ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure and Syllabus

APPLIED ELECTRONICS AND INSTRUMENTATION (AEI)
SEMESTER VII / AEI /B.TECH

Sl No	Sub Code	Subject	Hrs			Credits
			L	T	P	C
	Theory					
1	EC131701	Linear Integrated Circuits	3	2	0	4
2	AI131702	Fiber Optic Instrumentation	3	0	0	3
3	EC131703	VLSI Design	3	0	0	3
4	AI131704	Remote Control and Telemetry	3	0	0	3
5	**1317E01	Elective I (Departmental)	3	0	0	3
6	HS1317E02	Elective II (Humanities)	2	0	0	2
	Practical					
7	AI131712	Fiber Optic Instrumentation Lab	0	0	2	1
8	AI131713	VLSI and VHDL Lab	0	0	2	1
9	AI131715	Project	0	0	8	4
10	AI131721	Seminar on Summer Training	0	0	0	1
Total			17	2	12	**25**
Total Contact Hours : 31						
Total Credit : 25						

Elective-I Subjects		
Sl No	**Subject Code**	**Subject**
1	**1317E01(I)	Embedded System
2	**1317E01(II)	Power Plant Instrumentation
3	**1317E01(III)	Electrical Machines
4	EE1317E01(IV)	Optimization Techniques
5	**1317E01(V)	Any other subject offered from time to time with the approval of the University

Elective-II Subjects		
Sl No	**Subject Code**	**Subject**
1	HS1317E02(I)	Value Education, Human Rights and Legislative Procedure
2	HS1317E02(II)	Values and Ethics in Profession
3	HS1317E02(III)	Organizational Behaviour
4	HS1317E02(IV)	International Business and Intellectual Property Rights
5	HS1317E02(V)	Any other subject offered from time to time with the approval of the University

Course Title: LINEAR INTEGRATED CIRCUITS
Course Code: EC131701
L-T-P-C: 3-2-0-4

Class Hours/week	4
Expected weeks	12
Total hrs. of classes	36+12 =48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**INTRODUCTION**	Op-amp block diagram, symbol, and equivalent diagram, pin diagram, ideal Op-amp, voltage transfer characteristics, dc characteristic: input bias, offset current, offset voltage, Offset error compensation, thermal drift, ac characteristics: frequency response, frequency compensation, slew rate, noise, CMRR	8
2	**NEGATIVE FEEDBACK**	Op-amp as inverting, non-inverting amplifier, voltage follower, loading effect, adder, differential, integrator, differentiator, powering op-amp.	6
3	**CURRENT TO VOLTAGE CONVERTERS**	V-I converters (floating load and grounded load), Current amplifiers, instrumentation amplifier, Log/Antilog Amplifier, Analog multipliers, Electronic analog computation.	6
4	**COMPARATORS**	Voltage limiter, level detectors, window detectors, ON/OFF temperature controller, pulse width modulation, Schmitt trigger, Precision half wave and full wave rectifiers Peak detectors. Sample and hold circuits, clipper, and clamper.	7
5	**SINE WAVE GENERATORS**	555 timer, multivibrators, Triangular wave generator, Saw-tooth generator, Voltage to frequency and frequency to voltage converters.	7
6	**PERFORMANCE PARAMETERS**	Zener and Avalanche diode voltage references, Compensation methods, Series regulators, IC Voltage Regulators.	4
7	**CONVERTER DEFINITIONS AND SPECIFICATIONS**	Basic DAC techniques, Flash/Parallel, counter type, SAR AD converters.	4
8	**PHASE-LOCKED LOOP (PLL), VOLTAGE CONTROLLED OSCILLATOR (VCO)**	Phase-Locked Loop (PLL), Voltage Controlled Oscillator (VCO)	2
9	**FIRST ORDER ACTIVE FILTERS, SECOND ORDER RESPONSE**	Low-pass, high-pass, band pass and notch, KRC filters, multiple-feedback filters.	4

TEXTBOOKS / REFERENCES:

1. Nergio Franco - Design with Operational Amplifiers and Analog Integrated Circuits, McGraw Hill Book Company.
2. R.F.Coughlin, F.F.Driscoll - Operational AmpIifier and Linear Integrated Circuits, Prentice Hall of India.
3. Ramakant A. Gayakwad- Op-Amps and Linear Integrated Circuits, PHI.
4. D.Roy Choudhury and S. B. Jain- Linear Integrated Circuits, New Age Int.
5. Salivahanan: Linear Integated Circuits, TMH.

Course Title: FIBER OPTIC INSTRUMENTATION
Course Code: AI131702
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**OPTICAL FIBRES AND THEIR PROPERTIES**	Principles of light propagation through a fibre - Different types of fibres and their properties, Modes in optical fibers, Step index and Graded index fiber, Fibre characteristics ; Absorption losses; Scattering losses ; Dispersion ; Connectors and splicers ; Fibre termination ; Optical sources ; Optical detectors.	8
2	**INDUSTRIAL APPLICATION OF OPTICAL FIBRE**	Fibre optic sensors – Fibre optic instrumentation system – Different types of modulators – Interferometric method of measurement of length – Moire fringes – Measurement of pressure, temperature, current, voltage, liquid level and strain.	8
3	**LASER FUNDAMENTALS**	Fundamental characteristics of lasers – Three level and four level lasers – Properties of laser – Laser modes – Resonator configuration – Q-switching and mode locking – Cavity damping – Types of lasers – Gas lasers, solid lasers, liquid lasers, semiconductor lasers.	6
4	**INDUSTRIAL APPLICATION OF LASERS**	Laser for measurement of distance, length, velocity, acceleration, current, voltage and atmospheric effect – Material processing – Laser heating, welding, melting and trimming of material – Removal and vaporization.	7
5	**HOLOGRAM AND MEDICAL APPLICATIONS**	Holography – Basic principle – Methods of formation of holograms – Holographic interferometry and application, Holography for non-destructive testing – Holographic components – Medical applications of lasers, laser and tissue interactive – Laser instruments for surgery, removal of tumors of vocal cards, brain surgery, plastic surgery, gynaecology and oncology.	7

TEXTBOOKS / REFERENCES:

1. R.P.Khare, Fiber Optics and Optoelectronics, Oxford university press.
2. J. Wilson and J.F.B. Hawkes, Introduction to Opto Electronics, Prentice Hall of India.
3. Optics: Ghatak, TMH
4. Opto-electronics: An Introduction – Wolf and Smith, PHL
5. An Introduction to Fibre Optics – Shotwell; PHI (EEE)

Course Title: VLSI DESIGN
Course Code: EC131703
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**INTRODUCTION TO VLSI AND BASIC CONCEPT OF MOS:**	Evolution of VLSI, Technology trends in VLSI, Introduction to MOS Transistor, I-V characteristics of nMOS and pMOS transistors, transconductance (g_m), channel length modulation.	4
2	**VLSI FABRICATION TECHNIQUES**	Wafer fabrication - Wafer processing - Oxidation - Patterning - Silicon gate NMOS process - CMOS process - Nwell - Pwell - Twintub –resistor, capacitor and diode in IC - CMOS Process enhancements - Ion beam techniques - Chemical methods.	8
3	**ANALOG VLSI:**	Introduction to analog VLSI - Analog circuit building blocks - Switches, active resistors - Current sources and sinks - Current mirrors/amplifiers - MOS & BJT, inverting amplifiers - CMOS and BJT two stage op-amp.	6
4	**DIGITAL VLSI**	Basic electrical properties of NMOs & CMOS inverters, Stick Diagram & Design rules, Scaling of MOS Circuits, Subsystem Design And Layout, The CMOS structure: NAND and NOR gates, transfer characteristics, System Design And Design Methods; Adder Architectures, Multiplier Architectures, Counter Architectures, ALU Architectures. Latches, Flip-flops, Registers and Register Files, Standard Cell Approach. Moore and Mealy Machines, SRAM Cell, Different DRAM Cells.	10
5	**ASIC DESIGN AND VHDL**	Architecture and programming technologies of ROMs, EPROMs, Introduction to ASIC, PLA, PAL, Gate arrays, CPLDs and FPGAs, programmable interconnect - Configuration memory. VHDL: Basics of VHDL-Operators, hierarchy procedures and assignments-Timing controls and delays.	8

TEXTBOOKS:

1. D. A. Hodges, H. G. Jackson & R. A. Saleh, ***Analysis and Design of Digital Integrated Circuits***, Tata McGraw Hill, 3rd Ed.
2. D. A. Pucknell & K. Eshraghian, ***Basic VLSI Design,*** Prentice Hall of India, 3rd Ed.
3. Anguman Sarkar, Swapnadip De & Chandan Kumar Sarkar, ***VLSI Design and EDA Tools***, Scitech Publications (INDIA) Pvt. Ltd.

REFERENCES:

1. W. H. Wolf, ***Modern VLSI Design System-on-chip design***, Prentice Hall of India, 3rd Ed.
2. C. Mead & L. Conway, ***Introduction to VLSI system***, Addison Wesley.
3. James E.Palmor,Darid E.Perlman., "Introduction to Digital systems" Tata Mc Graw Hill.

Course Title: REMOTE CONTROL AND TELEMETRY
Course Code: AI131704
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**PURPOSE OF TELEMETRY**	Basic scheme, voltage, current and frequency telemetry; line length limitations. Concepts of Information transfer: bits, symbols, codes -source, line, channel, BCD, ABCII, BAUDOT, AMI, CMI, Manchester, HDBM, Block, Differential, Hamming, Conduction.	7
2	**MODULATION CODES**	PAM, PFM, PTM, PCM 2; Bit error rate; Inter symbol, noise, parity checking 3 ; Review of modulation and multiplexing: FM-AM, FM-FM, PAM-AM, PAM-FM, PCM-AM, etc. Quantization and conversion methods; error in quantization, bandwidth consideration.	7
3	**FDM SYSTEMS**	IRIG standards in FDM systems in FDM telemetry; SCO's ; Mux and Demux circuits; Detectors and Demodulators; Pulse averaging, Quadrature FM and PLL, Mixers, TDM systems (architecture)- TDM- PAM, PAM- PM, TDM- PCM systems; synchronization ; PCM generation; differential PCM, PCM reception and detection.	10
4	**MODEMS**	Digital modulation and Shift-keying, FSK, PSK, DPSK, QPSK, QAM, Modem Protocol; Satellite telemetry, TT and C services; subsystems; The earth station.	8
5	**FIBER OPTIC TELEMETRY**	The optical fibre as transmission medium; Interconnections; Repeaters; Sources; Detectors; WDM, Remote control: concept and example from a typical industrial operation.	4

TEXTBOOKS / REFERENCES:

1. D. Patranabis, Telemetry principles, TMH, New Delhi
2. E. L. Gruenberg, Handbook of Telemetry and Remote control, Mc Graw Hill
3. A. S. Tanenbaum, Computer Networks, Pearson

Course Title: ELECTIVE I (Departmental)
Course Code: **1317E01(I)
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

EMBEDDED SYSTEM

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**INTRODUCTION**	What is an embedded system? Overview of embedded systems, embedded system design challenges. Embedded hardware units and devices in a system, Embedded software in a system, Examples of embedded systems, Classification of embedded systems. Processor and memory organization, processor and memory selection.	4
2	**DEVICES AND COMMUNICATION BUSES FOR DEVICE NETWORKS**	I/O Types and Examples, Serial Communication Devices, Parallel Port Devices, Interfacing Features in Device Ports, Wireless Communication Devices, Timer and Counting Devices, Watchdog Timers, Real Time Clocks. Parallel communication network using the ISA, pci, pci-x and advanced buses.	10
3	**INTERRUPTS**	Interrupt service routine, Interrupt latency. Polled I/O issues. Thread and device driver concept. Interrupt sources; Interrupt servicing (handling) mechanism, Shared Data Problem, Multiple interrupts, Context and the periods for context switching, interrupt latency and deadline. Preemptive and non-preemptive multitasking. Critical section. Survey of software Architecture, Round Robin, Round Robin with Interrupts, function Queues, scheduling. Direct memory access. Device driver programming, Parallel port device drivers in a system. Serial port device drivers in a system, Timer devices.	10
4	**REAL TIME OPERATING SYSTEM**	Embedded operating system, Comparison with general purpose OS. RTOS Tasks, states, Semaphores and shared data. Concept of semaphores, problem of sharing data by multiple tasks and routines, inter process communication. More operating systems services - Message Queues, mail Boxes, timers, events, memory management, synchronisation, control blocks. **Scheduling**: conventional scheduling, deadline driven scheduling, rate monotonic scheduling, deadlock, watchdog timer. Encapsulating semaphores and Queues. Hardware software co-	12

		design aspects in embedded systems. **RTOS programming**: Micro C/OS-II and Vx Works, Types of real- time operating systems, RTOS mC/OS-II, RTOS Vx Works.	

TEXT BOOKS / REFERENCES:

1. Raj Kamal, Embedded systems. Architecture, programming and design, Tata McGraw Hill.
2. An Embedded software Primer - David E. Simon: Pearson Education.
3. Jonathan W Valvano, Embedded Microcomputer systems, Real time interfacing, Thomson Brooks/col.
4. Raj Kamal, Microcontrollers architecture, programming, interfacing and system design, pearson education.
5. Embedded System Design: A Unified Hardware/Software Introduction – Frank Vahid, Tony Givargis, John Wiley & Sons, Inc.
6. Embedded Systems Architecture – A Comprehensive Guide for Engineers and Programmers , Tammy Noergaard, Elsevier Publication.
7. Embedded C programming, Barnett, Cox & O'cull, Thomson.
8. Shibu, Introduction to to Embedded Systems, TMH

Course Title: ELECTIVE I (Departmental)
Course Code: **1317E01(II)
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

POWER PLANT INSTRUMENTATION

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**OVERVIEW OF ELECTRICAL POWER GENERATION**	Methods of Power Generation: Hydro, Coal-fired thermal, Natural Gas-based, Solar and Wind Power. Block/Schematic diagram. Major components. Operation. Co-generation .Importance of instrumentation in power generation.	8
2	**MEASUREMENTS IN POWER PLANTS**	Electrical Measurements**:** Current, voltage, power, frequency, power factor etc. Non-electrical parameters: Flow of feed water, fuel, air, steam with correction factor for temperature, Steam pressure and temperature, Drum level measurement, Radiation detector, Smoke density measurement, Dust monitor.	7
3	**ANALYSERS IN POWER PLANTS**	Flue gas-oxygen analyser, Analysis of impurities in feed water and steam, Dissolved oxygen analyser, Chromatography, pH meter, Fuel analyser, pollution monitoring instruments.	7
4	**CONTROL LOOPS IN BOILER**	Combustion control: Air/fuel ratio control, Furnace draft control, Drum level control, Main steam and reheat steam temperature control, Super heater control, Air temperature-Defecator control, Distributed control system in power plants, Interlocks in boiler operation.	7
5	**TURBINE MONITORING AND CONTROL**	Speed, vibration, Shell temperature monitoring and control. Steam pressure control. Lubricant oil temperature control. Cooling system.	7

RECOMMENDED BOOKS:

1. Dukelow, Sam G.; The Control of Boilers; Instrument Society of America.
2. Nag, P.K.; Power Plant Engineering; Tata McGrow Hill.
3. Elonka, S.M., Kohal, A.L.; Standard Boiler Operations; Tata McGrow Hill, New Delhi.
4. Jain, R.K.: Mechanical and Industrial Measurements, Khanna Publishers, New Delhi.
5. Wakil, E.Al.; Power Plant Engineering, Tata McGrow Hill.
6. Arora, S.C., Domkumdwar,S., Domkumdwar,A.V.; A course in Power Plant Engineering; Dhanpat Rai ; New Delhi.
7. Sharma, P.C.; Power Plant Engineering; Pub: S.K. Kararia; New Delhi.

Course Title: ELECTIVE I (Departmental)
Course Code: **1317E01(III)
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

ELECTRICAL MACHINES

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**D.C.MACHINES**	Constructional features and principles of operation; Classification; e.m.f. equation; Performance characteristics and applications of shunt, series and compound generators. D.C motors: Torque equation; Performance characteristics and applications of D.C. motors. Starting: 3-point and 4-point starters. Speed control: Field control and armature control, Static control of D.C. motors, Braking, Losses and efficiency.	12
2	**TRANSFORMER**	Constructional features and principles of operation: Transformer equation; Phasor diagram on No-load and on load. Equivalent circuit. Voltage regulation. Losses and efficiency.	6
3	**INDUCTION MOTORS**	Constructional features and principles of operation. Slip. Equivalent circuit. Energy flow diagram. Torque-speed characteristic. Starting: Autotransformer, Star-delta and rotor resistance. Braking. Speed control: V/f control, External voltage injection. Static control of 3-phase induction motors. 1-phase induction motor: Constructional features and operating principle. Speed-torque characteristic. Split-phase starting.	10
4	**SYNCHRONOUS MACHINES**	Constructional features: Turbo- and water-wheel alternators. E.M.F. equation (for round-rotor machines). Equivalent circuit, Synchronous impedance; Voltage regulation: E.M.F. and M.M.F. methods. Synchronization. Synchronous motors: Operating principle. Phasor diagram. Methods of starting. Application of synchronous motor in industries.	8

RECOMMENDED BOOKS:

1. Say, M.G.; Performance and Design of A.C. Machines; English Language Book Society.
2. Langdorf, A.S.; Theory of Alternating Current Machines; Mc-Grow Hill
3. Langdorf, A.S.; Principles of Direct Current Machines; Mc-Grow Hill.
4. Kothari, D.P. Nagrath, I.J.; Electric Machines, TMG Education Pvt. Ltd.
5. Mukherjee,P.K. & Chakravorty, S.; Electrical Machines ; Dhanpat Rai Publications.
6. Gupta, J.B.; Theory and Performance of Electrical Machines; S.K.Kataria Sons.
7. Gupta, B.R. & Singhal.V; Fundamentals of Electric Machines; New Age International Publishers.
8. Ghosh, S.; Electrical Machines; Pearson
9. Murugesh Kumar, K.; D.C.Machines and Transformer; Vikash Publishing House.
10. Murugesh Kumar, K.; Induction and inchronous Machines; Vikash Publishing House

Course Title: ELECTIVE I (Departmental)
Course Code: EE1317E01(IV)
L-T-P-C: 3-0-0-3

Class Hours/week	3
Expected weeks	12
Total hrs. of classes	36

OPTIMIZATION TECHNIQUES

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**INTRODUCTION TO OPTIMIZATION**	Introduction, Historical development, Engineering Application of Optimization, Statement of an Optimization problem-Design Vector, Design Constraints, Constraint Surface, Objective Function Surfaces. Classification of Optimization Problems, Optimization techniques, Engineering Optimization Literature. Problems	8
2	**CLASSICAL OPTIMIZATION TECHNIQUES**	Introduction, single variable Optimization, multi-variable Optimization with no constraints, multivariable Optimization with equality constraints, multivariable Optimization with inequality constraints, convex programming problems.	7
3	**LINEAR PROGRAMMING I: SIMPLEX METHOD**	Introduction, Application of Linear Programming, Standard form of a Linear Programming Problem, Geometry of a Linear Programming Problems, Definitions and Theorem, Solution of a system of Linear simultaneous equation, Pivotal reduction of a general system of equation, motivation of the simplex method, Simplex algorithm, two phases of the simplex method	7
4	**LINEAR PROGRAMMING II: ADDITIONAL TOPICS AND EXTENSIONS**	Revised simplex method, duality in linear programming, decomposition principle, sensitivity or postoptimality analysis, Transportation problem, Karmarkar's Method, quadratic programming.	7
5	**NON-LINEAR PROGRAMMING: ONE DIMENSIONAL MINIMIZATION METHODS**	Introduction, unimodal function, Unrestricted search, exhaustive search, dichotomous search, Interval Halving method, Fibonacci method.	7

TEXTBOOKS / REFERENCES:

1. Optimization Theory and Application – SS Rao, Wiley Eastern Ltd, 3rd edition.
2. Optimization Techniques-Chander Mohan, Kusum Deep, New Age Science.
3. Optimization Techniques-Paban Kumar Oberoi, Global Vision Publishing House.
4. Computer based Optimization Techniques-Tanweer Alam- A.B.Publications.
5. Operation Research-An Introduction-TAHA H A,Prentice Hall.

Course Title: ELECTIVE II (Humanities)
Course Code: HS1317E02(I)
L-T-P-C: 2-0-0-2

Class Hours/week	2
Expected weeks	12
Total hrs. of classes	24

VALUE EDUCATION, HUMAN RIGHTS AND LEGISLATIVE PROCEDURE

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**VALUES AND SELF DEVELOPMENT**	Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Confidence, National unity, Patriotism, Love for nature, Discipline. Devotion, Self reliance.	5
2	**PERSONALITY AND BEHAVIOUR DEVELOPMENT**	Soul and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, Happiness vs. suffering love for truth, Aware of self destructive habits, Association and cooperation	4
3	**CHARACTER AND COMPETENCE**	Science vs. God, Holy books vs. blind faith, Self management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of women, All religions and same message, Mind your mind, Self control	4
4	**HUMAN RIGHTS**	Jurisprudence of human rights nature and definition, Universal protection of human rights, Regional protection of human rights, National level protection of human rights, Human rights and vulnerable groups.	5
5	**LEGISLATIVE PROCEDURES**	Indian constitution, Philosophy, fundamental rights and duties, Legislature, Executive and Judiciary, Constitution and function of parliament, Composition of council of states and house of people, Speaker, Passing of bills, Vigilance, Lokpal and functionaries.	6

TEXTBOOKS:

1. Chakraborty, S.K., Values and Ethics for Organizations Theory and Practice, Oxford University Press, New Delhi
2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi
3. Basu, D.D., Indian Constitution, Oxford University Press, New Delhi

REFERENCE BOOKS:

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi.
2. Meron Theodor, Human Rights and International Law Legal Policy Issues, Vol. 1 and 2, Oxford University Press, New Delhi.

Course Title: ELECTIVE II (Humanities)
Course Code: HS1317E02(II)
L-T-P-C: 2-0-0-2

Class Hours/week	2
Expected weeks	12
Total hrs. of classes	24

VALUES AND ETHICS IN PROFESSION

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**EFFECTS OF TECHNOLOGICAL GROWTH**	Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development **Energy Crisis:** Renewable Energy Resources Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations, Environmental Ethics Appropriate Technology Movement of Schumacher; later developments Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis. Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology.	12
2	**ETHICS OF PROFESSION**	**Engineering profession:** Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.	4
3	**PROFESSION AND HUMAN VALUES**	Values Crisis in contemporary society, Nature of values: Value Spectrum of a good life **Psychological values:** Integrated personality; mental health **Societal values:** The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian	8

		Constitution. **Aesthetic values:** Perception and enjoyment of beauty, simplicity, clarity. **Moral and ethical values:** Nature of moral judgments; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.	

RECOMMENDED BOOKS:

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York.
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian perspective", Biztantra, New Delhi.
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press.

Course Title: ELECTIVE II (Humanities)
Course Code: HS1317E02(III)
L-T-P-C: 2-0-0-2

Class Hours/week	2
Expected weeks	12
Total hrs. of classes	24

ORGANIZATIONAL BEHAVIOUR

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**FOCUS AND PURPOSE**	Definition, need and importance of organizational behaviour; Nature and scope; Frame work; Organizational behaviour models.	3
2	**INDIVIDUAL BEHAVIOUR**	Personality ; types ; Factors influencing personality ; Theories ; Learning ; Types of learners ; The learning process ; Learning theories – Organizational behaviour modification. Misbehaviour; Types; Management Intervention. Emotions; Emotional Labour; Emotional Intelligence, Theories. Attitudes – Characteristics, Components, Formation, Measurement, Values. Perceptions, Importance, Factors influencing perception, Interpersonal perception- Impression Management. Motivation, importance, Types, Effects on work behaviour.	5
3	**GROUP BEHAVIOUR**	Organization structure , Formation , Groups in organizations , Influence , Group dynamics , Emergence of informal leaders and working norms , Group decision making techniques , Team building , Interpersonal relations, Communication , Control.	5
4	**LEADERSHIP AND POWER**	Meaning, Importance, Leadership styles, Theories, Leaders Vs Managers, Sources of power, Power centers, Power and Politics.	5
5	**DYNAMICS OF ORGANIZATIONAL BEHAVIOUR**	Organizational culture and climate, Factors affecting organizational climate, Importance. Job satisfaction, Determinants, Measurements, Influence	6

		on behaviour. Organizational change, Importance, Stability Vs Change, Proactive Vs Reaction change, the change process, Resistance to change, Managing change. Stress, Work Stressors, Prevention and Management of stress, Balancing work and Life. Organizational development – Characteristics, objectives, Organizational effectiveness**.**	

RECOMMENDED BOOKS:

1. Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 11th edition.
2. Fred Luthans, Organisational Behavior, McGraw Hill, 11th Edition.
3. Hellrigal, Slocum and Woodman, Organisational Behavior, Cengage Learning, 11th Edition
4. Ivancevich, Konopaske & Maheson, Oranisational Behaviour & Management, 7th edition, TMcGraw.

Course Title: ELECTIVE II (Humanities)
Course Code: HS1317E02(IV)
L-T-P-C: 2-0-0-2

Class Hours/week	2
Expected weeks	12
Total hrs. of classes	24

INTERNATIONAL BUSINESS AND INTELLECTUAL PROPERTY RIGHTS

MODULE	TOPIC	COURSE CONTENT	HOURS
1	**CONCEPT OF INTERNATIONAL BUSINESS**	Reason for expansion of international business. Difference from domestic business, international cultural environment, self-reference criterion and ethnocentrism.	4
2	**WORLD TRADE**	Definition and components of balance of payment, Types and cause of disequilibrium in balance of payment, Foreign exchange rate; fixed and flexible exchange rate and policy of devaluation.	10
3	**GLOBALISATION**	Meaning, case for globalization, dangers and risks of globalization, consequences of globalization for India.	4
4	**INTELLECTUAL PROPERTY**	Its origin and development; an overview, Need for protecting intellectual property, copyrights, trademarks and patent: meaning and implication, rights of patentees, International and Indian patent laws	6

RECOMMENDED BOOKS:

1. Rakesh Mohan Joshi,' International Business', Oxford University Press, 6th edition.
2. Avinash Shivade, 'Intellectual Property Manual', Lexix, Nexis.
3. B. L.Wadehra, ' Law Relating to Patent Trade Marks, copy right design and Geographical Indicators',University Law Publishing Co. Ltd.

PRACTICALS

Course Title: FIBER OPTIC INSTRUMENTATION LAB
Course Code: AI131712
L-T-P-C: 0-0-2-1
Expected No. of weeks : 12 (approx)

EXPERIMENT NO	AIM OF EXPERIMENT	HOURS
1	Fiber end preparation and measurement of numerical aperture.	3
2	Study of Mode field diameter of a single mode fiber.	3
3	Study of Refractive index profile of a multimode fiber.	3
4	Study of Bending in optical fiber- i. Microbending loss in single mode fiber ii. Macro-Bend induced loss in a single mode fiber	3
5	Study of optical fiber as sensor- i. Transmission sensor ii. Reflection sensor iii. Lateral and angular displacement sensor	3
6	Study of 4 channel TDM and demultiplexing.	3
7	Study of the effect of EMI interference on copper medium and optical fiber medium.	3
8	Study of the effect of EMI interference on copper medium and optical fiber medium.	3
9	Study of pulse width modulation (PWM) and pulse position modulation (PPM).	3
10	Study of forming PC to PC communication link using optical fiber link and RS-232 interface.	3
11	Study of PCM coding and frequency response of a CODEC chip.	3
12	Measurement of Bit error rate.	3
	TOTAL	36

Course Title: VLSI AND VHDL LAB
Course Code: AI131713
L-T-P-C: 0-0-2-1
Expected No. of weeks : 12 (approx)

EXPERIMENT NO	AIM OF EXPERIMENT	HOURS
1	Write dataflow VHDL description of a 4:1 MUX. Simulate and verify the design using ISE simulator.	3
2	Write behavioral VHDL description of a 4:1 MUX using a) CASE statement b) WHEN-ELSE statement Simulate and verify the design using ISE simulator	3
3	Design a full adder using half-adder. Write structural VHDL description of a full adder using half adder circuits. Simulate and verify the design using ISE simulator	3
4	Write structural VHDL description of generic ripple carry adder in VHDL. Use GENERATE statement. Simulate and verify the design using ISE simulator.	3
5	Write behavioral VHDL description of 3:8 address decoder in VHDL. Simulate and verify the design using ISE simulator.	3
6	Write behavioral VHDL description of following flip flops (a) S-R FF (b) J-K FF (c) T FF (d) D FF All flip flops to have preset and clear input terminals. Simulate and verify the design using ISE simulator.	3
7	Write behavioural VHDL description of a decade up-counter having a) synchronous reset and b) asynchronous reset. Simulate and verify the design using ISE simulator.	3
8	Write behavioural VHDL description of a circuit that generates a digital signal of frequency 1Hz from a digital signal of frequency 50MHz.	3
9	Write behavioural VHDL description of a shift register a) Serial IN serial OUT b) Serial IN parallel OUT Simulate and verify the design using ISE simulator	3
10	Write behavioural description of finite state machine in VHDL. Simulate and verify the design using ISE simulator.	
	TOTAL	30

AI131715	**PROJECT**	L = 0 T = 0 P = 8 C = 4
GUIDELINES WILL BE UPLOADED BY THE UNIVERSITY FROM TIME TO TIME		
AI131721	**SEMINAR ON SUMMER TRAINING**	L = 0 T = 0 P = 0 C = 1
GUIDELINES WILL BE UPLOADED BY THE UNIVERSITY FROM TIME TO TIME		