CS035	**Design of Algorithms**	**3**	**0**	**0**	**100**

1 . ADVANCED ALGORITHMS **12**

Polynomials - Evaluation - Matrices - Multiplication - FFT and Convolution - Binary matrices - Transitive closure - Number theoretic Algorithm - Chinese remainder theorem - RSA Public - Key crypto system.

2 . DIVIDE AND CONQUER **8**

General method - Typical problems - Finding the minimum and maximum - Strassen's matrix multiplications - Convex Hull.

3 . GREEDY METHOD **8**

General method - Knapsack problem - Tree vertex splitting - Job sequencing with deadlines.

4 . DYNAMIC PROGRAMMING **8**

General method - 0/1 knapsack - Traveling salesman problem - Flow shop scheduling.

5 . BACKTRACKING AND BRANCH AND BOUND TECHNIQUES **9**

General method - 8 Queens problems - Graph coloring - Branch and bound method - 0/1 knapsack - Traveling Salesman.

Total No of periods: 45

CS035 Design of Algorithms **3 0 0 100**

Text Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest , "Introduction to Algorithms", Prentice Hall of India Pvt. Ltd., 1998.

References:

1. Sara Baase, "Computer Algorithms - Introduction to Design and Analysis", Addison - Wesley Publishing Company, 1989.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran , "Computer Algorithms ", Galgotia Publications Pvt. Ltd, 1999.
3. S.Sahni, "Data Structures, Algorithms and Applications in C++", McGraw Hill, 1998.

CS064 Embedded System and Design **3 0 0 100**

1 . UNIT I : BASICS OF EMBEDDED SYSTEMS AND HARDWARE REQUIREMENTS : **10**

Introduction - Examples of embedded systems: Telegraph - Cordless bar - Code scanner - Laser printer - Underground tank monitoring - Nuclear Reactor monitor. Advanced hardwares: Programmable array logic; Application Specific Integrated circuits (ASIC) and Field Programmable Gate arrays (FPGA) - Watch dog timers - Built - Ins on the microprocessor - Interrupt.

2 . UNIT II : EMBEDDED SOFTWARE ARCHITECTURE: **7**

Round robin - Round robin with interrupts - Function Queue scheduling Architecture - Real time operating systems Architecture - Selecting architecture.

3 . UNIT III : REAL TIME OPERATING SYSTEM: **12**

Tasks and Task states - Tasks and Data - Semaphore and shared data - Message queues, mail boxes and pipes - Encapsulating semaphores and queues - Timer functions - Events - Memory management - Interrupt routines in an RTOS Environment.

4 . UNIT IV : BASIC DESIGN USING A REAL TIME OPERATING SYSTEM: **6**

Overview - Principles - Design of an embedded system (Underground tank monitoring System).

5 . UNIT VI : EMBEDDED SOFTWARE DEVELOPMENT TOOLS AND DEBUGGING : **10**

Linker/Locators for embedded software - embedded software in to the target system - Testing on host machine: Basic techniques - more advanced techniques - Limitations and shortcomings - Instruction set simulators - The assert macro - Testing using laboratory tools.

Total No of periods: 45

CS064 Embedded System and Design **3 0 0 100**

Text Book :

1. David E. Simon, An embedded software primer, Addition - Wesley 1999.
Indian Edition Reprint 2000, Second Edition Reprint 2001, Published by Addition - Wesley Longman (Singapore) Pte.Ltd., Indian
Branch 482, FIE Patparganj, New Delhi - 110 092.

EC046 Very Large Scale Integrated Circuit Design **3 0 0 100**

1 . MOS TECHNOLOGY AND CIRCUITS **9**

MOS Technology and VLSI, Process parameters and considerations for BJT, MOS and CMOS, Electrical properties of MOS circuits and Device modeling.

2 . MOS CIRCUIT DESIGN PROCESS **9**

MOS layers, Stick diagram, Layout diagram, Propagation delays, Examples of combinational logic design, Scaling MOS circuits.

3 . DIGITAL CIRCUITS AND SYSTEMS **9**

Programmable Logic Array (PLA) and finite state machines, Design of ALU's, Memories and Registers.

4 . ANALOG VLSI AND HIGH SPEED VLSI **9**

Introduction to analog VLSI, Models for analog switches, active resistors, current sources / sinks, current references, BJT and CMOS operational amplifiers for simulation. Layout of typical circuits like common source amplifier, current source and differential amplifier, Sub-micron technology and GaAs VLSI technology.

5 . HARDWARE DESCRIPTION LANGUAGES **9**

VHDL Background and basic concepts, Structural specification of hardware and Design organisation and parameterization.

Total No of periods: 45

EC046 Very Large Scale Integrated Circuit Design **3** **0** **0** **100**

Text Books:

1. *Dougles A. Pucknell and Kamran Eshrafhian, " Basic VLSI Design systems and circuits ", Prentice Hall of India Pvt. Ltd., 1993.*
2. *Randall L.Geiger and P.E.Allen, " VLSI design techniques for analog and digital circuits ", McGraw-Hill Int. Co. 1990.*
3. *Peter J.Ashenden, " The Designer's guide to VDNL ", Harcourt Asia Pvt. Ltd. 1995.*

References:

1. *Amar Murkherjee, " Introduction to NMOS and CMOS VLSI system design ", Prentice Hall, 1986.*
2. *Fabious. E., " Introduction to VLSI design ", McGraw-Hill, 1990.*
3. *Navabi. Z., " VHDL analysis and modeling of digital systems ", McGraw-Hill, 1993.*
4. *Mohammed Ismail and Terri Fiez, " Analog VLSI, Signal and Information Processing ", McGraw -Hill, 1994.*
5. *Neil H.E.Weste, Kamran Eshraghian, " Principles of CMOS VLSI Design ", Addison Wesley, 1998.*

EC053 Internet and Java **3 0 0 100**

1 . INTERNET WORKING WITH TCP / IP **9**

Review of network technologies, Internet addressing, Address resolution protocol (ARP / RARP), Routing IP datagrams, Reliable stream transport service (TCP) TCP/IP over ATM networks, Internet applications - E-mail, Telnet, FTP, NFS, Internet traffic management.

2 . INTERNET ROUTING **9**

Concepts of graph theory, Routing protocols, Distance vector protocols (RIP), Link state protocol (OSPP), Path vector protocols (BGP and IDRP), Routing for high-speed multimedia traffic, Multicasting, Resource reservation (RSVP), IP switching.

3 . WORLD WIDE WEB **9**

HTTP protocol, Web browsers Netscape, Internet explorer, Web site and Web page design, HTML, XML, Dynamic HTML, CGI.

4 . JAVA PROGRAMMING **9**

Language features, Classes, Object and methods, Subclassing and dynamic binding, multithreading, Overview of class library, Object method serialisation, Remote method invocation, Java script.

5 . MISCELLANEOUS TOPICS **9**

E-Commerce, Network operating systems, Web Design case studies.

Total No of periods: 45

EC053 Internet and Java **3 0 0 100**

Text Books:

1. *Douglas E.Comer, " Internetworking with TCP/IP ", Vol I: 3rd edition, Prentice Hall of India, 1999.*
2. *Eric Ladd and Jim O'Donnell, " Using HTML 4, XML and Java 1.2 ", Que Platinum edition, Prentice Hall of India, 1999.*

References:

1. *William Stallings, " High Speed Networks ", Prentice Hall Inc., 1998.*
2. *Margaret Levine Young, " Internet: The Complete References: ", Tata McGraw-Hill, 1999.*
3. *Balagurusamy.E, " Programming with JAVA, A primer ", Second edition, Tata McGraw-Hill, NewDelhi, 1999.*

EC056 Digital Image Processing **3 0 0 100**

1 . DIGITAL IMAGE FUNDAMENTALS **9**

Elements of digital image processing systems, Elements of Visual preception, Image sampling and quantization, Matrix amd Singular Value representaion of discrete images.

2 . IMAGE TRANSFORMS **9**

1D DFT, 2D DFT, Cosine, Sine, Hadamard, Haar, Slant, KL, SVD transforms and their properties.

3 . IMAGE ENHANCEMENT **9**

Histogram Modification and specification techniques, Image smoothing, Image sharpening, generation of spatial masks from frequency domain specification, Nonlinear filters, Homomorphic filtering, false color, Pseudocolor and color image processing.

4 . IMAGE RESTORATION AND RECOGNITION **9**

Image degradation models, Unconstrained and Constrained restoration, inverse filtering, Least mean square filter, Pattern Classes, optimal statistical classifiers, Neural networks and associated training methods and use of neural networks in image processing.

5 . IMAGE COMPRESSION **9**

Runlength, Huffman coding, Shift codes, arithmetic coding, bit plane coding, transform coding, JPEG Standard, wavelet transform, predictive techniques, Block truncation coding schemes, Facet modeling.

Total No of periods: 45

EC056 Digital Image Processing **3 0 0 100**

Text Books:

1. *Anil K. Jain, " FUNDAMENTALS OF DIGITAL IMAGE PROCESSING ", Prentice Hall of India, 1997.*
2. *Rafel C.Gonzalez and Richard E.Woods, " DIGITAL IMAGE PROCESSING ", Addison Wesley, 1993.*

References:

1. *William K. Pratt, " DIGITAL IMAGE PROCESSING ", John Wiley, NY, 1987.*
2. *Sid Ahmed M.A., " IMAGE PROCESSING THEORY, ALOGORITHMS AND ARCHITECTURES ", McGraw-Hill, 1995.*
3. *Umbaugh, " COMPUTER VISION ".*

EC062 Medical Informatics **3 0 0 100**

1 . MEDICAL INFORMATICS **9**

Medical data acquisition and database systems; PC based multichannel data acquisition system; Storage, analysis and retrieval techniques. PC based video card; Modems and Computer networking.

2 . VISUAL BASIC **9**

Visual programming concepts; Visual Basic environment, tools and controls; Dynamic data exchange; VB based Medical information system.

3 . COMPUTERS IN SYSTEM DESIGN **9**

Hospital information system its design and functional chzracteristics; Principles and applications of Artificial Intelligence, Pattern Recognition, Neural network and Fuzzy Logic in medicine.

4 . MULTIMEDIA AND VIRTUAL REALITY APPLIED TO MEDICINE **9**

Basic concepts of Multimedia; Design of Multimedia information systems; Components of Virtual reality; Virtual reality applications in medicine.

5 . COMPUTERS IN MEDICAL RESEARCH **9**

Physiological system modeling and simulation; Medical Informatics and its levels; Design and development of educational packages on medical sciences; Integrated design concepts; Interactive multimedia, virtual and digital libraries; Internet and its applications.

Total No of periods: 45

EC062 Medical Informatics **3 0 0 100**

Text :

1. R.D.Lele, " Computers in Medicine", Tata McGraw Hill, New Delhi, 1997.

References:

1. Tay Vaughan, "Multimedia making it work", Tata McGraw Hill, New Delhi, 1997.
2. Davis Chapman, "Teach yourself Visual Basic 6 in 21 days", Techmedia, New Delhi, 1998
3. Harold Sackman, "Biomedical Information Technology", Academic Press, New York, 1997.
4. Mary Brth Fecko, "Electronics resources: Access and Issues", Bowker and Saur, London, 1997.

EC063 Neural Networks **3 0 0 100**

1 . ADAPTIVE LINEAR COMBINER: **9**

Elementary neurophysiology and biological neural network - Artificial neural netowrk, Adeline and Madeline.

2 . BACK PROPAGATION AND ASSOCIATE MEMORY **9**

Back propagation network, generalized delta rule, Bi-directional associate memory, Hopfield memory architecture.

3 . BOLTZMANN'S MACHINES AND COUNTER PROPAGATION NETWORK: **9**

Simulated Annealing, Boltzman completion network, Boltzman input output network, counter propagation network

4 . SELF-ORGANISING MAPS AND ADAPTIVE RESONANCE THEORY: **9**

Self organising map, feature map classifier, adaptive resonance theory network, ART1, ART2.

5 . SPATIOTEMPORAL NETWORKS AND NEOCOGNITRON **9**

Architecture of spatiotemporal networks, Sequential competitive avalanche field, Neocognition architcture and dataprocessing.

Total No of periods: 45

EC063 Neural Networks **3 0 0 100**

Text Book:

1. J.A.Freeman & David.M.Skapura, Neural networks, Algorithms applications and programming techniques, Addison Wesley, 1991. ISE Reprint 1999.

Reference:

1. David M.Skapura, 'Building Neural Networks', Addison Wesley, 1996.
2. Bose, 'Neural Network Fundamentals with graphs, algorithms and applications', Tata McGraw Hill, 1995.

EC064 Linear IC's and Application **3 0 0 100**

1 . UNIT - I **8**

Operational Amplifier: Functional block diagram symbol characteristics of an ideal operational amplifier circuit schematic of A741.
Operational Amplifier Characteristics: Open loop gain - CMRR Input bias and offset currents - Input and Output offset voltages- Offset compensation techniques - Frequency response characteristics - Stability - Limitations- Frequency compensation - Slew rate - Transfer characteristics.

2 . UNIT - II **12**

Linear Applications of Operational Amplifiers: Inverting and Non-inverting amplifiers - Voltage follower - Summing amplifier - Differential amplifier- Instrumentation amplifier - Integrator and Differentiator - Practical considerations - Voltage to Current and Current to Voltage converters - Phase changers - Sinusoidal oscillators - Active filters - Design of low pass, high pass, wide band pass and band stop butter worth filters - Narrow band pass and notch filters.

Non Linear Applications of Operational Amplifiers: Comparator - Regenerative comparator - Zero crossing detector- Sample and hold circuit - Precision diode - Half wave and full wave precision rectifiers - Active peak detector, Clipper and Clamper - Logarithmic and Exponential amplifiers - Square and Triangular wave form generators.

3 . UNIT -III **10**

IC Voltage Regulators: Block diagram of 723 general purpose voltage regulator - Circuit configurations - Current limiting schemes. Output current boosting - Fixed and adjustable three terminal regulators.
Special Function ICs: 555 Timer Functional block diagram and description - Monostable and Astable operation - Applications - 566 Voltage controlled Oscillator - Analog Multiplexer - Comparator ICs - Function generator ICs.

4 . UNIT - IV **8**

Phase Locked Loop: Functional Block diagram - Principle of operation - Building blocks of PLL - Characteristics - Derivations of expressions for Lock and Capture ranges- Applications- Frequency synthesis - Frequency translation - AM and FM detection - Motor speed control.

5 . UNIT - V **7**

A-D & D-A Converters : Digital to Analog Converters : Binary weighted and R-2R Ladder types - Analog to digital converters: Continuous, Counter ramp, Successive approximation, Single, Dual slope and Parallel types - DAC/ADC performance characteristics.

Total No of periods: 45

EC064 Linear IC's and Application **3 0 0 100**

TEXT BOOK

1.Gayakwad. A.R.,- OP-Amps and Linear Integrated circuits -, Prentice Hall of India, Third Edition, New Delhi 1993.

REFERENCES

1. Coughlin. FR., and Driscoll. F.F., -Operational Amplifiers and Linear Integrated Circuits -, Prentice Hall of India, fourth edition, New Delhi 1997.
2. Millman, and Halkias,-Integrated Electronics : Analog and Digital Circuits and Systems -, McGraw Hill, Ninth Reprint, 1955.
3. Roy Choudhury, and Shail Jain, - Linear Integrated Circuits -, Wiley Eastern Ltd., 1991.

EC066 Electronics Manufacturing Technology **3 0 0 100**

1 . MICROELECTRONIC PROCESSES : 13

Atomic structure. Wafer preparation by growing, machining, and polishing. Diffusion. Microlithography. Etching and cleaning. Energy beam processes using photon, electron and ion. Ion implantation. Chemical vapor deposition. Physical vapor deposition. Epitaxial process. Applications to microchips and micro electrical mechanical devices.

2 . INTERCONNECTIONS AND PRINTED WIRING BOARD MANUFACTURE : 10

Through-hole components. Surface-mount components. Component manufacturing. Wire Bonding Technology. Tape Automated Bonding. Multiple Chip Modules. PWB types. Substrate materials. Fabrication procedures. Image Transfer. Plating. Plated-Through Holes. Etching. Solder-masking. Multi-layer board.

3 . SOLDERING AND CLEANING : 7

Wave soldering. Adhesive and solder paste application. Solder materials. Solder system variables. Soldering temperature profile. Reflow theory and alternatives. Soldering quality and defects. Post solder cleaning and selection. Measurement of cleanliness levels.

4 . AUTOMATIC ASSEMBLY FOR PCB 8

Assembly process variations. Component handling. Automated component placement/insertion. Surface Mount Technology (SMT). Robotic marking and assembly. Placement accuracy requirements. Machine vision, X-ray and laser inspection

5 . INSPECTION, TEST AND REWORK FOR PCB : 7

Inspection philosophy and techniques. Component placement and joining quality. Concept of yield. In-circuit test. Functional test. Environment stress screening. Design for testability. Design for reparability. Repair process. Field repair strategy.

Total No of periods: 45

EC066 Electronics Manufacturing Technology 3 0 0 100

TEXT BOOKS:

1) ULSI technology / edited by C.Y. Chang, S.M. Sze. Call Number : TK7874.76.U46, Publisher : New York ; Singapore :
McGraw-Hill, c1996 (Call Number : TK7874.76.U46)

REFERENCES:

1) Microchip Fabrication--a practical guide to semiconductor processing, by Peter Van Zant, 4th Ed. McGraw Hill, 2000
(Call Number: TK7871.85.V217)
2) Electronics Manufacturing Processes, by Tomas L. Landers, al et. Prentice Hall
3) Packaging of Electronic Systems: A Mechanical Engineering Approach, by James W. Dally, McGraw-Hill
4) Prasad R. P., "Surface Mount Technology: Principles and Practice", New York : Chapman & Hall, 1997, (Call Number:
TK7868.P7P911 1997)

EE044 Intelligent Controllers **3 0 0 100**

1 . INTRODUCTION **3**

Definition - architecture - difference between conventional and expert system.

2 . KNOWLEDGE ACQUISITION **10**

Knowledge representation and formal logic-knowledge engineer - Knowledge acquisition techniques - concept formalisation - Knowledge representation development - knowledge acquisition for core problem knowledge acquisition without knowledge engineers.

3 . EXPERT SYSTEM TOOLS **10**

Problem solving start engines - languages for expert system development - expert system shells - LISP machines - PC - based expert system tools.

4 . FUZZY MODELING AND CONTROL **10**

Fuzzy sets - Fuzzy set operators - Fuzzy Reasoning - Fuzzy propositions - Linguistic variable - Decomposition and Defuzzification - Fuzzy systems: case studies.

5 . NEURAL CONTROLLERS **12**

Introduction: Neural networks - supervised and unsupervised learning - neural network models - single and multi layers - back propagation - learning and training. Neural controllers case studies.

Total No of periods: 45

EE044 Intelligent Controllers **3** **0** **0** **100**

References:
1. Rolston, D.W., " Principles of Artificial and Expert Systems Development ", McGraw Hill Book Company, International Edition.
2. Kosko, B, " Neural Networks and Fuzzy Systems ", Prentice Hall of India Pvt. Ltd, 1994.
3. Klir, G.J and Folger, T.A. " Fuzzy Sets, and information ", Prentice Hall.
4. James A. Freeman, David M. Skapura, " Neural Networks Algorithms ", Applications and Programming Techniques', Addison Wesley Publishing Company 1992.

EE045 Bio-Medical Instrumentation **3 0 0 100**

1 . INTRODUCTION **9**

Cell structure - electrode - electrolyte interface, electrode potential, resting and action potential - electrodes for their measurement, ECG , EEG , EMG - machine description - methods of measurement - three equipment failures and trouble shooting.

2 . TRANSDUCERS FOR BIO-MEDICAL INSTRUMENTATION **9**

Basic transducer principles - source of bioelectric potentials - resistive, inductive, capacitive, fiber-optic, photoelectric, piezo-electric and chemical transducers - their description and feature applicable for biomedical instrumentation.

3 . SIGNAL CONDITIONING, RECORDING AND DISPLAY **9**

Input isolation, DC amplifier, power amplifier, differential amplifier - feedback, op Amp-electrometer amplifier, carrier Amplifier - instrument power supply. Oscillagraphic - galvanometeric - X-Y, magnetic recorder, storage oscilloscopes- electron microscope - PMMC writing systems.

4 . CARDIAC MEASUREMENTS **9**

Electrocardiograph measurements - blood pressure measurement: by ultrasonic method - plethysonography - blood flow measurement by electromagnetic flow meter-cardiac output measurement by dilution method - phonocardiography - vector cardiography. Respirator of measurement:spiro meters - pulmonary measurement system, medical gases and safety systems - heart lung machine - artificial ventilator - Anesthetic machine - Clinical equipment - CT scanner - NMRJ - ultrasonic scanner - thermographic measurement - bio-telemetry - laser equipment and application - therapeutic equipment - cardiac pacemaker - dc- defibrillator patient safety - electrical shock hazards - safety - pasemeters.

5 . COMPUTERS IN BIO-MEDICAL INSTRUMENTATION **9**

Introduction - Computers in medicine - basics of signal conversion and digital filtering - data reduction technique - time and frequency domain technique - ECG Analysis systems VLSI in Digital Signal Processing.

Total No of periods: 45

EE045 Bio-Medical Instrumentation **3** **0** **0** **100**

Text Books:

1. Khandpur, R.S., " Handbook of Biomedical Instrumentation ", TMH, 1989.

References:

1. Geddes L.A., and Baker, L.E., " Principles of Applied Bio-medical Instrumentation ", 3rd Edition, John Wiley and Sons, 1995.
2. Cromwell, Weibell and Pfeiffer, " Biomedical Instrumentation and Measurements ", 2nd Edition, Prentice Hall of India, 1999.
3. Tompkins W.J., " Biomedical Digital Signal Processing ", Prentice Hall of India,1998.

GE037 Intellectual Property Rights (IPR) **3 0 0 100**

1 . UNIT I **5**

Introduction - Invention and Creativity - Intellectual Property (IP) - Importance - Protection of IPR - Basic types of property (i. Movable Property ii. Immovable Property and iii. Intellectual Property).

2 . UNIT II **10**

IP - Patents - Copyrights and related rights - Trade Marks and rights arising from Trademark registration - Definitions - Industrial Designs and Integrated circuits - Protection of Geographical Indications at national and International levels - Application Procedures.

3 . UNIT III **10**

International convention relating to Intellectual Property - Establishment of WIPO - Mission and Activities - History - General Agreement on Trade and Tariff (GATT).

4 . UNIT IV **10**

Indian Position Vs WTO and Strategies - Indian IPR legislations - commitments to WTO-Patent Ordinance and the Bill - Draft of a national Intellectual Property Policy - Present against unfair competition.

5 . UNIT V **10**

Case Studies on - Patents (Basumati rice, turmeric, Neem, etc.) - Copyright and related rights - Trade Marks - Industrial design and Integrated circuits - Geographic indications - Protection against unfair competition.

Total No of periods: 45

GE037 Intellectual Property Rights (IPR) 3 0 0 100

TEXT BOOK

1. Subbaram N.R. " Handbook of Indian Patent Law and Practice ", S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1998.

REFERENCES

1. Eli Whitney, United States Patent Number : 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today : Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707_gibbs.html.

GE038 Indian Constitution and Society **3 0 0 100**

1 . UNIT I **9**

Historical Background - Constituent Assembly of India - Philosophical foundations of the Indian Constitution - Preamble - Fundamental Rights - Directive Principles of State Policy - Fundamental Duties - Citizenship - Constitutional Remedies for citizens.

2 . UNIT II **9**

Union Government - Structures of the Union Government and Functions - President - Vice President - Prime Minister - Cabinet - Parliament - Supreme Court of India - Judicial Review.

3 . UNIT III **9**

State Government - Structure and Functions - Governor - Chief Minister - Cabinet - State Legislature - Judicial System in States - High Courts and other Subordinate Courts

4 . UNIT IV **9**

Indian Federal System - Center - State Relations - President's Rule - Constitutional Amendments - Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

5 . UNIT V **9**

Society : Nature, Meaning and definition; Indian Social Structure; Castle, Religion, Language in India; Constitutional Remedies for citizens - Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

Total No of periods: 45

GE038 Indian Constitution and Society **3 0 0 100**

TEXT BOOKS

1. Durga Das Basu, " Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.
2. R.C.Agarwal, " (1997) Indian Political System ", S.Chand and Company, New Delhi.
3. Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, " (1997) Social Stratification in India: Issues and Themes ", Jawaharlal Nehru University, New Delhi.

REFERENCES

1. Sharma, Brij Kishore, " Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, " (1998) Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, " Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.
4. Yogendra Singh, " (1997) Social Stratification and Charge in India ", Manohar, New Delhi.

HS035 Technical German I **3 1 0 100**

1 . INTRODUCTION **5**

Special and comparative features of German with English, Hindi and Tamil - German Alphabets, pronunciation.

2 . THEMA **10**

Name, Land Wohnort - Sudium, Beruf - Familie, Geschwister, Alter - Tagesablauf , termine - Einladung - Stellensuche, Berufswahl - Einkauf.

3 . GRAMMATIK **10**

Personalpronomen, Verb, Wortstellung, Ort - Possessivpronomen, Verb - 'Sein' - Verb - 'Haben', Unbestimmter Artikel, Negation - 'Nicht' - 'Kein ' - Zeit, Bestimmter Artikel, Starke Verben - Trennbare Verben, Imperativ - Modal Verben - Akkusativ.

4 . UEBUNGEN **10**

Partner urbungen - Sachriftliche Uebungen - Aussprache Uebungen - Kontrollue bungen - Text generation.

5 . DIALOGUE **5**

Oral - Written.

6 . GLOSSARY **5**

Technical Words.

7 . TUTORIAL **15**

Total No of periods: 60

HS035 Technical German I	**3**	**1**	**0**	**100**

Text Book:

1. LERNZIEL DEUTSCH (Deutsch als Fremdsprache) - Grundstufe 1 from Max Hueber varlag.

HS036 Technical German II **3 1 0 100**

1 . INTRODUCTION **5**

German Idioms and Phrases.

2 . THEMA **10**

Geschenke, auf der post - Auskunft - Fest - Heirat, Kinder - Studium - Ausbuilding - Erziehung, Jugend - Deutschsprachige Laender, Europa - Arbeitswelt, Urlaub.

3 . GRAMMATIK **10**

Ort and Richtung - Reflexive Verben, Verben mit Praepositional object - Perfect - Praeteritum - Adjective - Komparation, Genitic Wortbuildung - Nebensaetze.

4 . UEBUNGEN **10**

Partner uebungen - Schriftliche Uebungen - Aussprache Uebungen - Kontrolluebungen - Text Generation.

5 . DIALOGUE **5**

Oral - Written.

6 . GLOSSARY **5**

Technical Words.

7 . TUTORIALS **15**

Total No of periods: 60

HS036 Technical German II	**3**	**1**	**0**	**100**

Text Book:

1. LERNZIEL DEUTSCH (Deutsch als Fremdsprache) - Grundstufe 1 from MAX Hueber Verlag.

HS037 Technical Japanese I **3 1 0 100**

1 . 9

Introduction to Japanese Alphabets - Hiragana, Katakana and Kanji - group 1,2,3 & 4 Syllabus - Writing Practice - Pronunciation - word Order - Greetings - Receiving a visitor and exchange of pleasantries - Kanji Practice.

2 . 9

Basic structure of sentences - classification of verbs - Polite form of verbs - irregular verbs - Particle-E - Time expressions - question sentences - Japanese numerals - Kanji practice.

3 . 9

Classification of particles - Ga, Ka, Wa, O, E, Ni etc - aural comprehension - reading comprehension - noun -1 Wa, noun -2 desu - Demostrative pronouns - kore, sore , are and dore - kono, sono, ano and dono - kochira - sochira - achira and dochira - parcle - No, kara, ni and de - question - itsu - conversational grammar - soo desu ka - Na, I adjectives perfect and imperfect - question words - Doo and ikaga - particle - To, ne and yo - Kanji practice.

4 . 9

Desu as a substitute for a verb - demonstrative pronouns sono and sore - Group 1 particles - de, O, Made and Ka - conjunction - soshite - Question words - dare, nani, doko, itsu, dore, dochira,doyatte, ikutsu, ikura - Words for degrees - gurai or kurai - Phrase - Saa - anoo - numerals - counters and numbers - humble form of desu and arimasu - Kanji practice.

5 . 9

Verbs ending in-te or de - classification of Te forms and Masu forms - verb modifiers - koo,soo, aa and doo - Set phrase - Onegaishimasu - Sumimasen - Adverbs - Mazu,sore kara and saigo ni - formation of the Te form of I adjective and desu - kanji practice.

Total No of periods: 45

HS037 Technical Japanese I **3** **1** **0** **100**

Text Books:

1. OOTSUBO et al - " A Course in Modern Japanese ", Vol.1, 1983, The University of Nagoya Press, Japan.
2. SHIYO SUZUKI and IKUO KAWASE - Nihongo Shoho text book with audio tapes, 1981.
3. YAN - SAN Serial - Video tapes, Japan.

HS038 Technical Japanese II **3 1 0 100**

1 . 9

Demonstrative Pronouns: Are - Interjection: Ee - Quoted Sentences - omoimsu - Non polite form of verbs - Group 1 ending in -ert or iru, group 2 verbs ending in - u - Non polite forms of - I - adjectives -non polite form of desu,deshoo,daroo - Suffic - Sugiru - expression of reason - tame (ni) - Counters: - Hon and - Do - Kanji practice.

2 . 9

Negative - Te - form of verbs -I adjectives - Permission and prohibition - te mo desuka and - te wa ikemasen ka - Na - adjectives - suki and kirai - Verbs:Itadaku - Conjunction - Nagara - Phrase - No koto na n desu ga - usage of chotto - kanji practice.

3 . 9

Noun modifiers - Quoting modifier - Suffix - Kata - sa and me - Particles - Made ni and dake - te form of verb and iru/imasu - noun - Uchi - Eba form of verbs - Kanji practice.

4 . 9

Potential sentences - group 1 verbs - group 2 verbs irregular verbs - Nouns - Tsumori and Hazu - Adverbs: Moo and Made - Form of address: moshomoshi - Expression - Ee - verbs: Naru and suru - Particles - De and ka - kanji practice.

5 . 9

Comparative sentences - no hoo ga and yori - Negative comparative sentences - Negative request - Adverbs of extent - Konna ni, sonna ni and anna ni - Te form of transitive verb and - arul - Passive sentence - neutral passive sentence - technical vocabulary related to Engineering and Technology - Preparation of technical reports.

6 . TUTORIALS 15

Total No of periods: 60

HS038 Technical Japanese II **3** **1** **0** **100**

Text Books:

1. *OOTSUBO ET AL - " A Course in Modern Japanese ", Vol.II, The University of Nagoya Press, Japan, 1983.*
2. *SHIYO SUZUKI and IKUO KAWASE - Nihongo Shoho text book with audio tapes, The Japan Foundation, Tokyo, Japan, 1981.*
3. *YAN - SAN Serial - Video tapes, Japan.*

HS039 Technical French I **3 1 0 100**

1 . **9**

Alphabets - Pronunciation - Masculine and Feminine Genders only - Numbers - Indefinite and definite articles - plurals - Verbs to be and to have.

2 . **9**

Present tense - Affirmative, interrogative and negative sentences - Adjectives - Adverbs - Prepositions - Possessive Pronoun - Personnel Pronoun - Indirect Object.

3 . **9**

Group I verbs - Conjugations - Present, Past compound, Simple past and future tenses - Singular & Plural - Masculine and Feminine - adjectives and adverbs.

4 . **9**

Group II Verbs - Conjugations- Present, Past compound, simple past and future tenses - Singular and Plural - Masculine and Feminine - adjectives and adverbs.

5 . **9**

Pronomial verbs - Presnet, Past compound, Simple past and future tenses - Singular and Plural - Masculine and Feminine - adjectives - adverbs - Dialogue - Glossary.

6 . TUTORIAL **15**

Total No of periods: 60

HS039 Technical French I **3 1 0 100**

Text Books:

1. MAUGER. G - Course de Langue et de - Civilization Francaises, HACHETTE -PARIS, 1986.
2. DOMINIQUE BERGER and REGINE MIRIEUX, Cadences, Method de Francais Didier, Paris, 1994.

References:

1. DENIS GIRARD, French to English, English to French Dictionary, Cassell - Mac Millan, 1981.

HS040	**Technical French II**	**3**	**1**	**0**	**100**

1 . **9**

Group III Verbs - Conjugations - Adjectives - Adverbs - sentences - present - past compound - Simple past - future.

2 . **9**

Comparative, superlative sentences - recent past - immediate future - grammatical analysis.

3 . **9**

Translation from English to French - Translation from French to English - Texts from Physics and Chemistry.

4 . **9**

Translation from English to French - Translation from French to English - Texts from Basic Engineering.

5 . **9**

Report writing and translation from English to French - Translation from French to English - Letter Writing - Dialogue - Glossary.

6 . TUTORIALS **15**

Total No of periods: 60

HS040 Technical French II **3 1 0 100**

Text Books:

1. MAUGER, G - Cours de Langue et de - Civilization Francaises, HACHETTE - PARIS, 1986.
2. DOMINIQUE BERGER and REGINE MIRIEUX, Cadences Methods de Francais, Didier, Paris, 1994.

References:

1. CENTRE D'ETUDES FRANCAISES, " Functional French for Scientists and Technologists ", Jawaharlal Nehru University, New Delhi, 1986.
2. J.O.KETTRIDGE " Dictionary of Technical terms and phrases Vol 1 & 2 ", The Gresham Press, Surrey, Great Britain, 1980.

HS041 English I **3 1 0 100**

1 . LISTENING **7**

Listening comprehension-listening for specific information-note-taking-use of charts and diagrams.

2 . SPEAKING **7**

Defining-describing objects-describing uses/functions-comparing-offering suggestions-analysing problems and providing solutions-expressing opinions (agreement/disagreement) predicting-expressing possibility/certainty-framing questions-providing answers-pronunciation practice (word stress).

3 . READING **12**

Skimming-scanning-detailed reading-predicting content-interpreting charts and tables-identifying stylistic features in texts - evaluating texts-understanding discourse coherence-guessing meaning from the context- note - making / transferring information.

4 . WRITING **12**

Sentence definition-static description-comparison and contrast-classification of information-recommendations-highlighting problems and providing solutions-formal and informal letter writing-using flow-charts/diagrams-paragraph writing-editing.

5 . FOCUS ON LANGUAGE **7**

Word formation with prefixes and suffixes-discourse markers and their functions-degrees of comparison-expressions relating to recommendations and comparisons-active and passive voice-antonyms-tense forms-gerunds-conditional sentences-modal verbs of probability and improbability-acronyms and abbreviations - compound nouns and adjectives-spelling-punctuation.

6 . PRACTICE IN LANGUAGE LAB **15**

Pronunciation practice - word stress - sentence stress - Listening comprehension - discussion - interpretation of visuals.

Total No of periods: 60

HS041 English I **3 1 0 100**

Text Books:

1. " English for Engineers and Technologists ", Volume I. Authors : Humanities and Social Science Department, Anna University, Published by Orient Longman Ltd., 1990.

References:

1. Narayanaswami, V.R.Strengthen Your Writing, Orient Longman Ltd., Chennai 1996 (Revised Edition)
2. Pickett and Laster, Technical English, Writing, Reading and Speaking, New York Harper and Row Publications.
3. Swan, Michael, Basic English Usage, Oxford University Press, 1984.

HS042 English II **3 1 0 100**

1 . LISTENING **7**

Listening comprehension - listening for specific information - note-taking and using non-verbal devices.

2 . SPEAKING **7**

Describing processes-stating purpose-offering opinions, suggestions and recommendations-summarizing-reporting-free discussion of chosen topics-pronunciation practice (word stress, consonant clusters-homonyms)

3 . READING **12**

Skimming-scanning-note -making-understanding the organisation of texts discourse cohesion-predicting and evaluating content-evaluating style-inferring meaning-study reading-interpreting tables, flow-charts.

4 . WRITING **12**

Extended definition-process description-cause and effect analysis-stating choice and justifying it -safety instructions-check list-letter of application-data sheet/resume.

5 . FOCUS ON LANGUAGE **7**

Word formation-synonyms-prepositions-adverbs-passive voice-sequence words/discourse markers-connective adverbs-numerical expressions-expansion of abbreviations-rules for writing SI units-language of instructions, check-lists, causes and effects, purpose and means-indefinite adjectives of number and quantity-spelling and punctuation.

6 . PRACTICE IN LANGUAGE LABORATORY

Pronunciation pratice - listening comprehension - discussion - interpreting and reporting from visual inputs.

7 . TUTORIAL **15**

Total No of periods: 60

HS042 English II **3 1 0 100**

Text Books:

1. *" English for Engineers and Technologists ", Volume II, AUTHORS :Humanities and Social Science Department, Anna University, Published by Orient Longman Ltd.,1990.*

References:

1. *Swales, John.M. and Christine B Feak, "Academic Writing for graduates students", The University of Michigan Press, USA, 1994.*
2. *Goddard, Ken - " Informative Writing - Your Practical Guide to Effective Communication ", Cassell Publication U.K. 1998.*
3. *Cutts, Martin " The Plain English guide-How to write clearly and Communicate Better ", Oxford University Press, New Delhi, 1995.*

HS053 Communication Skills for Engineers **2 0 2 100**

1 . UNIT I **22**

ORAL COMMUNICATION - Practical use of language in simulated real - life situations through role playing - social skills - interaction with employers, peers and subordinates - Group dynamics - Listening techniques - Phonological aspects of language use - pronunciation, stress and intonation.

Introducing oneself and others, narrating events - Making telephonic conversation - Making requests, Asking questions, Making recommendations using modal verbs, Expressing causal relations with suitable discourse markers, Giving instructions using imperatives, Expressing purposes and functions, obligation and preferences, Accepting offers and Counselling, Interpreting advertisements, Describing processes using sequential expressions. (Lecture:8, Practicals 14)

2 . UNIT II **12**

Presenting one's ideas at meetings and conferences, Making extempore talks, Public speaking, Body language, Strategic competence, Use of audio - visual aids and multimedia presentations. (Lecture : 6, Practical 6)

3 . UNIT III **8**

Technical Writing - the structure of organised writing - paragraph writing, coherence, cohesion (use of Discourse Markers) and punctuation, Use of titles, nonverbal devices - Layout - Revision strategies - Reading techniques.
Letter Writing: - Personal/Informal letters: Letters to family members and friends Business / Formal letters: Letters thanking the recipients, announcing functions, extending invitations, congratulating associates on important occasions, letters of application (Resumes), apology and complaint, letters to the editor.
(Lectue:8, Practical : 0)

4 . UNIT IV **8**

Report Writing: - persuasive, explanatory, argumentative and informative, Writing agenda, minutes, memos, project proposals and checklists.

(Lectuer : 8, Practical 0)

5 . UNIT V **10**

Grammar - study of grammatical items in contexts. Nouns, pronouns, adjectives, comparative adjectives, adverbs, gerund, prepositions, voice, tenses, 'if clauses, direct and indirect speech (reporting verbs), concord Vocabulary - Synonyms, antonyms, homonyms, homophones, hyponyms, affixes, reference words, phrasal verbs and prepositional phrases. (Lectuer:10, Practical : 0)

Total No of periods: 60

HS053 Communication Skills for Engineers **2 0 2 100**

Text Books:

1. Doff, Adrian and Jones, Christopher, Language in Use: Classroom Book (Intermediate level). Cambridge: CUP. 1994 (2 audio cassettes).

2. Dr.V.Chellammal, Learning to Communicate - a resource book for Engineers and Technologists. Coimbatore: Kamakhya Publications 2002 (1 audio cassette)

References:

1. Sung, Abraham. 330 more Model Letters for all occasions Malaysia-Minerva Publications. 2002.
2. Bentley, T.J. Report Writing in Business: The Effective Communication of Information. New Delhi: Viva Books Pvt.Ltd., 2001
3. Vivanilam, J.V. More Effective Communication: A Manual for Professionals. New Delhi: Response Books. 2000
4. Michael, V.P.Communication and Research for Management. Mumbai: Himalaya Publishing House 2001.
5. Nauheim, Ferd. How to Write Business Letters. New Delhi; Crest Publishing House 2000.
6. Mohan, Krishna, Meera Banerji. Developing Communication Skills. New Delhi: Macmillan 1991.
7. Denny, Richard. Communicate to Win. New Delhi: Kogan Page 2002.

ME046 Finite Element Techniques **3 0 0 100**

1 . INTRODUCTION - VARIATIONAL FORMULATION **8**

General field problems in Engineering - Modelling - Discrete and Continuous models - Characteristics - Difficulties involved in solution - The relevance and place of finite element method - Historical comments - Basic concept of FEM. Boundary and initial value problems - Gradient and divergence theorems - Functionals - Variational calculus - Variational formulation of VBPS. The method of weighted residuals - The Ritz method.

2 . FINITE ELEMENT ANALYSIS OF ONE DIMENSIONAL PROBLEMS **8**

One dimensional second order equations - discretisation of domain into elements - Generalised coordinates approach - derivation of elements equations - assembly of element equations - imposition of boundary conditions - solution of equations - Cholesky method - Post processing - Extension of the method to fourth order equations and their soultions - time dependant problems and their solutions - example from heat transfer, fluid flow and solid mechanics.

3 . FINITE ELEMENT ANALYSIS OF TWO DIMENSIONAL PROBLEMS **8**

Second order equations involving a scalar-valued function - model equation - Variational formulation - Finite element formulation through generalised coordinates approach - Triangular elements and quadrilateral elements - convergence criteria for chosen models - Interpolation functions - Elements matrices and vectors - Assembly of element matrices - boundary conditions - solution techniques.

4 . ISOPARAMETRIC ELEMENTS AND FORMULATION **7**

Natural coordinates in 1,2 and 3 dimensions - use of area coordinates for triangular elements in - 2 dimensional problems - Isoparametric elements in 1,2 and 3 dimensions - Largrangean and serendipity elements - Formulation of element equations in one and two dimensions - Numerical integration.

5 . APPLICATIONS TO FIELD PROBLEMS IN TWO DIMENSIONS **7**

Equations of elasticity- plane elasticity problems - axisymmetric problems in elasticity - Bending of elastic plates - Time dependent problems in elasticity - Heat - transfer in two dimensions - incompressible fluid flow.

6 . INTRODUCTION TO ADVANCED TOPICS (NOT FOR EXAMINATION PURPOSES.) **7**

Three dimensional problems - Mixed formulation - use of software packages.

Total No of periods: 45

ME046 Finite Element Techniques **3 0 0 100**

Text Book:

1. J.N.Reddy, " An Introduction to Finite Element Method ", McGraw Hill, Intl. Student Edition, 1985.

References:

1. Rienkiewics, " The finite element method, Basic formulation and linear problems ", Vol.1, 4/e, McGraw Hill, Book Co.
2. S.S.Rao, " The Finite Element Method in Engineering ", Pergaman Press, 1989.
3. C.S.Desai and J.F.Abel, " Introduction to the Finite Element Method ", Affiliated East west Press, 1972.

ME048 Mechanical Vibrations **3 0 0 100**

1 . INTRODUCTION **9**

Relevance of and need for vibrational analysis - Mathematical modelling of vibrating systems - Discretes and continuous systems - review of single-degree of freedom systems - free and forced vibrations, Various damping models.

2 . TWO DEGREE-OF-FREEDOM SYSTEMS **9**

General solution to free vibration problem - damped free vibration - Forced vibration of undamped system - dynamic vibration absorbers - Technical applications.

3 . MULTI DEGREE-OF-FREEDOM SYSTEMS **9**

Free and forced vibrations of multi-degree of freedom systems in longitudinal torsional and lateral modes - Matrix methods of solution-normal modes - Orthogonality principle-Energy methods, Introduction to vibrations of plates.

4 . CONTINUOUS SYSTEMS **9**

Torsional vibrations - Longitudinal vibration of rods - transverse vibrations of beams - Governing equations of motion - Natural frequencies and normal modes - Energy methods, Introduction to vibration of plates.

5 . VIBRATION MEASUREMENT **9**

Vibration monitoring - data acquistion - Vibration Parameter Selection-Vibration sensors-Accelerometers-Performance charateristics-Sensor location-Signal preamplification-Types of preamplifiers-Instrumentation-Tape recorders-Real time analysis-Digital Fourier transforms-FFT Analysis- Signature analysis and preventive maintanence: Vibration meters-vibration signatures-standards-vibration testing equipment-in-site balancing of rotors.

Total No of periods: 45

ME048 Mechanical Vibrations **3 0 0 100**

Text Book:

1. *J.S.Rao and K.Gupta, " Introductory Course on Theory and practice of Mechanical Vibrations ", Wiley Eastern Ltd., 1991.*

References:

1. *P.Srinivasan, " Mechanical Vibration Analysis ", Tata-Mc Graw Hill, New Delhi, 1982.*
2. *G.K.Grover, " Mechanical Vibrations ", New Chand and Bros., Roorkey, 1989.*
3. *Seto, " Mechanical Vibrations ", Schaum Series, McGraw Hill Book Co.,*
4. *J.P.Den Hartog, " Mechanical Vibrations ", (4th Edition) McGraw Hill, New York, 1985.*
5. *L.Meirovitch, " Elements of vibration Analysis ", (2nd Edition) McGraw Hill, New York, 1985.*

ME049 Industrial Tribology **3 0 0 100**

1 . SURFACES AND FRICTION **9**

Topography of Engineering surfaces- Contact between surfaces - Sources of sliding Friction - Adhesion Ploughint- Energy dissipation mechanisms Friction Characteristics of metals - Friction of non metals. Friction of lamellar solids - friction of Ceramic materials and polymers - Rolling Friction - Source of Rolling Friction - Stick slip motion - Measurement of Friction.

2 . WEAR **9**

Types of wear - Simple theory of Sliding Wear Mechanism of sliding wear of metals - Abrasive wear - Materials for Adhesive and Abrasive wear situations - Corrosive wear - Surface Fatigue wear situations - Brittle Fracture wear - Wear of Ceramics and Polymers - Wear Measurements.

3 . LUBRICANTS AND LUBRICATION TYPES **9**

Types and properties of Lubricants - Testing methods - Hydrodynamic Lubrication - Elasto hydrodynamic lubrication- Boundary Lubrication - Solid Lubrication Hydrostatic Lubrication.

4 . FILM LUBRICATION THEORY **9**

Fluid film in simple shear - Viscous flow between very close parallel plates - Shear strress variation Reynolds Equation for film Lubrication - High speed unloaded journal bearings - Loaded journal bearings - Reaction torque on the bearings - Virtual Co-efficient of friction - The Somerfield diagram.

5 . SURFACE ENGINEERING AND MATERIALS FOR BEARINGS **9**

Surface modifications - Transformation Hardening, surface fusion - Thermo chemical processes - Surface coatings - Plating and anodizing - Fusion Processes - Vapour Phase processes - Materials for rolling Element bearings - Materials for fluid film bearings - Materials for marginally lubricated and dry bearings.

Total No of periods: 45

ME049 Industrial Tribology **3 0 0 100**

Text Book:

1. I.M. Hutchings, Tribology, " Friction and Wear of Engineering Material ", Edward Arnold, London, 1992.

References:

1. T.A. Stolarski, " Tribology in Machine Design ", Industrial Press Inc., 1990.
2. E.P.Bowden and Tabor.D., " Friction and Lubrication ", Heinemann Educational Books Ltd., 1974.
3. A.Cameron, " Basic Lubrication theory ", Longman, U.K.., 1981.
4. M.J.Neale (Editor), " Tribology Handbook ", Newnes. Butter worth, Heinemann, U.K., 1975.

ME050 Design for Manufacture **3 0 0 100**

1 . DFMN APPROACH AND PROCESS **9**

Methodologies and tools, design axioms, design for assembly and evaluation, minimum part assessment taquchi method, robustness assessment, manufacturing process rules, designer's tool kit, Computer Aided group process rules, designer's tool kit, Computer Aided group Technology, failure mode effective analysis, Value Analysis. Design for minimum number of parts, development of modular design, minimising part variations, design of parts to be multi-functional, multi-use, ease of fabrication, Poka Yoka principles.

2 . GEOMETRIC ANALYSIS **9**

Process capability, feature tolerance, geometric tolerance, surface finish, review of relationship between attainable tolerence grades and difference machining processes. Analysis of tapers, screw threads, applying probability to tolerences.

3 . FORM DESIGN OF CASTINGS AND WELDMENTS **9**

Redesign of castings based on parting line considerations, minimising core requirements, redesigning cast members using weldments, use of welding symbols.

4 . MECHANICAL ASSEMBLY **9**

Selective assembly, deciding the number of groups, control of axial play, examples, grouped datum systems - different types, geometric analysis and applications-design features to facilitate automated assembly.

5 . TRUE POSITION THEORY **9**

Virtual size concept, floating and fixed fasterners, projected tolerance zone, assembly with gasket, zero true position tolerance, functional gauges, paper layout gauging, examples. Operation sequence for typical shaft type of components. Prepration of process drawings for different operations, tolerence worksheets and centrality analysis, examples.

Total No of periods: 45

ME050 Design for Manufacture **3 0 0 100**

Text Books:

1. Harry Peck, "Designing for Manufacture ", Pitman Publications, 1983.
2. Matousek, "Engineering Design, - A Systematic Approach" - Blackie & Son Ltd., London, 1974.

References:

1. Sports M.F.., " Dimensioning and Tolerence for Quantity Production ", Prentice Hall Inc., 1983.
2. Oliver R. Wade, " Tolerence Control in Design and Manufacturing ", Industrial Press Inc. New York Publications, 1967
3. James G. Bralla, " Hand Book of Product Design for Manufacturing ", McGraw Hill Publications, 1983.
4. Trucks H.E., " Design for Economic Production ", Society of Manufacturing Engineers, michigan, 2nd edition, 1987.

ME052 Composite Materials Technology **3 0 0 100**

1 . INTRODUCTION **9**

Limitations of conventional materials - definition of composite materials - types and characteristics - applications.

2 . MATERIALS **9**

Fibbers - Materials - Fibber reinforced plastics - thermoset polymers - Coupling agents, fillers and additives - Metal Matrix and Ceramic composites.

3 . MANUFACTURING **9**

Fundamentals - bag moulding - compression moulding pultrusion-filament winding - other manufacturing process - quality inspection and non-destructive testing.

4 . MECHANICS AND PERFORMANCE **9**

Introduction to micro-mechanics-unidirectional lamina - laminates - interlaminar stresses - static mechanical properties - fatigue properties - impact properties - enviromental effects - fracture mechanics and toughening mechanisms, damage prediction, failure modes.

5 . DESIGN **9**

Failure predictions - design considerations - joint design - codes - design examples. Optimization of laminated composites - Application of FEM for design and analysis of laminated composites.

Total No of periods: 45

ME052 Composite Materials Technology **3 0 0 100**

Text Books:

1. *Ronald Gibson, " Principles of Composite Material Mechanics ", Tata McGraw Hill, 1994.*
2. *Micael hyer, " Stress Analysis of Fiber - Reinforced Composite Materials ", Tata McGraw Hill, 1998.*

References:

1. *P.K.Mallicak, " Fiber-reinforced composites ", Monal Deklar Inc., New York, 1988.*
2. *B.D. Agarwal and L.J.Broutman, " Analysis and Performance of Fiber Composites ", John Wiley and Sons, New York, 1980.*
3. *F.L.Matthews & R.D.Rawlings, " Composite Materials, Engineering and Sciences ", Chapman & hall, London, 1994.*

ME056 Entrepreneurship Development **3 0 0 100**

1 . ENTREPRENEURSHIP **9**

Entrepreneur - Traits of Entrepreneurs - Types of Entrepreneurs - Intrepreneur Diffenernce between Entrepreneur and Intrapreneur - Entrepreneurship in Economic Growth, Factors affecting Entrepreneurical Growth.

2 . MOTIVATION **9**

Major motives influencing Entrepreneur- Achivement Motivation Training, Self Rating, Business game, Thematic Apperception Test - Stress Management. Entrepreneurship Development Programs - Need, objectives.

3 . BUSINESS **9**

Small Enterprises-definition, Classification - Characteristics, ownership structure-Project Formulation - Steps involved in setting up a Business - Identifying, Selecting a good business opportunity Market survey and Research, Techno economic Feasibility Assessment - Preliminary Project Report-Project Appraisal-Sources of information-Classification of needs and Agencies.

4 . FINANCING & ACCOUNTING **9**

Need-Sources of Finance, Term Loans, Capital structure, Financial Institutions, Management of working capital, Costing Break Even Analysis, Network analysis Techniques of PERT/CPM - Taxation - Income Tax, Excise Duty - Sales Tax.

5 . SUPPORT TO ENTREPRENEURS **9**

Institutional Support to Entrepreneurs-Sickness in small Business - Concept, Magnitude, Causes and Consequences, Corrective measures - Government Policy for small Scale Enterprise - Growth strategies in small Industry - Expansion, Diversification, Joint venture, Merger, sub-contracting.

Total No of periods: 45

ME056 Entrepreneurship Development **3 0 0 100**

Text Book:

1. S.S. Khanka, Entrepreneurial Development, S.Chand & Co. Ltd, Ram Nagar , New Delhi, 1999.

Reference:

1. EDII - " Faculty & External experts - A Hand Book for new Entrepreneurs. publishers : Entrepreneurship Development ", Institute of India, Ahmedabad, 1986.

ME058 Marketing Management **3 0 0 100**

1 . BASICS **9**

Definition, Marketing Process, Dynamics, Needs, Wants & Demands, Marketing Concepts, Environment, mix, types, philosophies, Selling Vs. Marketing, organisation, Industrial Vs. Consumer Marketing, Consumer goods, Industrial goods, Product hierarcy.

2 . BUYING BEHAVIOUR & MARKET SEGMENTATION **9**

Cultural, Demographic factors, Motives, types, Buying decisions, segmentation factors, Demographic, Psychographic & Geographic Segmentation, Process, Patterns.

3 . PRODUCT PRICING & MARKETING RESEARCH **9**

Objectives, pricing, Decisions and Pricing methods, Pricing Management. Introduction, Uses, process of Marketing Research.

4 . MARKETING PLANNING & STRATEGY FORMULATION **9**

Components of a marketing plan, strategy formulations and the marketing process, implementation, Portfolio analysis, BCG, GEC grids.

5 . ADVERTISING, SALES PROMOTION & DISTRIBUTION **9**

Characteristics, Impact, goals, types, Sales promotion-Point of Purchase, Unique Selling proposition. Characteristics, Wholesaling, Retailing, channel design, logistics, Modern Trends in retailing.

Total No of periods: 45

ME058 Marketing Management **3 0 0 100**

Text Book:

1. Govindarajan.M. 'Modern Marketing Management', Narosa Publishing House, New Delhi, 1999.

References:

1. Philip Kolter, " Marketing Management: Analysis, Planning, Implementation and Control ", 1998.
2. Green Paul.E. and Donald Tull, " Research for Marketing Decisions ", 1975.
3. Ramaswamy.V.S. and S.Namakumari, " Marketing Environment: Planning, Implementation and Control the Indian Context ", 1990
4. Jean Plerre Jannet Hubert D Hennessey Global Marketing Strategies.

ME436 Operations Research **3 1 0 100**

1 . LINEAR MODELS **15**

The phases of operations research study- Linear programming - Graphical method - Simplex algorithm - Duality - Transportation problems - Assignment problems - Applications to problems with discrete variables.

2 . NETWORK MODELS **6**

Network models - Shortest route - Minimal spanning tree - Maximum flow models - Project network - CPM and PERT networks - Critical path scheduling - Sequencing models.

3 . INVENTORY MODELS **6**

Inventory models - Economic order quantity models - Quantity discount models - Stochastic Inventory models - Multi product models - Inventory control models in practice.

4 . QUEUEING THEORY **8**

Queueing models - Queueing systems and structures - Notation - parameter - Single Server and multi server models - Poisson input - Exponential service - Constant rate service - Infinite population - Simulation.

5 . DECISION MODELS **10**

Decision models - Game theory - Two person zero sum games - Graphical solution - Algebric solution - Linear programming solution - Replacement models - Models based on service life - Economic life - Single/ Multi variable search technique - Application of OR models - Case studies.

6 . TUTORIALS **15**

Total No of periods: 60

ME436 Operations Research **3** **1** **0** **100**

Text Books:

1. H.A.Taha, " Operations Research ", Prentice Hall of India, 1999, Sixth Edition.
2. S.Bhaskar, " Operations Research ", Anuradha Publishers, Tamil Nadu, 1999.

References:

1. Shennoy, Srivastava, " Operation Research for Management ", Wiley Eastern, 1994.
2. M.J. Bazara, Jarvis, H. Sherali, " Linear Programming and Network Flows ", John Wiley, 1990.
3. Philip and Ravindran, " Operational Research ", John Wiley, 1992.
4. Hillier and Lieberman, " Operations Research ", Holden Day, 1986.
5. Frank, S.Budnick, Dennis, McLeavy, " Principles of Operation Research for Management ", Richard D Irwin, 1990.

MF038 Artificial Intelligence **3 0 0 100**

1 . INTRODUCTION **10**

Definition - Pattern recognition - Criteria of Success - Production Systems - Control Strategies - Heuristic Search - Problem Characteristics - Production System Characteristics - Forward and backward reasoning - Matching Indexing - Heuristic Functions - Search Algorithms

2 . GAME PLAYING **8**

Overview - Minimax search procedure - Adding Alpha - Beta cutoffs - Waiting for Quiescence - Secondary search - Using book moves.

3 . KNOWLEDGE REPRESENTATION **10**

Use of Predicate logic - Introduction to representation - representing simple facts in logic - augmenting the representation - resolution - Conversion to clause from - The basis of resolution 0 Unification of algorithm - Question answering - Natural Deduction.

4 . KNOWLEDGE REPRESENTATION USING OTHER LOGICS **8**

Nonmonotonic reasoning - Statistical and Probabilistic reasoning - Techniques for dealing with a random world and deterministic world - rule based system.

5 . STRUCTURAL REPRESENTATIONS OF KNOWLEDGE **9**

Common knowledge stuctures-Level of representation - Right structures - Declarative representations - Semantic nets - Conceptual dependency - Frames - Scripts - Procedual representation - Natural language understanding - Perception - learning - Implementatin A.I. Systems

Total No of periods: 45

MF038 Artificial Intelligence **3 0 0 100**

Text Book:

ELAINE RICH, Artificial Intelligence, McGraw Hill Book Company.

References:

1. M.W.RICHAUGH, Artificial Intelligence, A.Knowledge Based Apprach, PWS Rent Publishing, Boston.
2. CHARNIAC, E and M.C.DERMOTT, Introduction to Artificial Intelligence, Addison Wesley Publishing Company.

MF039 Rapid Prototyping **3 0 0 100**

1 . INTRODUCTION **7**

Basic concept - Overview of existing technologies of Prototyping and Tooling - Need for speedy design to market operations.

2 . PRODUCT DEVELOPMENT **10**

State of the Technology - Conceptual design - development - Detail design - Prototype - Tooling - Engineering Pilot - Limitations.

3 . ACCELERATED PRODUCT DEVELOPMENT **8**

Application of CAD - Techniques - Procedures - Product slicing - Software - Applications.

4 . RAPID PROTOTYPING SYSTEMS **10**

Selective laser sintering - Working Principles - Advantages and Limitations - Sterolithogrphy- Working Principle - Applications advantages and limitations.

5 . OTHER SYSTEMS **10**

Laminated object modeling - Waving Principles applications - advantages and limitations - fused deposition modeling - direct shell production casting - applications.

Total No of periods: 45

MF039 Rapid Prototyping **3 0 0 100**

References :

1. *PAUL F.JACOBS, Rapid Prototyping and Manufacture, Fundamentals of Stereolithograpy, 1995.*
2. *SOENEN,R and OLLING, Advanced CAD/CAM Systems, Narosa Publishing House, 1995.*
3. *DURVENT, W.R., The Lithographic Handbook, Narosa Publishing House, 1995.*
4. *Rapid News, University of Warwick, UK, 1995.*

MH001 Real Time Operating System **3 0 0 100**

1 . INTRODUCTION : **9**

Real Time System - Embedded Systems - Pervasive Computing - Information Access Devices - Smart Cards - Embedded Controllers - Hardware Fundamentals.

2 . RTOS **9**

Real Time Operating Systems - Memory Management - Processes, Threads, Interrupts, Events - User Interface.

3 . REAL TIME UML **9**

Requirements Analysis - Object identification strategies - Object Behavior - Real Time Design Patterns.

4 . SOFTWARE DEVELOPMENT **9**

Concurrency - Exceptions - Tools - Debugging Techniques - Optimization - Case Studies.

5 . CONNECTIVITY **9**

Wireless Connectivity - Blue Tooth - Other Short Range Protocols - Wireless Application Environment - Service Discovery - Middleware.

Total No of periods: 45

MH001 Real Time Operating System **3 0 0 100**

References

1. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real Time Systems", Prentice-Hall International, 1999.
2. B.P.Douglass, "Real Time UML 2nd Edition", Addison-Wesley, 2000.
3. D.E.Simon, "An Embedded Software Primer", Addison-Wesley, 1999.
4. J.Schiller, "Mobile Communications", Addison-Wesley, 2000.
5. V.Hansmann, L.Merk, M.S.Nicklous, T.Stober, "Prevasive Computing Handbook", Springer, 2001.

MH002 Statistical Quality Control **3 0 0 100**

1 . UNIT I **9**

Introduction definition of quality, method of control chance, causes, assignable causes, SQC benefits and limitations. Quality assurance, quality management, total quality control, quality circles, fundamental concepts, normal curve, measure of dispersion. Distributions - Binomial, Poisson, Geometric, Hyper geometric, Gamma distribution. Poisson as an approximation to the Binomial distribution, normal approximation to the Binomial . Review of probability theorems.

2 . UNIT II **9**

Theory of control charts, sample as an estimate of universe process control, control charts for variables - X bar and R charts, standard deviation charts, run up and run down, process capability studies, control charts for attributes, fraction defectives and number of defective charts. Chart sensitivity, control charts for non-conformities - C and U charts.

3 . UNIT III **9**

Acceptance sampling - fundamental concepts and terms, OC curves, AGL, LTPD, AOQL, six sigma limit sampling plans, simple, double, multiple and sequential sampling plans, stratified sample for variables, Dodge Romig sampling plans, Bulk sampling - problems using Dodge Romig and BIS code books. ISO-9000 - a simple case study in an Industry.

4 . UNIT IV **9**

Reliability: definition, mean fracture rate, mean time for failure, mean time between failure, hazard rate, hazard models. Constant hazard, linearly increasing hazard, Weibull's model. System reliability, series, parallel and mixed configuration - simple problems.

5 . UNIT V **9**

Reliability: improvement, redundancy, element, unit and standby redundancy, reliability allocation for a series system. Maintainability and availability. System down time, reliability and maintainability, trade-off-simple problems.

Total No of periods: 45

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Textbooks:

1. Grantt E.L. and Leavenworth R.S., "Statistical Quality Control", McGraw Hill, ISE, 5th edition, 1980.
2. Srinath, L.S., "Reliability Engineering", Affiliated East West Press, New Delhi, 3rd Ed.1991.

Reference Books:

1. Jerry Banks, "Principles of Quality Control", John Wiley, 1991.
2. Douglas,C.Montgomery, "Principles of Quality Control", John Wiley, 1991.