used as the criterion for selection for the specific course.

Application forms must be accompanied by a copy of the relevant degree certificate and a passport size photograph. If the degree certificate of the University has not been issued, a ***Provisional Certificate*** from the University or from the Principal of the college, where the applicant has studied, has to be attached in the prescribed form (see Appendix 'A'). **(Course completion certificates and/or marks card will not be accepted in lieu of the degree certificate/provisional certificate)**.

SELECTION CRITERIA:

There is a maximum permissible and minimum required number of registrants for each course. If the number is less than the minimum required in a particular course, that course may not be offered. A course may also be dropped due to unforseen circumstances. The decision of the Chairman, CCE, shall be final in this regard.

Applicants may be required to take a written test for **selection to some of the courses**. The test will be of aptitude/objective type of **one hour duration**, confined to the minimum background and pre-requisites prescribed. The applicants called for the test will be intimated by post well in advance. The list of candidates called for the test will also be displayed on the **PROFICIENCE Office** notice board. The applicants are also requested to check with the Office for any information/clarification.

SELECTION INTIMATION:

The list of selected candidates will be displayed on the **PROFICIENCE Office** notice board. The candidates will also be intimated of their selection by post. **PROFICIENCE Office** is not responsible for any postal delay / loss.

ON INTIMATION OF SELECTION:

The selected candidates should produce the original certificates for verification and a passport size photograph (for identity card) along with the fees. Payment of fees should be made through an **"A/c payee" DD drawn on a nationalised Bank in Bangalore. The DD should be drawn in favour of COORDINATOR, PROFICIENCE. The fee will be received in the PROFICIENCE Office on the dates mentioned in the intimation letter** (please refer to the back cover).

FEES:

The course fee is Rs.1500/- per credit. Some of the courses include a limited exposure to computer operation and programming (C). The additional fees for this is Rs. 3,000/-. The course fee and laboratory fee should be paid in full at the time of joining the course.

A concession of 10% in course fee will be allowed for **members** of the **participating professional bodies** and **students** and **employees of IISc**, who enrol in their individual capacity. (Members of the Professional Institutions and students and employees of IISc are required to furnish documentary proof of their current membership/studentship/ employee number.) Members of Professional bodies must produce the latest subscription paid receipts. No request for concession after the payment of fees will be entertained.

REFUND OF COURSE FEE:

Refund of course fee will not be made, unless, the course is withdrawn officially, in which case, the course fee paid is refunded in full. **Application fee once paid will NOT BE REFUNDED under any circumstances**.

APPLICANTS OF COURSES OFFICIALLY WITHDRAWN:

Applicants for those courses are given an opportunity to select other courses except courses which had an **aptitude test** provided they fulfill the requirements for the opted course. This can be done with the approval of the Chairman, CCE.

CLASSES:

Classes will be held in the Lecture Hall Complex of IISc. Lectures will be between 6.00 and 8.00 p.m. **Monday through Friday** and between 10 a.m. and 12 noon on **Saturdays**.

LABORATORY CLASSES: The timings and days for laboratory classes will be fixed in the second week of the respective months (August & January) after the complete registration is known. This will be done, keeping in view the convenience of the faculty and all the students of the courses with laboratory component.

RESULTS :

Results of the courses will be announced normally around 1st week of January for August-December term and 1st week of June for January-May term. Certificates will be issued on or after the date of announcement of results and against surrendering the Identity Card.

IDENTITY CARD:

Participants will be issued identity cards which should be shown on demand. The participants who have successfully completed should surrender the ID card at the time of receiving certificate, failing which the certificate(s) will not be issued to her/him. In the event of loss of identity card, the matter should be immediately reported to the PROFICIENCE office in writing. **A duplicate identity card will be issued on payment of Rs. 50/-**.

NO REQUEST FOR CHANGE OF EITHER THE STIPULATED DATES, MODE OF PAYMENT, CHANGE OF COURSE OR SUBMISSION/VERIFICATION OF ENCLOSURE TO APPLICATION ETC., WILL BE ENTERTAINED UNDER ANY CIRCUMSTANCES.

SCHEDULE FOR JANUARY-MAY 2006

REGULAR COURSES

	Mondays 6.00 p.m. to 8.00 p.m.		
1.	Intellectual Property - Protection	2+0	Dr. S Rama Murthy, Intellevate
	Mondays & Wednesdays, 6.00 p.m. to 7.30 p.m.		
2.	Plant Biotechnology & Molecular Biology	3+0	Prof. C Jayabaskaran, BC
	Tuesdays 6.00 p.m. to 8.00 p.m.		
3.	Advanced Finite Element Methods-I	2+0	Prof. P C Pandey, CE
4.	Cryptography & Network Security	2+0	Prof. R C Hansdah, CSA
5.	Wireless Mobile Communication	2+0	Prof. C Murali, MSRIT
	Tuesdays & Thursdays, 6.00 p.m. to 7.30 p.m.		
6.	Basic Analytical Gas Dynamics	3+0	Dr. S V Raghurama Rao, AE
7.	Financial Management	3+0	Mr. R Balasubramanian, KPCL
8.	Intelligent Agents	3+0	Dr. V Susheela Devi, CSA
9.	Project Management & Communication	3+0	Dr. Parameshwar P Iyer, CSIC
10.	Theory, Analysis & Design of Composite Materials & Structural Elements	3+0	Mr. G Narayana Naik, AE
	Wednesdays, 6.00 p.m. to 8.00 p.m.		
11.	Rational Foundation Design	2+0	Prof. G L Sivakumar Babu, CE
12.	Vibration & Noise: Theory & Practice	2+0	Dr. S B Kandagal, AE
	Thursdays, 6.00 p.m. to 8.00 p.m.		
13.	Comprehensive Project Management	2+0	Mr. R Srivastava, ADA
14.	Data Mining	2+0	Dr. S K Shevade, CSA
15.	Embedded Systems Design using Microcontrollers	2+C	Mr. S Ramgopal, IN
	Fridays, 6.00 p.m. to 8.00 p.m.		
16.	Quantitative Methods for Logistics Management	2+0	Dr. M Mathirajan, MS
17.	Smart Materials & Structures: Fundamentals & Applications	2+0	Dr. S B Kandagal, AE
	Saturdays, 10.00 a.m. to 12.00 Noon		
18.	Digital Systems Design with FPGAs	2+0	Mr. Kuruvilla Varghese, CEDT
19.	Finite Element Methods	2+C	Prof. P C Pandey, CE
20.	Intelligent Systems & Applications	2+0	Dr. H K Anasuya Devi, NIAS
21.	Introduction to Internet Technology	2+0	Ms. Anandi Giridharan, ECE

INTERNET BASED COURSES

	Saturdays		
22.	Internet Protocols Design & Testing	3+0	Prof. P Venkataram, ECE
23.	Fiber Optic Networks	3+0	Dr. T Srinivas, ECE
24.	Environmental Management	3+0	Dr. T V Ramachandra, CES
25.	Municipal Solid Waste Management	3+0	Dr. T V Ramachandra, CES
26.	Introduction to Six Sigma	3+0	Mr. P Vijayasekar, Wipro (SUN)
27.	Software Quality Assurance & Management	3+0	Mr. P Vijayasekar, Wipro (SUN)

FEE STRUCTURE AT A GLANCE

REGULAR COURSES

Per Credit[#] : Rs.1,500/-

Computer Lab Fee: Rs.3,000/-

1. Course with 2 credits[#] ..... Rs. 3,000/-
2. Course with 2+C[$] credits .. Rs. 6,000/-
3. Course with 3[#] credits ..... Rs. 4,500/-

[#]credits = Lecture Hours per week

[$]C Stands for Computer Laboratory

INTERNET BASED COURSES

Per Credit: Rs.3,000/-

Courses with 3 credits ..... Rs. 9,000/-

REGULAR COURSES

JANUARY-MAY 2006

INTELLECTUAL PROPERTY - PROTECTION (2+0)

Objectives

To create awareness of IP in the present industrial scenario and also to impart knowledge about patents, copyrights and Trade marks.

Syllabus

Introduction and importance of Intellectual Property; Various forms of IP-Patents, copyright, Industrial Design and Trademarks; Pratical aspects of drafting patent documents; Application of IP knowledge for protection of innovative works.

Target Group

National Aerospace Laboratories, ISRO, Power Research Institutions, all R&D Institutions, Software Industries, Faculty of PG in Universities, Adocates practicing Intellectual property issues.

Faculty: **Dr. S RAMA MURTHY**
Intellevate (India) Pvt. Ltd., Bangalore
E-mail: murthy_132001@yahoo.com

Reference Books

1. *Prabudha Ganguli*
   Intellectual Property, Vol I,
   Pearson Education, 2003.

2. *P Narayan*
   Intellectual Property Law,
   Eastern Law House, Calcutta, 1990.

3. *Indian Patent Act & Patent Rules,*
   Universal Law Publishing Co,
   New Delhi, 2003.

Minimum Background:

B.E. / B.Tech or PG in Science/ Masters in Lib./ Humanities **OR** equivalent

Course Fee:

Rs. 3,000/-

Schedule:

MONDAYS
6.00 p.m. to 8.00 p.m.

PLANT BIOTECHNOLOGY AND MOLECULAR BIOLOGY (3+0)

Objective

To educate research students, post-graduate teachers and industrialists about recent development in plant biotechnology and biocompounds.

Syllabus

Overview of secondary metabolisms; structures, biosynthesis and functions of secondary metabolities; Metabolic engineering of secondary metabolic pathways; Plant transformation techniques - Agrobacterium - mediated plant transformation, direct gene transfer techniques and chloroplast transformation. Plant Molecular Farming. Genetically engineered plants; Plant tissue culture techniques, Gene cloning techniques; Plant cell signallings; Phytohormones, Methods for separation, purification and identification of plant biocompounds.

Target Group

Research Students, Post-doctoral Fellows, College Teachers & Biotechnology scientists

Faculty: **Prof. C JAYABASKARAN**
Dept. of Biochemistry, IISc, Bangalore.
E-mail: cjb@biochem.iisc.ernet.in

Reference Books

1. *A. Stater, N. Scott and Fowler*
Plant Biotechnology,
Oxford University Press, 2003.

2. *Introduction to Plant Biotechnology*
Oxford & IBH Publishing Co. Pvt. Ltd., 2002.

3. Metabolic Engineering of Plant Secondary Metabolism,
Kluwer Academic Press, 2000.

Minimum Background:
MSc (Life Sciences, Agri, Pharmacology), MVSc, MPharm, BPharm, BE (Biotech) **OR** equivalent

Course Fee:
Rs. 4,500/-

Schedule:
MONDAYS & WEDNESDAYS
6.00 p.m. to 7.30 p.m.

ADVANCED FINITE ELEMENT METHOD-I (2+0)

Objectives

This is a second level course covering some advanced topics in Finite Element Analysis.

Analysis of Plates of Shells are usually not covered in the first course of FEM. The FEM treatment of Plates and shells requires additional background of the mechanics for better understanding but such options are generally not available to graduate engineers or even to post-graduates. However, practicing engineers, especially structural analysts and designers, usually come across many practical problems which requires finite element modeling using plate and shell elementrs. The objective of this course is to introduce such structural finite elements in order to model problems involving plates and shells.

Also Topics of Finite Element Analysis for Dynamic loads and Linear Bucklings are included.

Syllabus

Review of Isoparametric 2-D and 3-D finite elements. Finite elements for beams, arches, plates, cylindrical shells, axisymmetric shells and general shells. Euler-bernouli Beam element. Timoshenko beam element. Plate bending elements (Kirchhoff's and Mindlin's). Three dimensional membrane element. Facet shell element, Curved Shell Element, degenerated Shell element. Some practical applications.

Finite Element analysis for Dynamic Loads, Finite-element analysis for Linear Buckling. Computational Issues.

Faculty : **Prof. P. C. PANDEY,**
Dept. of Civil Engineering, IISc. E-mail: pcpandey@civil.iisc.ernet.in

Reference Books

1. *Cook, R. D., et.al,*
Concepts & Applications of Finite Element Analysis, John Wiley & Sons, 2002 (IV Edn).
2. *Zienkiewicz, O. C., and Taylor, R. L.,*
The Finite Element Method, V Edn., Vol 1 & 2, McGraw-Hill, 2002 (V Ed.).
3. *Shames I. H and Dym C. L.*
Energy & Finite Element Methods in Structural Mechanics,
New Age Int. Publishers Ltd, Indian Ed, Bangalore, 1995.

Minimum Background:
B. E./B.Tech (Civil/Mechanical/ Aerospace) OR equivalent

Pre-requisite required:
Basic knowledge of structural mechanics. An exposure to basci Finite Element Method.

Course Fee:
Rs. 3,000/-

Schedule:
TUESDAYS
6.00 p.m. to 8.00 p.m.

CRYPTOGRAPHY AND NETWORK SECURITY (2+0)

Objectives

This course is intended for all software engineers who need to deal with security issues in computer networks for either management or development purposes. Dealing with such issues needs a basic background in cryptography. Consequently, the course will start with exposure to basic techniques of cryptography. Subsequently, their applications for network security will be dealt with.

Syllabus

Requirements for Information and Network Security. Introduction to Number Theory. Symmetric and Public Key Cryptography. Conventional Encryption Techniques: DES, IDEA and BLOWFISH. Key Distribution. Public Key Cryptographic Techniques: RSA, Diffe-Hellman and DSS. Cryptanalysis. Message Authentication and Digital Signatures. Kerberos. E-mail and IP Security. Secure Socket Layer and Transport Layer Security. Secure Electronic Transaction. Network Management Security. Intruders and Viruses. Firewalls.

Target Group

Industries/R&D Units engaged in developing secure networking applications will benefit from this course. Besides, Industries/R&D Units which need to maintain networks will also benefit from this course.

Faculty: **Prof. R C HANSDAH**
Dept. of Computer Science & Automation, IISc.
E-mail: hansdah@csa.iisc.ernet.in

Reference Books

1. *William Stallings*
Cryptography & Network Security: Principles & Practice, III Edition, Pearson Education, 2002.
2. *William Stallings*
Network Security Essentials: Applications & Standards, II Edition, Pearson Education, 2002.
3. *C Kaufman, R Perlman & M Speciner*
Network Security: Private Communication in a Public World, Pearson Education, 2002.

Minimum Background:

BE/BTech in CS/IT/ECE/EE **OR**
MCA with Physics and Mathematics at the BSc level **OR**
MSc in Computer Science

Pre-requisites:

1. Knowledge of data structures and Programming in C
2. Knowledge of Computer Networks at the undergraduate level.

Course Fee: Rs. 3,000/-

Schedule:
TUESDAYS
6.00 p.m. to 8.00 p.m.

WIRELESS MOBILE COMMUNICATION (2+0)

Objectives

To provide insight into mobile communication for engineering graduates and professionals.

Syllabus

Telephone networks, The Cellular concept - Frequency reuse, cellular systems, channel allocation, hand off strategies. Radio propagation - Models for path loss, reflection, diffrraction, scattering, shadowing, Multipath feeding, outdoor and indoor models, diversity techniques. Multiple access techniques - FDMA, TDMA, CDMA. GSM techniques and standards. Wireless data networking.

Target Group

Professionals in industry, R&D units, Fresh Graduates in E&C/TC

Faculty: **Prof. C MURALI**
Dept. of E & C., MSRIT, Bangalore.
E-mail: muraliec@bgl.vsnl.net.in

Reference Books

1. Wireless Digital Communications,
   PHI, 2004.
2. *D P Agrawal & Qing-Anzeng*
   Introduction to Wireless and Mobile Systems
   Thomson Books/Cole, 2003.
3. *Theodore S Rappaport,*
   Wireless Communications, II Ed (2002)
   Pearson Education.

Minimum Background:
B. E.(Electrical Sciences), MSc (Electronics), AMIETE in Electronics **OR** equivalent.

Pre-requisites:
Communication background

Course Fee:
Rs. 3,000/-

Schedule:
TUESDAYS
6.00 p.m. to 8.00 p.m.

BASIC ANALYTICAL GAS DYNAMICS (3+0)

Objectives

To teach the fundamental aspects of Gas Dynamics, as a preparation for a Computational Fluid Dynamics.

Syllabus

Conservation Laws in Fluid Dynamics, Navier- Stores & Evler Equations, Burgers Equation, Shocks, Expansion Waves, Convection and Diffusion, Hyperbolic, Elliptic and Parabolic Equations, Hyperbolic Systems, Riemann Problems.

Target Group

All DRDO labs, CSIR labs, University, Engineering & Science colleges, software companies, and other private industries with mechanical/aerospace/chemical/civil engineering background.

Faculty: **Dr. S V RAGHURAMA RAO**

Dept. of Aerospace Engineering, IISc

E-mail: raghu@aero.iisc.ernet.in

Reference Books

1. *John D. Anderson*
   Modern Compressible Flows with Historical Introduction

2. *Liepmann & Roshko*
   Elements of Gas Dynamics

3. *Roger Knobel*
   An Introduction to Mathematical Theory of Waves

Minimum Background:

B. E./M.Sc. **OR** Equivalent

Course Fee :

Rs. 4,500/-

Schedule :

TUESDAYS & THURSDAYS
6.00 p.m. to 7.30 p.m.

FINANCIAL MANAGEMENT (3+0)

Objectives

This course presents a basic understanding and appreciation of the theory of finance with emphasis on a firm's (or an individual's) decisions related to valuation, investments, financing, rate of return and risk and other parameters. The course would be taught with emphasis on analytic approaches to financial decision making. It has an orientation towards corporate finance and capital markets.

After successful completion, the participants would be in a position to understand the philosophies of decision making in finance. Further, they can use basic valuation models.

Syllabus

Financial objectives of firm: Accounting techniques and principles, Financial Statements, analysis and interpretation-Concepts in valuation, time value of money, present value annuities, share and bond valuations. Simple capital budgeting models-NPV, IRR and payback, Valuation with uncertainties, risk and rate of return Sensitivity/Decision tree analysis-Long term finance, theory of shares and capital market, Cost of capital, Optimal financing decisions, Short term finance, working capital management, Leasing vs buying decisions. Implications of tax and tax planning.

Faculty: Mr. R. Balasubramanian
Company Secretary, KPCL, Bangalore
E-mail: cs@karnatakapower.com

Reference Books

1. *James C Van Horne & John M Wacho Wicz Junior*
   Fundamentals of Financial Management
   11th Ed, Prentice Hall
2. *Sheeba Kapil and Kanwal Nayan Kapil*
   Financial Management Strategy,
   Implementation & Control,
   Pragati Edition.
3. *SC Kuchhal*
   Financial Management,
   Chaitanya Publishing House, Allahabad

Minimum Background

B.E. or Master's degree in Science/ Humanities or AICWA/ACA/ACS or MBA. **OR** equivalent

Course Fee

Rs. 4,500/-

Schedule

TUESDAYS & THURSDAYS
6.00 to 7.30 p.m.

INTELLIGENT AGENTS (3+0)

Objectives

To impart knowledge of concepts, techniques, tools and applications of intelligent agents. To make the students aware of the platforms and programming languages which can be used for practical implementation of agents.

Syllabus

Concepts of agents and intelligent agents, action of agents, percepts to actions. Structure of intelligent agents, agent environments, problem solving agents, knowledge based agents, communicating, perceiving and acting. Planning agents, decision-theoretic agents, Concepts of distributed AI, Co-operation, and Negotition. Multiple agents, web based agents, agent programming.

Target Group

Defense organisations like ISRO, DRDO, software organisations like IBM, motorola, HP labs etc., lecturers from colleges.

Faculty: **Dr. V SUSHEELA DEVI**
Dept. of CSA., IISc.
E-mail: susheela@csa.iisc.ernet.in

Reference Books

1. *S. Russel and P. Norvig*
'Artificial Intelligence-A Modern Approach'
Prentice Hall, 1995.

2. *Nils J.Nilsson*
'Artificial Intelligence: A New Synthesis'
Morgan Kaufmann, 1998.

3. *George F. Luger*
'Artificial Intelligence'
Pearson Education, 2002.

Minimum Background:

B.E. In Electrical, Electronics, Computer Science & ECE **OR** equivalent

Course Fee:

Rs. 4,500/-

Schedule:

TUESDAYS & THURSDAYS
6.00 p.m. to 7.30 p.m.

PROJECT MANAGEMENT AND COMMUNICATION (3+0)

Objectives

To impart knowledge and skills in the art of managing projects scientifically, so as to fulfill objectives within the constraints of time, cost, and other resources. In addition, exposure to technical communication and software for project management will be provided.

Syllabus

Introduction, need for project management; Systems approach; Work definition and breakdown; scheduling and network analysis; Costing, budgeting and financial assessment; Project control and management; Project organisation; Leadership and teamwork; Role of computers in project management.

Managerial communcation process; Technical communication; Writing proposals, progress reports and final reports; Case analysis; Oral communication and presentations of study projects.

Target Group

Scientists, Engineers, Managers of R&D, Administrators, Entrepreneurs in Knowledge-based organisations.

Faculty : **Dr. PARAMESHWAR P IYER**
Dept. of Management Studies, IISc.
E-mail: piyer@mgmt.iisc.ernet.in

Reference Books

1. *Parameshwar P Iyer*
   Engineering Project Management with Case Studies, Apex Publishing, 2000.

2. *J R Meredith and S J Mantel*
   Project Management: A Managerial Approach John Wiley and Sons, Inc., 1995.

3. *Windschuttle K and Elliot E*
   Writing, Researching, Communicating: Communication Skills for the Information Age, Irwin McGraw Hill, Sydney, 1999.

Minimum Background:

BE/BTech or PG in any discipline **OR** equivalent

Some exposure to projects is desirable but not essential

Course Fee :

Rs. 4,500/-

Schedule :

TUESDAYS & THURSDAYS
6.00 p.m. to 7.30 p.m.

THEORY, ANALYSIS & DESIGN OF COMPOSITE MATERIALS AND STRUCTURAL ELEMENTS (3+0)

Objectives

The subject of composite materials is truly an interdisciplinary area where chemists, material scientists, chemical engineers, mechanical engineers and structural engineers contribute to the overall product. The main objective of the course is to teach about the different aspects of material science, mechanics and design of composite materials & structural elements. The course helps to know about the advanced materials, properties, functions and its applications. In addition to this, the students can learn to analyze and design the composite structural elements.

Syllabus

Basic Concepts and Terminology, different types of fibers and matrices; Fibers – Glass, Carbon, Boron, Organic, Ceramic, Metallic; Matrices – Polymers, Metals, Ceramics. Micromechanics of Composites: - Prediction of elastic constants and strengths, mechanics of load transfer from matrix to fiber. Macromechanics of Composites:- Constitutive equations of a lamina, transformation of stresses and strains. Failure theories (criteria) for composite lamina. ABD matrices, Stress-strain analysis of lamina and laminates. The theory of elasticity of an anisotropic body, Bending of plane anisotropic beams. Classical and first order theories of laminated composite plates. Analysis of sandwich plates. Buckling analysis of laminate composite plates. Design of composite laminae, laminates.

Target Group

Research & Development Organizations, Lecturers & Students of Engineering Institutions, Lecturers of Diploma Colleges & Institutions, R&D Industrial & Manufacturing Industries and Fresh Graduates & PG.

Faculty: **Mr. G NARAYANA NAIK**
Dept. of Aerospace Engineering, IISc
E-mail: gnn@aero.iisc.ernet.in

Reference Books

1. *John C Halpin*
   Primer on Composite Materials Analysis, Technomic Publishing Co. Inc., 1992.
2. *Robert M Jones*
   Mechanics of Composite Materials, 2nd Ed, McGraw-Hill Kogakusha Ltd., 1990.
3. *Krishan K Chawla*
   Composite Materials, Springer-Verlag, 1987

Minimum Background:
BE/BTech/AMIE/MSc
OR equivalent

Course Fee:
Rs. 4,500/-

Schedule:
TUESDAYS & THURSDAYS
6.00 p.m. to 7.30 p.m.

RATIONAL FOUNDATION DESIGN (2+0)

Objectives

The growth of infrastructure in the form of highrise buildings, flyovers and other facilities has been phenomenal in the recent years. Design of these facilities involve rational design of foundations, considering soil type, earthquake forces, etc. In some cases, ground modification/ improvement techniques should also be used. This course provides an introduction to this area and is useful to civil and construction industry professionals.

Syllabus

General principles of foundation design, shallow foundations, Mat foundations, Pile foundations, group of piles, piled raft foundations, drilled-shaft and caisson foundations, foundations on difficult soils, such as expansive/collapsible soils, soil improvement and ground modification, reinforced soil and geosynthetics, limit state design of foundations, earthquake resistant design of foundations, codal provisions.

Target Group

Practicing Civil engineers, planners connected with infrastructure, builders, architects, post graduate students, and teachers of engineering colleges.

Faculty: **Prof. G L SIVAKUMAR BABU**
Dept. of Civil Engineering., IISc.
E-mail: gls@civil.iisc.ernet.in

Reference Books

1. *B M Das*
Principles of Foundation Design
1999.

2. *M J Tomlinson*
Foundation Design & Construction,
1986.

3. Soil Reinforcement & Geosynthetics
AICTE lecture notes

Minimum Background:

B.E. (Civil) **OR** equivalent

Course Fee:

Rs. 3,000/-

Schedule:

WEDNESDAYS
6.00 p.m. to 8.00 p.m.

VIBRATION AND NOISE: THEORY & PRACTICE (2+0)

Objectives

Growing awareness of the necessity of making vibration and noise a valid design criterion in the design of machines, automobiles, buildings, industrial facilities, etc, and the increasing number of standard regulations and human comfort associated with noise and vibration makes it mandatory to control vibration and noise leading to quieter technology. This course aims at teaching the analytical and experimental skills to tackle the problems related noise and vibration.

Syllabus

Vibration of structural systems. Transient vibration. Eigen value analysis and modal analysis. Vibration control-isolation and absorption. Vibration standards. Vibration measurement tools and techniques. Natural frequency, mode shape and damping estimation methods. Signal and system analysis. Case studies.

Noise and its effects on man. Acoustic and sound field, Enclosures, shields and barriers-design. Silencer and suppression systems. Instrumentation for noise analysis. Noise level interpolation and mapping. Case studies.

Target Group

Lecturers, R&D Labs in Automobile industry & Aerospace industry

Faculty : **Dr. S B KANDAGAL**
Dept. of Aerospace Engineering, IISc
E-mail: sbk@aero.iisc.ernet.in

Reference Books

1. *Harris, C W*
   Shock and Vibration Handbook,
   McGraw-Hill, New York, 1996.

2. *Ewins, D J*
   Modal Analysis: Theory & Practice
   Research Studies Press Ltd., England, 1984.

3. *Cheremisinoff, P N*
   Industrial Noise Control Handbook,
   Ann Arbar Science Publishers, Mascow, 1978.

Minimum Background:

B. E./AMIE **OR** equivalent

Course Fee:

Rs. 3,000/-

Schedule:

WEDNESDAYS
6.00 p.m. to 8.00 p.m.

COMPREHENSIVE PROJECT MANAGEMENT (2+0)

Objectives

To enhance the Project Management capabilities of the participants to enable them manage their projects more efficiently and effectively.

Syllabus

Projects, need for their professional management, Project Management (PM), Systems' Approach to PM, Systems' Development cycle, Management functions pertinent to PM, Essential elements of PM, Network development and analysis, Project planning and control using PERT and CPM, Risk Management, Software PM, latest developments, quality standards and practices in PM.

Target Group

Working Project management professionals from various fields/areas with minimum 2 years of work-experience.

Faculty : **Mr. R SRIVASTAVA,**
Programme Management, Aeronautical Development Agency, Bangalore
E-mail: rajeev_srivastavain@yahoo.co.in

Reference Books

1. *Harold Kerzner*
   Project Management-A Systems Approach to Planning, Scheduling & Controlling,
   CBS Publishers & Distributors, 1998.

2. *Jerome D Weist & Ferdinand K Levy*
   A Management Guide to PERT/CPM,
   Prentic-Hall of India Pvt. Ltd., 1998.

3. *Bennet P Lientz & Kathryn P Rea*
   Project Management for the 21st Century,
   Academic Press, 1995.

Minimum Background:
B.E. / B.Tech**/**MSc.
OR equivalent

Course Fee :
Rs. 3,000/-

Schedule :
THURSDAYS
6.00 p.m. to 8.00 p.m.

DATA MINING (2+0)

Objectives

To introduce the fundamental techniques and algorithms of Data Mining.

Syllabus

Introduction, Data Preprocessing, Visualizing and Exploring Data, Association Rules, Predictive Modeling for Classification and Regression, Cluster Analysis, Mining Complex Types of Data, Applications to Web Mining and Bioinformatics.

Target Group

Industries, Govt. R&D Organizations.

Faculty : **Dr. S K SHEVADE**
Dept. of CSA, IISc.
E-mail: shirish@csa.iisc.ernet.in

Reference Books

1. *D. Hand, H. Mannila & P Smyth*
   Principles of Data Mining,
   PHI, 2001.

2. *J. Han, & M. Kamber*
   Data Mining: Concepts and Techniques
   Morgan Kaufmann Publishers, 2001.

Minimum Background:
B.E. / B.Tech/MSc.
OR equivalent

Course Fee :

Rs. 3,000/-

Schedule :

THURSDAYS
6.00 p.m. to 8.00 p.m.

EMBEDDED SYSTEMS DESIGN USING MICROCONTROLLERS (2+C)

Objectives

Embedded computer systems are electronic systems that include a microcomputer to perform a specific dedicated application. Embedded microprocessors or micro-controllers are the brain behind these systems. The participant actually solves the given problems by doing it on the trainer module. This will provide participant with a hands-on opportunity o learn the fundamentals of designing the hardware and software for systems based upon embedded microcontrollers. All exercises will have programming in 'C' language.

Syllabus

Introduction to embedded systems. The 8051 family of Microcontrollers. C programming for microcontrollers. I/O ports Programming. Timer/Counter hardware and its device driver. Serial communication interface and its device driver. Interrupts Programming. Embedded software development cycle and the environment debugging techniques for embedded software and the role of cross compilers and simulators. Real world interfacing case studies; LCD, Sensors, stepper motor, keyboard, personal computer interaction. Design of device drivers for serial devices. Case studies like stop watch, temperature controller. RTC test beds using finite state machines.

Target Group

This is an important area and it is useful for almost all industries viz IT/Telecom.

Faculty: **Mr. S RAMGOPAL**
Dept. of Instrumentation., IISc.
E-mail: sharma.ramgopal@gmail.com

Reference Books

1. *Yeshavant Kanetkar*
Let us 'C'
BPB Publications, 2005.

2. Muhammad Ali Mazidi & Janice Gillispie M
The 8051 Microcontrollers & Embedded Systems, Pearson Education, 2004.

3. *Kenneth J Ayala*
The 8051 Microcontroller Architecture, Programming & Applications,
Penram Publication, 1997.

Minimum Background:
B.E. / MCA **OR** equivalent

Pre-requisite required:
Knowledge architecture of any microprocessor and familiarity with 'C' language

Course Fee: Rs. 6,000/-

Schedule: Theory
THURSDAYS 6.00 p.m. to 8.00 p.m.
Lab: Fridays 5.00 p.m. to 8.00 p.m.

QUANTITATIVE METHODS FOR LOGISTICS MANAGEMENT (2+0)

Objectives

The objective of this course is to provide an understanding of major areas in Logistics and to make familiar with state-of-the-art practice of quantitative methods and software that are used to solve logistical problems.

Syllabus

The scope of this course falls roughly into three sections. The first section is concerned *Introduction to Logistics*: What is Logistics?, Applications, and Tools and Techniques Involved. The second section deals with *Logistics Systems*: Transportation Systems, Inventory Systems, and Distribution Systems. The third section is concerned with *Logistics Systems Techniques* such as Shortest path methods, Transportation Algorithms, Dynamic Programming Techniques, Linear Programming Methods, Integer Programming Techniques, and Heuristic approaches (including meta heuristics), applicable to routing, inventory, scheduling, and integrated distribution models and algorithms.

Many practical application models will be discussed and analyzed. The students are expected to use a computer package (LINDO / LINGO / SOLVER) for solving a number of more or less real-life problems.

Faculty: **Dr. M MATHIRAJAN**
Department of Management Studies, IISc.
E-mail: msdmathi@mgmt.iisc.ernet.in

Reference Books

1. *R. H. Ballou*
Business Logistics Management
5th Edition, Prentice Hall, 2004.
2. *P. R. Murphy, Jr and D. Wood*
Contemporary Logistics,
8th Ed., Prentice Hall, 2004.
3. *A. Harrison and R. van Hoek*
Logistics Management & Strategy
Prentice Hall, 2002.
4. *Douglas M Lambert, James R Stock and Lisa M Ellram*,
Fundamentals of Logistics Management,
Irwin McGraw-Hill, 1998.

Minimum Background:

BE/MCA/MSc (Maths/Satatistics / Operations Research),
MA (Eco) / MCom **OR** equivalent

Course Fee:

Rs. 3,000/-

Schedule:

FRIDAYS
6.00 p.m. to 8.00 p.m.

SMART MATERIALS & STRUCTURES: FUNDAMENTALS & APPLICATIONS (2+0)

Objectives

Advanced research in material science resulted in plastics, composites and MEMS. Structural design of components with unusual shapes became possible with the idea of embedding sensors to monitor structural behaviour and hence the performance. These "smart" structures monitor themselves as well as adapt to the environment. The knowledge of "smart" concept to sense and correct optimal performance with piezoceramics, magnetostrictive materials, shape memory alloys, ER and MR fluids is most essential in the current design of structures in aircraft structures, bio-sensors and automobiles.

Syllabus

Intelligent concepts, classification of smart materials, piezoceramic materials-PZT, PVDF, magnetostrictive materials, shape memory alloys, electro-rheological fluids, megneto-rheological fluids, fiber optics, MEMS, Mechanics of structures with smart materials, passive and active vibration control, Principles of actuators and sensors with simple control algorithms. Potential applications and limitations of smart materials in shape control, vibration, noise control, deflection control and aeroelastic control. Case studies to demonstrate the application of smart materials from current literature.

Target Group

Lecturers, R&D Labs in Automobile industry & Aerospace industry

Faculty: **Dr. S B KANDAGAL**
Dept. of Aerospace Engineering, IISc
E-mail: sbk@aero.iisc.ernet.in

Reference Books

1. *M.V. Gandhi & B.S. Thompson*
   Smart materials and structures,
   Champman and Hall Ltd, 1992.
2. *Ogata, K*
   Modern control Engineering,
   Printice-Hall of India, Pvt Ltd,
   NewDelhi, 1997.
3. *Doebelin, E.O*
   Measurement systems, Applications & Design,
   Mc Graw- Hill, New York, 1990.

Minimum Background:

B. E./AMIE **OR** equivalent

Course Fee:

Rs. 3,000/-

Schedule:

FRIDAYS
6.00 p.m. to 8.00 p.m.

DIGITAL SYSTEMS DESIGN WITH FPGAs (2+0)

Objectives

To teach the working engineers the basic concepts of Advanced digital systems and to design with FPGAs.

Syllabus

Hierarchy in Design, Controllers, Mealy and Moore Machiners, Meta-stability, synchronization, FSM issues, Clock Trees, Clockl skew, Pipelining, Multiple clock domains, Case studies.

VHDL: Behavioral, Data Flow, Structural Models, Simulation Cycles, Process, Concurrent and Sequential Statements, Loops, Delay Models, Synthesis, FSM Coding, Library, Packages, Functions, Procedures, Resource sharing, Test benches, Hardware-software co-simulation, Bus function models.

FPGA: Logic Block Architecture, Routing Architecture, Programmable Interconnections, Design Flow, Xilinx Virtex-II and Altera Stratix Architectures, Device Programming, Timing Closure, Debugging, Applications, Case Study. Embedded System on Programmable Chips.

Target Group

VLSI/FPGA Design Industries, R&D Industries who does Digital System Design with FPGAs.

Faculty : **Mr. KURUVILLA VARGHESE**
CEDT, IISc.
E-Mail: edkuru@cedt.iisc.ernet.in

Reference Books

1. *John F Wakerly,*
   Digital Design: Principles & Practices,
   Prentice Hall.
2. *Kevin Skahil*
   VHDL for Programmable Logic,
   Addison Wesley.
3. *PLD & FPGA Data Sheets*
   Application Notes, etc.

Minimum Background:
BE (Electronics/ECE/Computer Science) **OR** equivalent

Pre-requisites:
Basic knowledge of Digital systems, CMOS, VLSI Circuits

Course Fee: Rs. 3,000/-

Schedule:

SATURDAYS
10.00 a.m. to 12.00 Noon

FINITE ELEMENT METHOD (2+C)

Objectives

This is a foundation course in Finite Element Method (FEM) aimed at Civil, Mechanical and Aerospace Engineering professionals. In particular, it would be beneficial to engineers who do not have any formal training in FEM, even though, they may have skill to use a FEM package. The course is designed to provide a basic introduction to FEM with emphasis on stress and structural analysis. It is believed that it would be of interest to engineers working in industries, consulting firms, and teachers of engineering colleges.

Syllabus

Concept of Stiffness and Flexibility in structural analysis. Basic foundations of elasticity and energy principles, Introduction to displacement based FEM with reference to continuum and skeletal structures. Element formulation and Applications to Plane stress, Plane strain, Axisymmetric, plate bending and 3-D problems. Isoparametric concept, Equation solvers, Post-processing, Adaptivity, Programming and Computational aspects, practical applications. Hands-on practice using available FEM package.

Faculty : **Prof. P. C. PANDEY,**
Dept. of Civil Engineering, IISc
E-mail: pcpandey@civil.iisc.ernet.in

Reference Books

1. *Cook, R. D., et.al,*
Concept and Applications of
Finite Element Analysis,
John Wiley & Sons, 2002 (IV Edn).

2. *Chandrupatala, T. R., and Belegundu A. D.,*
Introduction to Finite Elements in
Engineering, Prentice Hall -
Indian Edition - III Ed, Aug 2003.

3. *Zienkiewicz, O. C., and Taylor, R. L.,*
The Finite Element Method,
V Edn., (3 Vols),
Butterworth Heinemann, New Delhi, 2002.

Minimum Background:
B. E./B.Tech (Civil/Mechanical/
Aerospace) OR equivalent

Course Fee:

Rs. 6,000/-

Schedule:
Theory: SATURDAYS
10.00 a.m. to 12.00 noon

Lab: SATURDAYS

12.30 p.m. to 3.30 p.m.

INTELLIGENT SYSTEMS & APPLICATIONS (2+0)

Objectives

- To introduce the state of art of Soft-Computing methods, Human-Machine Interaction and the techniques involved in Artificial Intelligence to those who possess post-graduate degree in Science/Arts/Management.
- To enhance the background and technical skills of IT professionals to use AI technology in industry.
- Facilitates Teaching profession.

Syllabus

Overview of AI - Knowledge Structures - Knowledge Engineering - Knowledge Representation - Logic Programming - Problem Solving Strategies - Laboratory Assignments, Web Designing - Concept of Distributed and Parallel Systems - Knowledge Based Systems - Pattern Recognition - Machine Learning - Expert systems - Natural Language Processing - Artificial Neural Networks - Project work.

Target Group

R&D Units

Faculty : **Dr. H K ANASUYA DEVI,**
National Institute of Advanced Studies, IISc Campus
E-mail: hka@nias.iisc.ernet.in

Reference Books

1. *Mohamad H Hassoun*
Fundamentals of Artificial Neural Networks
Prentice-Hall of India Pvt. Ltd., 2003

2. *Elaine Richie & Kevin Knight*
Introduction to Artificial Intelligence,
Tata McGraw-Hill, II Ed, 1999.

3. *David W Rolston*
Artificial Intelligence & Expert Systems Dev.,
McGraw Hill Intl Edition, 1988.

Minimum Background:
BE/MCA/MTech/PG in Science/
PhD in Science **OR** equivalent

Pre-requisites:
Knowledge of Mathematics upto graduation with knowledge of programming.

Course Fee:
Rs.3,000/-

Schedule:
SATURDAYS
10.00 a.m. to 12.00 Noon

INTRODUCTION TO INTERNET TECHNOLOGY (2+0)

Objectives

This course provides basic technical introduction to Internet technologies like telnet, ftp, E-mail and WWW. Participants will be able to understand history of Internet, Indentify resourses available on the Internet, understand DNS concepts and working, working of Proxy and uses. Perform basic file and directory management, editing files in linux environment. Create web pages using valid HTML code and how to protect computer from viruses.

Syllabus

Chapter 1: History of the Internet (using the internet). Basic guide to internet, origins and Development of the Internet, Internet applications.

Chapter 2: How computers communicate on Internet (moving data across the Internet). Introduction to TCP/IP, Internet addressing, how DNS works and its history (making a connection), Modems, Dial up, ISDN, cable, DSL, Wireless.

Chapter 3: Introduction to HTML, Web page creation

Chapter 4: Linux commands, creating file, editing and directory management

Chapter 5: Other Internet services like Proxy and its uses, mail services, basic structure, telnet, ftp, usenet, chat, etc.

Chapter 6: Internet Security: How to protect computer from Viruses.

Target Group

Industry, R&D Units & Institutions

Faculty : **Ms. ANANDI GIRIDHARAN**
Dept. of ECE, IISc Campus
E-mail: anandi@ece.iisc.ernet.in

Reference Books

1. *William Stallings*
Data and Computer Communication,
6th Edition.

2. *A. S. Tannenbaum*
Computer Networks (4th Ed),
PHI, 1999.

3. *www.w3.org*

Minimum Background:
Bacherlor's degree in Engineering. Useful even for non-technical participants **OR** equivalent

Course Fee:
Rs.3,000/-

Schedule:
SATURDAYS
10.00 a.m. to 12.00 Noon

INTERNET BASED COURSES

CONTENTS

Particulars **Page No.**

INTERNET BASED COURSES

Outline & Objective

Competency based education is defined as an instructional system in which a performance-based learning process is used. The learner demonstrates his/her level of attainment on subject-area. Intensive internet based course format, gives the participants to take more responsibility for their own learning process. Subject material for courses in Internet Based Education is offered in four different modes for the registered participants:

I. *Downloadable mode*: Downloadable mode empowers to offer education in a dynamic form to students. Participants can access lessons, assignments and submit their scripts online. They need not brood if they miss lessons - they can download the lesson notes and access archived lessons, tutorial sessions, lectures, etc.

II. *Read-only mode*: Participants may be able to only read the course materials on concepts and analysis

III. *Interaction-through-Internet*: The interactive learning provides an environment for participants to talk and discuss freely about any related topics on-line or off-line.

There are two ways of interaction

- Xchat: Client Server Model that works with Internet Relay Chat Server Protocol, it allows servers to connect to each other effectively forming a network. Protocol is used by servers to talk to each other. Instructor and participants can interact and discuss on related topic for stipulated time given by the Instructor.
- Mailing Group: Participants can become member of mailing group by registering their name in the group. Once approved by the instructor, participants can post their questions to this group ID. This way Course Instructor or any other participant can reply to questions that will be read by all the members in that group including the instructor.

IV. Classroom Interaction: The classroom session will be held in CCE Lecture halls. Duration will be notified by the instructor. During the classroom session, participants coming from outstation have to arrange their own accommodation.

INTERNET PROTOCOLS DESIGN & TESTING (3+0)

Objective

This course gives the participants the theoretical and practical knowledge of internet and its applications in various fields. Courses like Web creation, Business application on E-Commerce, Multimedia, mail, etc. The curriculum is aimed at training the engineering graduates to enable them to the better opportunities in Information technology sector.

Syllabus

Part I - INTERNET ACCESS

1. **Overview of Internet**:
   History, Computer networking, Developments, Taxonomy of Internet and Applications.
2. **Internet Protocols**:
   TCP/IP protocol suite, Application Protocols: Email, SNMP, SMTP, ping, finger, FTP, Telnet, Other tolls like finger, nslookup, whois, ping, PETSIM.
3. **Network Connectivity**:
   Network Connectivity, WANs in India, WANs in world, Modern, hubs, bridges, routers, switches, PC to Internet connection protocols, PPP, SLIP.
4. **Protocol Testing**:
   Conformance Testing Methodology and Framework, Testing Architecture, Test Sequence Generator Method , Testing with TTCN,RIP,SDL Based tool, SDL based performance Testing of TCP, OSPF, Interoperability Testing, Testing of CSMA/CD protocol using bridge, Scalability testing of BGP.

Part II - ADVANCES INTERNET TECHNOLOGY

High Speed Networks, MPLS, VPN, Multimedia protocols, IPV6, wireless network architecture M-Commerce, Wireless network architecture, Mobile computing, Mobile-IP.

References

1. Pallapa Venkataram & Sunilkumar S Manvi Communication Protocol Engineering
2. A. De and Venkataran. P Validation and Termination Detection of Communication Protocols by an Expert System, Proceedings IASTED International Symposium on Expert Systems: Theory and Application, pp. 1-4, 1990

Duration & Course Fee

The course is designed for 4 months (total credits 3+0). Course Fee is Rs.9,000/-. The intake is limited to 50 and the admission is based on First-cum-First-Served basis.

Course Schedule

- Classroom briefing and introductory sessions at the beginning of the course (3 days)
- Interactive session through WEB and Email for two months
- Mid-term contact session (3 consecutive days) & Mid-term Exam
- Project work after the Mid-term contact session
- Final contact session (3 days) and Final exam at the End of the Course

Faculty: **PROF. P VENKATARAM,** Dept. of ECE, IISc.
E-mail: pallapa@ece.iisc.ernet.in

FIBER OPTIC NETWORKS (3+0)

Objective

To introduce fundamental concepts of current and futuristic optical networks. Depth of understanding and recent developments will be emphasized by problem solving, discussion on IEEE Journal papers and company products. Periodic assignments and a Term paper are offered. some understanding of communication concepts, OSI layer, and protocols is assumed. Mathematics of a graduate level communication Engineer is also assumed.

Syllabus

1. Overview of optical communications
2. Optical Networking fundamentals, SONET/SDH, ATM, IP
3. WDM Technology: MUX/DeMUX, Crossconnects, Amplifiers, Switches and Routers, MEMS/MOEMS
4. WDM Network elements and Architectures
5. WDM System design: Routing and Wavelength Assignment (WRA) Problems and Algorithms
6. Application of WDM in Long-haul, MAN, PON, etc.
7. Control and Management issues
8. IP over WDM
9. Introduction to MPLS
10. Current topics like photonic switching, optical TDM, spatio-temporal codes

Target Group

Communication Engineers of Industry, R&D Units & Institutions

References

1. Rajiv Ramaswamy and Kumar Sivarajan, Optical Networks, Morgan Kaufman, 2002.
2. Bishwanath Mukherjee, Optical Networks, McGrah-Hill, 1997.
3. Papers from recent IEEE Journals like JLT, JSAC and JSTQE.

Minimum Background

B.E. / B.Tech (Computer Science, Electronics & Telecom) **OR** equivalent

Duration & Course Fee

The course is designed for 4 months (total credits 3+0). Course Fee is Rs.9,000/-. The intake is limited to 50 and the admission is based on First-cum-First-Served basis.

Course Schedule

- Classroom briefing and introductory sessions at the beginning of the course (3 days)
- Interactive session through WEB and Email for two months
- Mid-term contact session (3 consecutive days) & Mid-term Exam
- Project work after the Mid-term contact session
- Final contact session (3 days) and Final exam at the End of the Course

Faculty: **Dr. T SRINIVAS,** Dept. of ECE, IISc
E-mail: srinu@ece.iisc.ernet.in

ENVIRONMENTAL MANAGEMENT (3+0)

Objective

This course provides an overview of the key concepts and principles in environmental management, areas of global and national environmental concern, and strategies and tools for effective environmental management. Attempt to understand the genesis of environmental problems; the concerns that lead to various international and national initiatives to tackle them have been made in this course. Various tools, which can be used to address environmental problems and the role that the professionals can play in managing environment in their respective areas would be discussed.

Syllabus

1. Principles of Environmental Management.
2. Principles of Ecology, Environment & Environmental Management.
3. Policies and Legal Aspect of Environmental Management.
4. Overview of Environmental Impact Assessment (EIA).
5. Preparation and Review of Environmental Impact Assessment Report.
6. Environmental Audit.
7. Life Cycle Assessment as EM Tool.
8. Environmental Management Systems Standards: ISO 14000 (EMS).
9. Related Issues in Environmental Management.
10. Environmental Design.
11. Environmental Economics.
12. Basics of Data base Management System (DBMS), Geographic Information System (GIS) and Remote Sensing
13. Geographic Information System (GIS) and Remote Sensing in Environmental Management.

Minimum Background Required

In-service professionals / Fresh graduates in Engineering

Duration & Course Fee

The course is designed for 4 months (total credits 3+0).

Course Fee: Rs.9,000/-. The intake is limited to 50 and the admission is based on First-cum-First-Served basis.

Course Schedule

- Classroom briefing and introductory sessions at the beginning of the course (3 days - 28th Jan - 30th Jan 2006))
- Interactive session through WEB and Email for two months
- Mid-term contact session (3 consecutive days) & Mid-term Exam
- Project work after the Mid-term contact session
- Final contact session (3 days) and Final exam at the End of the Course

Faculty: **DR. T V RAMACHANDRA,** Centre for Ecological Sciences, IISc
E-mail: cestvr@ces.iisc.ernet.in

MUNICIPAL SOLID WASTE MANAGEMENT (3+0)

Objective

The quantum of solid waste generation has considerably increased and the characteristics of wastes have also significantly changed over the years, with the unplanned growth of population, increased urbanization and developmental activities which are seriously degrading the urban and semi-urban environment in many parts of the world, placing enormous strain on natural resources and undermining efficient and sustainable development. Daily thousands of tonnes municipal solid waste is simply being dumped on open lands and these existing sites are overflowing with new wastes and identification of new sites for disposal of wastes are becoming scarce. Therefore, there is a need is to raise awareness on the use of appropriate technologies for efficient management of solid waste. Against this backdrop, the course will discuss the basic concepts of solid waste and their classifications based on sources and types followed by the aspects of environmentally sound management practices and the current scenario of solid waste in India.

Syllabus

1. Municipal Solid Waste Management: An Introduction.
2. MSWM In India: Issues and approaches
3. Generation and Characteristics of Waste.
4. Waste Collection, Storage and Transport.
5. Waste Disposal.
6. Waste Processing Techniques.
7. Source Reduction, Product Recovery and Recycling.
8. Recovery of Biological Conversion Products: Compost and Biogas.
9. Incineration and Energy Recovery.
10. Hazardous Waste: Management and Treatment.
11. Integrated Waste Management (IWM).
12. Basics of Data base Management System (DBMS), Geographic Information System (GIS) and Remote Sensing
13. Geographic Information System (GIS) and Remote Sensing data in planning and management of MSW.

Duration & Course Fee

The course is designed for 4 months (total credits 3+0).

Course Fee: Rs.9,000/-. The intake is limited to 50 and the admission is based on First-cum-First-Served basis.

Course Schedule

- Classroom briefing and introductory sessions at the beginning of the course (3 days - 28th Jan - 30th Jan 2006))
- Interactive session through WEB and Email for two months
- Mid-term contact session (3 consecutive days) & Mid-term Exam
- Project work after the Mid-term contact session
- Final contact session (3 days) and Final exam at the End of the Course

Faculty: **DR. T V RAMACHANDRA,** Centre for Ecological Sciences, IISc
E-mail: cestvr@ces.iisc.ernet.in

INTRODUCTION TO SIX SIGMA (3+0)

Objective

The primary objective of this course is to introduce the fundamentals of six sigma concept and its implementation in the organizations. This course will help the candidates to gain a through knowledge of six sigma methodology using DMAIC approach and practical understanding of the statistical principles and tools used. This course can be a primer for those who are looking for Six Sigma Black Belt/Green Belt certification programs.

Syllabus

1. Overview of Six Sigma
2. Introduction to DMAIC Methodology
3. Project Selection and Management
4. Translating customer requirements
5. Measurement System Analysis and process capability
6. Process Analysis, Improvement and Control
7. Basic Probability and Statistics
8. Financial benefits calculation
9. Brief Introduction to DFSS Methodology
10. Certification Programs

Target Group

Engineers, Managers, Quality Professionals and Process improvement executives.

References

1. Forrest Breyfogle, Implementing Six Sigma: Smarter Solutions Using Statistical Methods, New York: John Wiley & Sons, 1999.
2. Thomas Pyzdek, The Six Sigma Hand book, Second Edition, McGraw Hill, 2003.
3. Peter S. Pande, Roland R. Cavanagh, Robert P. Neuman, The Six Sigma Way Team Fieldbook: An Implementation Guide for Process Improvement Teams. Tata-McGraw Hill, 2001.

Minimum Background

B.E./ B.Tech./ M.Sc. / MCA

Duration & Course Fee

The course is designed for 4 months (total credits 3+0). Course Fee is Rs.9,000/-. The intake is limited to 50 and the admission is based on First-cum-First-Served basis.

Course Schedule

- Classroom briefing and introductory sessions at the beginning of the course (3 days)
- Interactive session through WEB and Email for two months
- Mid-term contact session (3 consecutive days) & Mid-term Exam
- Project work after the Mid-term contact session
- Final contact session (3 days) and Final exam at the End of the Course

Faculty: Mr. Vijayasekar P
E-mail: vijayasekar.palanisamy@wipro.com

SOFTWARE QUALITY ASSURANCE & MANAGEMENT (3+0)

Objective

The primary objective of this course is to understand the concepts and theory related to software quality assurance and management and its application in the industry through class work and case studies. The course adds value to the students by discussing the application of SQA methodologies in different software development life cycles, formal Quality Management Systems, Software Configuration Management, Auditing, Metrics, Cost of Software Quality, Reviews and Inspections, Statistical Methods applied to Software Quality Control and Six Sigma Methodologies.

Syllabus

1. Introduction to Software Quality Assurance and Management
2. Software Reviews and Inspections
3. Software Testing
4. Software Metrics
5. Cost of Software Quality
6. Software Configuration Management
7. Statistical Methods applied in Software Quality
8. ISO 9001:2000 and CMMI
9. Software Quality Auditing
10. Introduction to Six Sigma Methodologies
11. Case Studies

Target Group

Software Engineers, Software Quality practitioners, SEPG members and Software Project Managers.

References

1. Jeff Tian, Software Quality Engineering, John Wiley & Sons, Feb. 2005.
2. Pressman RS, Software Engineering, Tata McGraw-Hill, 6th Edition, 2004.
3. Schulmeyer G. Gordon, Handbook of Software Quality Assurance, 3rd Edition, Prentice Hall Publications, 1999.

Minimum Background

B.E./ M.Sc. / MCA

Duration & Course Fee

The course is designed for 4 months (total credits 3+0). Course Fee is Rs.9,000/-. The intake is limited to 50 and the admission is based on First-cum-First-Served basis.

Course Schedule

- Classroom briefing and introductory sessions at the beginning of the course (3 days)
- Interactive session through WEB and Email for two months
- Mid-term contact session (3 consecutive days) & Mid-term Exam
- Project work after the Mid-term contact session
- Final contact session (3 days) and Final exam at the End of the Course

Faculty: Mr. Vijayasekar P
E-mail: vijayasekar.palanisamy@wipro.com

LIST OF MEMBER PROFESSIONAL INSTITUTIONS

	Society Name	Address
1.	**Computer Society of India, Bangalore Chapter.** **E-mail: csibc@bgl.vsnl.net.in**	Flat # 201, II Floor, MBC 134, Infantry Road, Bangalore 560 001 ✈ 22860461/22862215 (Fax)
2.	**Indian Institute of Metals, Bangalore Chapter.**	C/o Dept. of Metallurgy, Indian Institute of Science, Bangalore 560 012 ✈ 22932259
3.	**Institute of Electrical & Electronics Engineers Inc., Bangalore Section.** **E-mail: kasi@ee.iisc.ernet.in**	C/o Dept. of Electrical Engineering, Indian Institute of Science, Bangalore 560 012 ✈ 22932366
4.	**Institute of Electronics & Telecommunication Engineers.** **E-mail: ieteblr@bgl.vsnl.net.in**	IETE Building, Bellary Rd., Ganga Nagar Extn., Bangalore 560 032 ✈ 23331133/23337231 (Fax)
5.	**The Institution of Engineers (India), Karnataka State Centre.** **E-mail: ieiksc@bgl.vsnl.net.in**	# 3, Dr. B.R. Ambedkar Veedhi, Bangalore 560 001 ✈ 22264698
6.	**Instrument Society of India, Bangalore.** **E-mail: sasokan@isu.iisc.ernet.in**	C/o Dept. of Instrumentation, IISc., Bangalore 560 012 ✈ 22932269 / 2271
7.	**Royal Society of Chemistry (London), Deccan Section.**	C/o Alumni Association Indian Institute of Science, Bangalore 560 012 ✈ 22932597

Appendix `A' ***PROFORMA***

NAME OF THE COLLEGE

PROVISIONAL CERTIFICATE

This is to certify that Sri/Smt.....

was a student of this college studying in.....*

Course.....**

branch during the session.....to.....

He / She has successfully completed the course as prescribed by the.....University with regard to course of study, attendance, sessional requirements etc.

He/She has passed the final.....* examination held during.....securing.....class as per the results announced by the University. He/She will be awarded the.....degree during the next convocation of the University.

College Seal PRINCIPAL

Date :

**Appropriate course to be filled in (B.E., M.E., M.Sc., M.Com., M.B.B.S., etc)*

*** Mention Civil, Electrical, Electronics, Chemistry, Biology, etc.,*

IMPORTANT DATES

Issue of application commences (@ Rs. 150/-)		**21-10-2005 - Monday**
Last date for submission of application		**16-11-2005 - Wednesday**
Intimation for aptitude/objective test *		**25-11-2005 - Friday**
Aptitude / Objective test *		**11-12-2005 - Sunday**
Intimation of selection		**19-12-2005 - Monday**
Receiving fees	**From**	**21-12-2005 - Wednesday**
	To	**09-01-2006 - Monday**
Classes Commence		**23-01-2006 - Monday**
Final Exams Commence		**22-05-2006 - Monday**

*** (only if required) - Please check with PROFICIENCE Office on the specified date.**

PROFICIENCE

CENTRAL LECTURE HALL COMPLEX,
INDIAN INSTITUTE OF SCIENCE,
BANGALORE 560 012.

Phone: +91 080 23600104 / 22932508

E-mail: prof@cce.iisc.ernet.in

URL: www.cce.iisc.ernet.in

Working Hours

Monday through Friday: 1200 to 1400 & 1440 to 1900
Saturday: 1000 to 1230

Prof. P Venkataram
CHAIRMAN
CENTRE FOR CONTINUING EDUCATION
INDIAN INSTITUTE OF SCIENCE
BANGALORE 560 012
Phone: +91 080 22932491/23600911
E-mail: *chairman@cce.iisc.ernet.in*

COORDINATORS, PROFICIENCE

Prof. G L Sivakumar Babu
Dept. of Civil Engg., IISc.
E-mail: *gls@civil.iisc.ernet.in*

Prof. C Murali
Dept. of E & C, MSRIT,
MSR Nagar, Bangalore 560 054
E-mail: *muraliec@bgl.vsnl.net.in*

Mr. Hitesh Mehta
Chief Technical Officer,
Eagle Photonics
Rajaji Nagar, Bangalore 560 010
E-mail: *hitesh@eaglephotonics.com*