SAMPLE LECTURE PLANS:

Faculty Name: DebaratiSarkar
CLASS : B.Tech 5th semSem ECE,
SUBJECT :Digital Communication [Code : EC 501]

NAME OF THE TEACHER :DebaratiSarkar

Module	Day (no.of Lectures)	TOPICS	
Introduction To Digital Communication and Pulse Modulation:			
1 & 2	Day 1	Introduction: A historical perspective in the development of Digital Communication	
	Day 2	Elements of a digital communication system, Analog versus Digital communication	
	Day 3-4	Pulse modulation: Introduction, sampling process, pulse amplitude modulation,	
	Day 5-6	TDM, PPM, PDM, bandwidth-noise trade-off, quantization process	
	Day 7-8	PCM, DPCM, DM, Adaptive DPCM, sub-band coding, linear predictive coding.	
Base band pulse transmission:			
3	Day 9	Introduction	
	Day 10	matched filter.	
	Day 11	error rate due to noise, intersymbol interference,	
	Day 12	NYQUIST'S criterion for distortion less base band binary transmission, correlative level coding.	
Digital pass-band transmission:			
4	Day 13	Introduction, pass band transmission model	
	Day 14	Gram Schmidt orthogonalization procedure, geometric representation of signals,	
	Day 15-17	response of bank of correlators, to noisy input, coherent detection of signals in noise, probability of error, correlation receiver, detection of signals with unknown phase,	
	Day 18-19	hierarchy of digital modulation techniques, coherent binary	

		PSK, coherent binary FSK	
	Day 20-21	coherent QPSK, coherent minimum shift keying, differential phase shift keying, comparison of binary & quaternary modulation schemes, M-ary modulation techniques	
	Day 22	power spectra, bandwidth efficiency, synchronization	
Information Theory:			
5	Day 23	Mathematical models of information sources,a logarithmic measure of information,	
	Day 24	source coding theorem	
	Day 25-26	source coding algorithms,Mathematical problems	
	Day 27-28	the Huffman source coding algorithm & the Lempel-Ziv source coding.	
Coding:			
6	Day 28-29	Channel capacity & coding: Modeling of communication channels	
	Day 30-31	channel capacity, bounds on communication, coding for reliable communication	
	Day 31-32	linear block codes, cyclic codes, convolutional codes	

Text Books :

1. Communication Systems: Simon Haykin, John Willey & Sons
2. Communication Systems Engineering Proakis&Salehi, Pearson Education.

LECTURE PLAN

CLASS : B.Tech 8thsem ECE,
SUBJECT :Mobile Computing (EC802B**)**
NAME OF THE TEACHER : DebaratiSarkar

Module No.	Day (no. of Lecture classes)	TOPICS	
Wireless Communication			
1	Day 1	Introduction: Wireless Communication Fundamentals: Wireless transmission, Frequencies for radio transmission, Signal Propagation	
	Day 2-3	Modulations- Spread spectrum – MCA	
	Day 4-5	SDMA, FDMA, TDMA, CDMA, Cellular wireless Networks.	
Wireless access protocols:			
2	Day 6-7	IEEE 802.11 standard, WLAN Family, WLAN transmission technology, WLAN system architecture, 802.11 PHY and MAC layers, IEEE 802.	
	Day 7-8	Collision Sense Multiple Access with Collision Detection(CSMA/CD) and CSMA Collision avoidance (CSMA/CA),	
	Day 9-10	Distributed Co-ordinate System (DCF) and Point Co-ordination Function (PCF), WLAN family, HyperLAN, Bluetooth, Brief overview of WiMAX for wireless broadband communication	
Basic mobility management in Wireless Networks: **&** Mobile Network Layer Considerations:			
3 & 4	Day 11-12	Handoff and location management, Basic Mobile IP operations, types, concepts	
	Day 13-14	Four basic entities for MIPv4, Mobile IPv4 Registration, Tunneling, MIPv4 Reverse Tunneling, MIPv4 Triangular Routing.	
	Day 15-16	Limitations of MIPv4, MIPv6 and HMIPv6, Dynamic Host Configuration protocol.	
	Day 17-19	Micromobility solutions to the host mobility problem, Routing in Mobile ad-hoc network, DSDV, DSR, AODV, Alternative metrics	
Transport Layer Considerations:			
5	Day20-21	Transport Layer Considerations: Traditional TCP, Classical TCP	

		improvements- Mobile Operating Systems: PalmOS, Pocket PC and Windows CE, Embedded Linux and other Mobile Opearting Systems. 4 7 Application Layer Considerations: Adaptation, Disconnected operations, Mobile Agents, Business implications and mobile commerce. Emerging Technologies such as W	
	Day 22	WAP, WAP 2.0.	
Mobile Operating Systems:			
6	Day 23-24	PalmOS, Pocket PC and Windows CE	
	Day 25-26	Embedded Linux, other Mobile Opearting Systems	
Application Layer Considerations			
	Day 26-27	: Adaptation, Disconnected operations, Mobile Agents. .	
7	Day 27-29	Business implications and mobile commerce. Emerging Technologies such as Wearable Computing- challenges and concerns	

Text Books :

1. Mobile Computing by Raj Kamal, Oxford Higher Education University Press, New Delhi.
2. 802.11 Wireless LAN Fundamentals by PejmanRoshan& Jonathan Leay, Pearson Education, ND. 3.GPRS Networks by Geoff Sanders, John Wiley and sons, England

Faculty Name : Prof Arup Kumar Paul **Sub: Basic Electronics**

Module	**Day (no.of Lectures)**	**TOPICS**	
Diode and transistor:			
1	Day 1	Energy band diagram, vi characteristic of p-n junction diode, application of p-n junction diode.	
	Day 2	Vi characteristic of zener diode and it's application.	
	Day 3-4	Working of rectifiers and calculation of ripple factor , efficiency , regulation.	

	Day 5-6	Introduction to transistor, transistor current component, input output characteristics of CB mode.	
	Day 7-8	Characteristics of CE and CC mode. Transistor baising.	
FET AND FEEDBACK			
2	Day 9	**Characteristic of JFET**	
	Day 10	Characteristic of MOSFET.	
	Day 11	CS, CD and CG CONFIGARATION.	
	Day 12	Feedback typology.	
	Day 13	Effects of feedback.	
Operational Amplifier:			
3	DAY 14	INTRODUCTION of OPAMP, CONCEPT of DIFFERENTIAL amplifier, virtual ground concept,	
	Day 15	Open loop and close loop amplifier, voltage follower circuits, Inverting & non-inverting amplifier,	
	Day 16	Integrator & differentiator circuits, summing & subs-tractor amplifier, comparator.	
DIGITAL LOGIC AND CRO.			
4	Day 17-18	Introduction to digital logic, basic gates and ex-or gate, construction,	
	Day 19	Construction of basic gates and ex-or gate using universal gates.	
	Day 20 to 24	Introduction to BOOLEAN algebra, SOP and POS, KARNAUGH map,	
	Day25-26	CONSTRUCTION OF CRO. Measurement of amplitude and frequency with CRO.	

CLASS : B.Tech 3rd year,ECE
SUBJECT : ANTENNA & WAVE PROPAGATION(EC-503)

NAME OF THE TEACHER : JAYDIP LAHIRI

Module	Day (no.of Lectures)	TOPICS	
Antenna terminology:			
1	Day 1	Introduction about basic antenna system and chart of various frequency and wave lenth range.	
	Day 2-3	Definition of isotropic antenna,radiationpattern,powergain,directivegain,captureeffect,beamwidth, HPBW etc.	
	Day 4-5	Problems on antenna efficiency,radiationresistance,gain,directivity,capture effect etc.	
	Day 6-7	Discuss friss free space wave equation and spatial attenuation.	
	Day 8-9	Problems related to space wave equation and spatial attenuation.	
Antenna array:			
2	Day 10-11	Concept on antenna array,discuss various arrays like broad side,end-fire etc.differences between end- fire and broad side array.	
Discussion about horn,paraboliccreflecter,dipole,microstrippatch,yagi-uda antenna:			
3	Day 12	General charecteris and working principles of horn antenna.	
	Day 13	Working principle of parabolic reflector and its applications	
	Day 14	General charecteristics,working principle and application of yagi_uda antenna	
	Day 15-16	Discussion about microstrip patch and dipole antenna and their applications.	
	Day 17	Numericals on parabolic reflector.	
	Day 18	1st internal exam on the above mentioned topic.	

Wave propagation:			
4	Day 19-20	Discussion about various wave propagation like ground wave,skywave,spacewave,ductetc propagation.	
	Day21-22	Discuss on secant law,virtualheight,MUF,actualheight,calculation of f_{muf} for flat earth and curved earth.	
	Day 23-24	Problems on MUF,virtual height, secant law etc.	
	Day 25	2nd internal exam on wave propagation.	

Text Books :

1. Antenna and wave propagation-K.D PRASAD
2. Antenna and wave propagation-BAKSI,BAKSI,BAKSI
3. Antenna and wave propagation-G.S.N RAJU

CLASS : B.Tech 6thSem ECE,
SUBJECT : Material Science [EC 603]

NAME OF THE TEACHER :MirwaizRahaman

Module	**Day (no.of Lectures)**	**TOPICS**	
Structure of solids:			
1	Day 1	Atoms and their binding, Bonds	
	Day 2-3	Crystal Systems, BravaisLatticeMiller Indices, Crystalline, Polycrystalline and Amorphous Materials; Metals, Semiconductors and Insulators	
	Day 4	Lattice defects-Qualitative ideas of point, line, surface and volume defects.	
Dielectric Properties:			
2	Day 5-6	Dielectric Polarization and Mechanism- Internal or local field, Dielectric Loss, Temperature and Frequency dependence of dielectric constant	
	Day 7	Elementary ideas of Piezoelectrics, Ferroelectrics and Pyroelectric Materials and its Applications.	

Magnetic Properties:			
3	Day 8	Elementary ideas of classification of magnetic materials	
	Day 9	Diamagnetism, Paragnetism, Ferrognetism, Ferrimagnetism, Magnetic Domains.	
Superconductors:			
4	Day 10	Basic concepts of superconductivity	
	Day 11	Transition temperature, Meissner effect High-T superconductors	
	Day 12	Hard and Soft Materials, SQUID.	
Optical properties:			
5	Day 13	Absorption, Emission	
	Day 14	Luminescence	
	Day 15	Electro-optic and Acousto optic effects, Photorefractive effects	
Materials for optical communication:			
6	Day 16	LED andf Laser Materials	
	Day 17	Optical Fibre	
Materials for data storage:			
7	Day 18	Magnetic Cores, Tapes, Disks, Hard disk, Floppy disk	
	Day 19	Magneto-optic devices, Bubble memories	
	Day 20	Magnetoelectronic Materials	
	Day 21	CD,DVD,CCD	
Materials for display devices:			
8	Day 22	CRT, LED, LCD	
	Day 23	TFT, Plasma Display	
Advanced materials:			
9	Day 24	Metallic Glasses	
	Day 25	Nanomaterials	

CLASS : B.Tech4th Sem ECE

SUBJECT : Solid State Devices (EC403)

NAME OF THE TEACHER : MaitreyeeBiswas

Module No.	Day (no. of Lecture classes)	TOPICS	
1	Day 1-2	Energy Bands and Charge Carriers in Semiconductors- Energy-band (E-k) diagram, effective mass, wave vector.Debye length, Direct & indirect band-gap semiconductors; Carrier distribution, Fermi-level.	
	Day 3	Debye length, Direct & indirect band-gap semiconductors; Carrier distribution, Fermi-level.	
	Day 4-5	Intrinsic & Extrinsic semiconductors, Non-equilibrium in carrier distribution; drift, diffusion, scattering; Piezo& Hall effects.	
	Day 6	scattering; Piezo& Hall effects.	
2	Day 7	Homojunction – Semiconductor-semiconductor p-n junction & rectification (recapitulation) (1L); Plot of junction voltage, field and depletion charge with distance by solving simple 1D Poisson's Equation	
	Day 8	Schottky contact &Schottky diode; Junction capacitances in p-n diodes (recapitulation) and their expressions; Application of Diode capacitance in Varactor Diodes (1L); Derivation for Forward and Reverse current, piece-wise linear diode-characteristics, concept of Diode resistance & Differential diode resistance	
	Day9	Diode switching & diode switch, properties of rectifier and switching diodes; Importance of reverse current in optical detectors, photo-diodes, solar cells	
	Day10	Spontaneous emission & Stimulated emission - optical devices (basic idea	

		only), Tunnel diode -(basic principle only - importance of negative resistance)	
3	Day 11	Bipolar Junction Transistors: Physical mechanism, current gain, minority current distribution	
	Day 12	I-V characteristics (input & output) with derivation, input & output characteristics for CB. CE & CC mode, current amplification factors α for CB mode and β for CE mode	
	Day 13-15	Eber's Moll model for Static behaviour& Charge controlled model (without derivation) for dynamic behaviour, equivalent circuits; Basic idea about Photo-transistors & Power transistors (only their features Vis-à-vis the ordinary transistors)	
4	Day 16-17	Concept of Field effect device, channel modulation & channel isolation, JFET - behaviour, characteristics.	
	Day 18-20	MOS capacitances, depletion width, surface field and potential (by solving Poisson's equation with gradual channel & depletion approximations); Real MOSFET & Threshold voltage for real MOSFET; I-V characteristics with expressions for saturation and non-saturation regions (concepts but no detail derivations, empirical relations to be used for solving problems); Equivalent circuit for MOSFET; MOSFET for VLSI - scaling issues (basic concept of Short Channel Effects only)	

Text Books : 1. Neamen- Semiconductor Physics and Devices TMH 2. Bhattacharya & Sharma- Solid State Electronic Devices- Oxford 3.Maini&Agrawal- Electronics Devices and Circuits- Wiley

Reference Books : 1. Milman, Halkias&Jit- Electronics Devices and Circuits- TMH 2. Bell-Electronics Devices and Circuits-Oxford 3.Bhattacharya & Sharma- Solid State Electronic Devices- Oxford 4.Singh & Singh- Electronics Devices and Integrated Circuits –PHI 5.Bogart, Bisley& Rice-Electronics Devices and Circuits- Pearson 6.Kasap-Principles of Electronic Materials and Devices- TMH 7.Boylestad&Nashelsky- Electronics Devices and Circuit Theory- Pearson 8.Salivahanan, Kumar &Vallavaraj- Electronics Devices and Circuits- TMH

CLASS : B.Tech 6thSem ECE

SUBJECT : VLSI Circuits and Systems (EC602)

NAME OF THE TEACHER :MaitreyeeBiswas

Module	Day (no.of Lectures)	TOPICS	
Filters & Regulators:			
1	Day 1	VLSI Design Concepts, Moor's Law, Scale of Integration (SSI, MSI, LSI, VLSI, ULSI – basic idea only), Design principles (Concept of Regularity, Granularity etc), Design Domains.	
	Day 2-3	Review of MOSFET characteristics, scaling and small-geometry effects.	
Oscillators:			
2	Day 4	Analog VLSI design steps; Basic building blocks of Analog VLSI chips; MOS switch; Active load / resistors.	
	Day 5-6	Voltage dividers; CMOS Current source & sink; CMOS Voltage references/voltage dividers [Basic circuits only].	
	Day 6-8	CMOS Differential amplifier; Output amplifiers [Basic circuits only]	
	Day 8-10	CMOS OPAMP; Switched capacitor filter.	
Operational Amplifier:			
3	Day 11-12	CMOS, CMOS inverter characteristics; CMOS logic circuits,	
	Day 13-15	NAND & NOR Gates, Complex logic circuits, CMOS Full Adder, CMOS Transmission GATE, Advanced CMOS Logic circuits	
	Day 16-17	Sequential CMOS logic circuits; SR Latch circuit, clocked JK Latch/ Master-Slave JK, CMOS D-latch & Edge triggered flip-flop	
Multivibrator:			
4	Day 18-20	Silicon Semiconductor Technology- An Overview, Wafer processing, Oxidation, Epitaxial deposition, Ion-implantation & Diffusion, Cleaning, Etching, Photolithography – Positive & Negative photo-resist	
	Day 21-22	Basic CMOS Technology – (Steps in fabricating CMOS), Basic n-well CMOS process, p-well CMOS process, Twin tub process.	
	Day 23-24	CMOS), Basic n-well CMOS process, p-well CMOS process, Twin tub process. CAD Tools for VLSI Design: - VHDL Syntax: Basic concepts in VHDL and VHDL grammar, Structural specification, VHDL description	

		of Inverter, NAND gate, Full adder	
	Day 25-26	Layout design rules, Layout of inverters, NAND, NOR gates using LASI.	

Text Books: 1. Digital Integrated Circuit, J.M.Rabaey, Chandrasan, Nicolic, Pearson Education.
2. CMOS Digital Integrated Circuit, S.M.Kang&Y.Leblebici, TMH.
3. Modern VLSI Design, Wayne Wolf, Pearson Education.
4. VHDL, Bhaskar, PHI.
5. CMOS Analog Circuit Design by P.E. Allen & D.R. Holberg;

References: 1. Digital Integrated Circuits, Demassa&Ciccone, John Willey &Sons . 2. Modern VLSI Design: system on silicon, Wayne Wolf; Addison Wesley Longman Publisher 3. Basic VLSI Design, Douglas A. Pucknell& Kamran Eshranghian, PHI 4.CMOS Circuit Design, Layout & Simulation, R.J.Baker, H.W.Lee, D.E. Boyee, PHI 5. VLSI design and EDA tools, Dr. AngsumanSarkar; Dr. Swapnadip De; Dr. Chandan Kumar Sarkar, Scitech Publications.

CLASS : B.Tech 7thSem

SUBJECT : Microwave Engineering and RADAR (EC702)

NAME OF THE TEACHER :MaitreyeeBiswas

Module	Day (no.of Lectures)	TOPICS	
Filters & Regulators:			
1	Day 1	Introduction: RF & Microwave Spectrum, Historical Background, Typical applications of RF & Microwaves	
	Day 2-6	Microwave Waveguides : Rectangular and Circular Waveguides– Mode structures, Cut-off frequency, Propagation Characteristics, wall currents, Attenuation constant, waveguide excitations.	
Oscillators:			
2	Day 7-9	Waveguide Passive Components: Waveguide Resonators – Rectangular & Cylindrical; Resonant frequencies, Mode structures, Q- factor	
2	Day 10-11	Co-axial Resonators; Excitation & coupling of cavities, Design of resonators.	
4	Day 12	N-port networks – circuit representations, Z-matrix, Y-matrix, S-matrix,	

		transmission matrix,; their relationships.	
4	Day 13-15	attenuators, phase shifter, directional couplers, Bethe-hole coupler, Magic tee, hybrid ring, circulators, isolators	
5	Day 16-18	antennas: Horns- sectoral horns, Pyramidal horns, Parabolic reflector, Cassigran feed, Patch antennas, antenna arrays. Scattering matrix representations of passive components.	
5	Day 19-20	Planar structure :Strip lines, Micro-strip lines, coplanar structure, Slot lines	
6	Day 21-22	Microwave Tubes: Limitations of conventional tubes in microwaves; Multi-cavity Klystron, Reflex klystron; Magnetron, Travelling wave tube, Backward wave oscillator – working principles, characteristics.	
7	Day 23-24	Semiconductor Microwave Devices: Tunnel diode; Gunn diode–design considerations for their waveguide mount. Avalanche diode – IMPATT, TRAPATT, Microwave bipolar transistor, hetero-junction bipolar transistor, Microwave field-effect transistor–JFET, MOSFET, MESFET, Parametric amplifiers; ICs	
8	Day 25-26	Radar systems – Radar block diagram, radar equation, detection of signals in noise and signal-to-noise ratio, Probabilities of detection & False alarm, integration of radar pulses, radar cross section, distributed targets, Transmitted power, pulse-repetition frequency, antenna parameters & system losses, introduction to radar clutter. Pulsed radar, CW radars, MTI, Tracking radars, Altimeter- Principles of operation	

Text Books 1. SY Liao Microwave Devices & Circuits Pearson Education /PHI
2. PA Rizzi Microwave Engineering-Passive Circuits Pearson Education
3. MI Skolnik Introduction to Radar Systems Tata-McGraw Hill
4. David M Pozar Microwave Engineering John Willy & Sons Inc.
References Books 1 Robert E Collin Foundation of Microwave Engineering, 2ed edition, McGraw Hill, Inc. 2 3 4 5 GP Srivastava& VL Gupta Microwave Devices & Circuit Design PHI 3.S Das & A Das Microwave Engineering Tata-McGraw Hill 4.K C Gupta Microwaves New Age Publishers 5 ML Sisodia& GS Raghuvansi Microwave Circuits and Passive Devices New Age Publishers

CLASS : B.Tech 3rd Sem EE,

SUBJECT : Analog & Digital Electronic Circuit [EC (EE)-301]

NAME OF THE TEACHER :SayantanBiswas

Module	Day (no.of Lectures)	TOPICS	
Filters & Regulators:			
1	Day 1	Introduction about filters, Principle of Capacitor filters	
	Day 2	Principle of Π- filter using full wave rectifier, ripple factor equation	
	Day 3-4	Problem of Π- filter, Voltage regulator, Types of Voltage regulator, Definition of voltage regulation,	
	Day 5-6	Series & Shunt voltage regulator, related problem of voltage regulation, Concept of SMPS.	
	Day 7-8	Concept of Trans- resistance & Trans-Conductance, Principle of Emitter-follower circuit & circuit analysis, Introduction of high frequency model of transistor.	
Oscillators:			
2	Day 9	Concept of Oscillator, difference between amplifier & oscillator, condition for sustain oscillation	
	Day 10	Significance of Barkhausen criterion, operation of Oscillators, Frequency stability of Oscillator.	
	Day 11	Types of Transistor Oscillators, Circuit diagram of Colpitt oscillator & expression for the frequency of oscillation.	
	Day 12	Circuit diagram of Hartley oscillator & expression for the frequency of oscillation.	
	Day 13	Circuit diagram of Phase-shift oscillator & expression for the frequency of oscillation.	
	Day 14	Circuit diagram of Wien- bridge oscillator & expression for the frequency of oscillation.	
	Day 15	Circuit diagram of Crystal oscillator & expression for the frequency of oscillation.	
	Day 16	Related problems of different types of oscillator.	
Operational Amplifier:			

3	Day 17	Concept of operational amplifier, block diagram of operational amplifier, concept	
	Day 18	Detail concept of current mirror, CMRR, level shifter, slew rate	
	Day 19	Detail concept of virtual ground, voltage follower circuits, Inverting & non-inverting amplifier, differential amplifier	
	Day 20	Integrator & differentiator circuits, summing & subs-tractor amplifier, related problem	
	Day 21	Schmitt- trigger, Instrumentation amplifier, log & anti-log amplifier, related problems	
	Day 22	Concepts of precision rectifier, voltage to current & current to voltage converter	
Multivibrator:			
4	Day 23	Introduction of 555 timer & details pin configuration	
	Day 24	Concept of Monostablemultivibrator& circuit analysis using IC 555, related problem	
	Day 25	Concept of Astablemultivibrator& circuit analysis using IC 555, related problem	
	Day 26	Concept of Bistablemultivibrator& circuit analysis using , Concepts of VCO & PLL	

Text Books :

4. Microelectronic Circuits, Sedra& Smith, Oxford University Press.
5. Integrated Electronics, Milman&Halkias, McGraw Hill Company.
6. Electronic devices & Circuits, Balbir Kumar &ShailB. Jain, PHI.
7. Op-amps and Linear IC's, R.A. Gayakwad, PHI.
8. Microelectronic Circuit- Analysis & Design, Rashid,Cenage Learning.
9. Electronic Circuits: Discrete & Integrated, 3rdEdition, Schilling &Belove, McGraw Hill Company.
10. Electronic principles, 6thEdition, Malvino, McGraw Hill Company.
11. Operational Amplifier & Linear IC's, Bell, Oxford University Press.
12. 2000 Solved Problems in Electronics, Jimmie J. Cathey, McGraw Hill Inc.
13. Electronic Devices -System & Application, Robert Diffenderfer, Cengage Learning.
14. Op- Amps & Linear Integrated Circuits, Ravi Raj Dudeja& Mohan Dudeja, Umesh Publication.

15. Digital Principles & Application, 5thEdition, Leach &Malvino, McGraw Hill Company.
16. Modern Digital Electronics, 2nd Edition, R.P. Jain.TataMcGraw Hill Company Limited
17. Fundamental of Digital Circuits, A. Anand Kumar, PHI.
18. Digital Logic Design, Morries Mano, PHI.
19. Digital Integrated Electronics, H. Taub& D. Shilling, McGraw Hill Company.
20. Digital Electronics, James W. Bignell& Robert Donovan, Thomson Delman Learning.

LECTURE PLAN

CLASS : B.Tech 3rd Sem CSE,
SUBJECT :Communication Engg.& Coding Theory (EC(CS)-305)
NAME OF THE TEACHER : SayantanBiswas

Module No.	Day (no. of Lecture classes)	TOPICS	
Elements of Communication system			
1	Day 1-2	Introduction of basic knowledge Elements of Communication system, Analog Modulation & Demodulation	
	Day 3	Noise, SNR, Basic ideas in brief Analog-to Digital Conversion	
	Day 4-5	Elements of Communication systems(mention of transmitter, receiver and channel); origin of noise and its effect Importance of SNR in system design, Basic principles of Linear Modulation (Amplitude Modulation),brief ideas about SSB-SC and DSB-SC(Generation and Detection not required)	
	Day 6-7	Basic principles of Non-linear modulation (Angle Modulation - FM, PM).Basics of PLL, Sampling theorem, Sampling rate, Impulse sampling, Reconstruction from samples, Aliasing(1L); Analog Pulse Modulation - PAM (Natural & flat topped sampling), PWM, PPM , Basic concept of Pulse Code Modulation, Block diagram of PCM, Multiplexing - TDM, FDM basic ideas	
Digital Transmission:			
2	Day 7-8	Details Concept of Quantisation&Quantisation error, Uniform Quantiser, Non-uniform Quantiser, A-law & μ -law. Companding Encoding, Coding efficiency ,Line coding & properties, NRZ & RZ, AMI, Manchester coding	

	Day 8-9	Baseband Pulse Transmission, Matched filter (mention of its importance and basic concept only), Error rate due to noise , ISI, Raised cosine function,	
	Day 10-12	Nyquist criterion for distortion-less base-band binary transmission, Eye pattern, Signal power in binary digital signals & related problems	
Digital Carrier Modulation & Demodulation Techniques:			
3	Day 13-14	Details Bit rate, Baud rate (1L); Information capacity, Shanon's limit ,M-ary encoding, Introduction to the different digital modulation techniques - ASK, FSK, PSK, BPSK, QPSK, mention of 8 BPSK, 16 BPSK	
	Day 15-16	Introduction to QAM, mention of 8QAM, 16 QAM without elaboration, Delta modulation, Adaptive delta modulation (basic concept and importance only,	
	Day 17-18	introduction to the concept of DPCM, Delta Modulation, Adaptive Delta modulation and their relevance ,Spread Spectrum Modulation – concept only	
Information Theory & Coding:			
4	Day-19--20	Introduction, News value & Information content ,Entropy	
	Day 21-22	Mutual information, Information rate, related problems	
	Day 23-24	Shanon-Fano algorithm for encoding ,Shannon's Theorem - Source Coding Theorem ,Channel Coding Theorem, Basic of Information Capacity Theorem,related problem	
	Day 25-26	basic principle Error Control & Coding	

Text Books :

1. Communication System by B.P.Lathi, Oxford publisher.
2. Data Communication and Networking by Behrouz A. Forouzan, Published by Tata McGraw-Hill
3. 3 Analog and Digital Communication System by Sanjay Sharma,Publisherd by Katson

References:

1. Communication Systems 4th Edition by Simon Haykin; Published by Wiley India (Student Edition)
2. Principles and Analog and Digital Communication by Jerry D Gibson, Published by MacMillan.

3. Communication Systems by A. B. Carlson, Published by McGraw-Hill.

LECTURE PLAN

CLASS : B.Tech 6th Sem ECE
SUBJECT :ELECTRONIC MEASUREMENT AND INSTRUMENTATION EC605B
NAME OF THE TEACHER : SayantanBiswas

Module No.	Day (no. of Lecture classes)	TOPICS	
Basic Measurement Concepts			
1	Day 1-2	:Measurement systems – Static and Dynamic Characteristics – Units and Standards of measurements, –errors analysis	
	Day 3	Moving iron meters, moving coil,	
	Day 4-5	PMMC dynamometer, wattmeter Bridge measurements, Wheatstone Bridge	
	Day 6	Kelvin, Wein, Maxwell, Hay, Schering and Anderson Bridges	
Basic Measurement Concepts			
2	Day 7	Electronic Ammeter Volt meter(with DC and AC voltage)Multimeter Current measurement with analog electronic instruments.	
	Day 8-9	Chopper stabilized amplifier for measurement of very low voltage and currents.	
	Day 10-12	Cathode Ray Oscilloscopes- Block Schematic, Principles and applications.Dual Trace and Dual Beam Oscilloscopes, Digital Storage Oscilloscopes	
Signal Generator and Analysis			
3	Day 13-14	Function Generators- RF Signal Generators	
	Day 15-16	Sweep Generators – Frequency Synthesizer	
	Day 17-18	Wave Analyzer- Harmonic Distortion Analyzer, Spectrum Analyzer	
Digital Instruments			
4	Day-19--20	Comparison of analog& digital techniques- digital voltmeter	
	Day 21-24	mutlimeter–frequency counters- measurement of frequency and time	

		interval extension of frequency range- measurement errors	

LECTURE PLAN

CLASS : B.Tech 6th Sem ECE
SUBJECT :ELECTRONIC MEASUREMENT AND INSTRUMENTATION EC605B
NAME OF THE TEACHER : PurbaBasu

Module No.	Day (no. of Lecture classes)	TOPICS	
Basic Measurement Concepts			
1	Day 1-2	:Measurement systems – Static and Dynamic Characteristics – Units and Standards of measurements, –errors analysis	
	Day 3	Moving iron meters, moving coil, PMMC dynamometer	
	Day 4-5	, wattmeter Bridge measurements, Wheatstone Bridge	
	Day 6	Kelvin, Wein, Maxwell, Hay, Schering and Anderson Bridges	
Basic Measurement Concepts			
2	Day 7	Electronic Ammeter Volt meter(with DC and AC voltage)Multimeter Current measurement with analog electronic instruments.	
	Day 8-9	Chopper stabilized amplifier for measurement of very low voltage and currents.	
	Day 10-12	Cathode Ray Oscilloscopes- Block Schematic, Principles and applications.Dual Trace and Dual Beam Oscilloscopes, Digital Storage Oscilloscopes	
Signal Generator and Analysis			
3	Day 13-14	Function Generators- RF Signal Generators	
	Day 15-16	Sweep Generators – Frequency Synthesizer	
	Day 17-18	Wave Analyzer- Harmonic Distortion Analyzer, Spectrum Analyzer	
Digital Instruments			
4	Day-19--20	Comparison of analog& digital techniques- digital voltmeter	

	Day 21-24	mutlimeter–frequency counters- measurement of frequency and time interval extension of frequency range- measurement errors	
	Day 22-23	Basic concept of transducer, starin gauge and types,LVDT and Application,Piezoelectric crystal	

Text book;

1 Shawhaney

2. Gupta

3.DavidA.Bell

LECTURE PLAN

CLASS : B.Tech4thSem .

SUBJECT :Analog Communication (ECE 501)

NAME OF THE TEACHER :ShampaKarmakar

SL. NO.	DATE	TOPICS	Remarks
Introduction to Analog			

Communication :			
1	Day 1-2	Elements of communication system - Transmitters, Transmission channels & receivers , Concept of modulation, its needs	
2	Day 3-5	Amplitude modulation(AM-DSB/TC): Time domain representation of AM signal (expression derived using a single tone message), modulation index , frequency domain (spectral) representations, illustration of the carrier and side band components; transmission bandwidth for AM;. Phasor diagram of an AM signal; Calculation of Transmitted power & sideband power & Efficiency ; concept of under, over and critical modulation of AM-DSB-TC.	
3	Day 6-9	Other Amplitude Modulations: Double side band suppressed carrier (DSBSC) modulation: time and frequency domain expressions, bandwidth and transmission power for DSB. Single side band modulation (SSB) both TC & SC and only the basic concept of VSB, Spectra and band-width.	
Generation & Detection of Amplitude Modulation:			
4	Day 10	a) Generation of AM: Concept of i) Gated and ii) Square law modulators, Balanced Modulator.	
5	Day 11-12	b) Generation of SSB: Filter method, Phase shift method and the Third method	
6	Day 13-14	Demodulation of AM signals: Detection of AM by envelope detector , Synchronous detection for AM-SC, Effects of Frequency & Phase mismatch, Corrections.	
7	Day 15	**Principle of Super heterodyne receivers:** Super heterodyning principle, intermediate frequency, Local oscillator frequency, image frequency.	

Angle Modulation::			
8	Day 16	a) Frequency Modulation (FM) and Phase Modulation (PM): Time and Frequency domain representations, Spectral representation of FM and PM for a single tone message, Bessel's functions and Fourier series. ; Phasor diagram;	
9	Day 17	a) **Generation of FM & PM:** Narrow and Wide-band angle modulation, Basic block diagram representation of c) **Demodulation of FM and PM:** Concept of frequency discriminators , Phase Locked Loop generation of FM & PM, Concept of VCO & Reactance modulator	
Multiplexing			
10	Day 18	a) Frequency Division Multiplexing, Time Division Multiplexing, (FDM) b) Stereo – AM and FM: Basic concepts with block diagrams	
12	Day 19	c) **Random Signals and Noise in Communication System:** i) Noise in Communication systems – Internal & External noise, Noise Temperature, Signal-to-Noise ratio, White noise, thermal noise, Figure of Merit. iii)Noise performance in Analog Communication systems	

Text Books :

1. Taub and Schilling , "Principles of Communication Systems", 2nd ed., Mc-Graw Hill
2. B.P.Lathi -Communication Systems- BS Publications
3. V Chandra Sekar – Analog Communication- Oxford University Press

LECTURE PLAN

CLASS : B.Tech 5th Sem ECE
SUBJECT : Digital Communication (ECE501)
NAME OF THE TEACHER : ShampaKarmakar

Module	DATE	TOPICS	Remarks
Signal Vector Representation:			
1	Day 1	Analogy between signal and vector, distinguishibility of signal, orthogonality and orthonormality, basis function, orthogonal signal space	
	Day 2	Message point , signal constellation, geometric interpretation of signals, likelihood functions, Schwartz inequality, Gram-Schmidt orthogonalization procedure, response of the noisy signal at the receiver, maximum likelihood decision rule, decision boundary, optimum correlation receiver; probability of error	
Digital Data Transmission			
2	Day 3	Concept of sampling, Pulse Amplitude Modulation (PAM), interlacing and multiplexing of samples	
	Day 4	Pulse Code Modulation (PCM), quantization, uniform and non-uniform quantization, quantization noise, binary encoding	
	Day 5	A-Law and μ -law companding, differential PCM, delta modulation and adaptive delta modulation.	
	Day 6-7	Digital transmission components, source, multiplexer, line coder, regenerative repeater, concept of line coding – polar/unipolar/bipolar NRZ and RZ, Manchester, differential encoding and their PSDs	
	Day 9-10	pulse shaping, Inter Symbol Interference (ISI), Eye pattern,	

		Nyquist criterion for zero ISI, equalizer, zero forcing equalizer, timing extraction.	
Digital Modulation Techniques:			
3	Day 11	Types of Digital Modulation, coherent and non-coherent Binary Modulation Techniques, basic digital carrier modulation techniques: ASK, FSK and PSK	
	Day 12-13	Coherent Binary Phase Shift Keying (BPSK), geometrical representation of BPSK signal; error probability of BPSK, generation and detection of BPSK Signal, power spectrum of BPSK.	
	Day 14-15	Concept of M-ary Communication, M-ary phase shift keying, the average probability of symbol error for coherent M-ary PSK, power spectra of MPSK, Quadrature Phase Shift Keying (QPSK), error probability of QPSK signal, generation and detection of QPSK signals, power spectra of QPSK signals, Offset Quadrature Phase shift Queuing (OQPSK),	
	Day 18	Minimum Shift Keying (MSK), signal constellation of MSK waveforms, error probability of MSK signal, Gaussian Minimum Shift Keying: GMSK, basic concept of OFDM, constellation diagram	
Information Theory & Coding			
4	Day 19	**Source Coding** Uncertainty and information, average mutual information and entropy, information measures for continuous random	

		variables, source coding theorem, Huffman codes.	
	Day 20	**Channel Capacity And Coding [7L]** Channel models, channel capacity, channel coding, information capacity theorem, The Shannon limit.	
	Day 21	**Linear And Block Codes For Error Correction [8L]** Matrix description of linear block codes, equivalent codes, parity check matrix, decoding of a linear block code, perfect codes, Hamming codes	
	Day 22-23	Switching mode regulators	

TEXT BOOKS:

1) Digital Communications, S. Haykin, Wiley India.
2) Principles of Communication Systems, H. Taub and D.L.Schilling, TMH Publishing Co.
3) Wireless Communication and Networks : 3G and Beyond, I. SahaMisra, TMH Education.
4) Digital Communications, J.G.Proakis, TMH Publishing Co.

LECTURE PLAN
CLASS : B.Tech 7th Sem EE
SUBJECT : Digital Communication (EE(EC)-701)

NAME OF THE TEACHER : ShampaKarmakar

Module	DATE	TOPICS	Remarks
Signal Vector Representation:			
1	Day 1	Analogy between signal and vector, distinguishibility of signal, orthogonality and orthonormality, basis function, orthogonal signal space	
	Day 2	Message point , signal constellation, geometric interpretation of signals, likelihood functions, Schwartz inequality, Gram-Schmidt orthogonalization procedure, response of the noisy signal at the receiver, maximum likelihood decision rule, decision boundary, optimum correlation receiver; probability of error	
Digital Data Transmission			
2	Day 3	Concept of sampling, Pulse Amplitude Modulation (PAM), interlacing and multiplexing of samples	
	Day 4	Pulse Code Modulation (PCM), quantization, uniform and non-uniform quantization, quantization noise, binary encoding	
	Day 5	A-Law and μ -law companding, differential PCM, delta modulation and adaptive delta modulation.	
	Day 6-7	Digital transmission components, source, multiplexer, line coder, regenerative repeater, concept of line coding – polar/unipolar/bipolar NRZ and RZ, Manchester, differential encoding and their PSDs	
	Day 9-10	pulse shaping, Inter Symbol Interference (ISI), Eye pattern, Nyquist criterion for zero ISI, equalizer, zero forcing equalizer, timing extraction.	

Digital Modulation Techniques:			
3	Day 11	Types of Digital Modulation, coherent and non-coherent Binary Modulation Techniques, basic digital carrier modulation techniques: ASK, FSK and PSK	
	Day 12-13	Coherent Binary Phase Shift Keying (BPSK), geometrical representation of BPSK signal; error probability of BPSK, generation and detection of BPSK Signal, power spectrum of BPSK.	
	Day 14-15	Concept of M-ary Communication, M-ary phase shift keying, the average probability of symbol error for coherent M-ary PSK, power spectra of MPSK, Quadrature Phase Shift Keying (QPSK), error probability of QPSK signal, generation and detection of QPSK signals, power spectra of QPSK signals, Offset Quadrature Phase shift Queuing (OQPSK),	
	Day 18	Minimum Shift Keying (MSK), signal constellation of MSK waveforms, error probability of MSK signal, Gaussian Minimum Shift Keying: GMSK, basic concept of OFDM, constellation diagram	

TEXT BOOKS:

1) Digital Communications, S. Haykin, Wiley India.
2) Principles of Communication Systems, H. Taub and D.L.Schilling, TMH Publishing Co.
3) Wireless Communication and Networks : 3G and Beyond, I. SahaMisra, TMH Education.
4) Digital Communications, J.G.Proakis, TMH Publishing Co.

LECTURE PLAN
CLASS : B.Tech 8th Sem EE
SUBJECT : Communication Engineering(EE(EC)-801B)

NAME OF THE TEACHER : ShampaKarmakar

Module No.	Day (no. of Lecture classes)	TOPICS	
Elements of Communication system			
1	Day 1-2	Introduction of basic knowledge Elements of Communication system, Analog Modulation & Demodulation	
	Day 3	Noise, SNR, Basic ideas in brief Analog-to Digital Conversion	
	Day 4-5	Elements of Communication systems(mention of transmitter, receiver and channel); origin of noise and its effect Importance of SNR in system design, Basic principles of Linear Modulation (Amplitude Modulation),brief ideas about SSB-SC and DSB-SC(Generation and Detection not required)	
	Day 6-7	Basic principles of Non-linear modulation (Angle Modulation - FM, PM).Basics of PLL, Sampling theorem, Sampling rate, Impulse sampling, Reconstruction from samples, Aliasing(1L); Analog Pulse Modulation - PAM (Natural & flat topped sampling), PWM, PPM , Basic concept of Pulse Code Modulation, Block diagram of PCM, Multiplexing - TDM, FDM basic ideas	
Digital Transmission:			
2	Day 7-8	Details Concept of Quantisation&Quantisation error, Uniform Quantiser, Non-uniform Quantiser, A-law & μ -law. Companding Encoding, Coding efficiency ,Line coding & properties, NRZ & RZ, AMI, Manchester coding	
	Day 8-9	Baseband Pulse Transmission, Matched filter (mention of its importance and basic concept only), Error rate due to noise , ISI, Raised cosine function,	
	Day 10-12	Nyquist criterion for distortion-less base-band binary transmission, Eye pattern, Signal power in binary digital signals & related problems	
Digital Carrier Modulation & Demodulation Techniques:			
3	Day 13-14	Details Bit rate, Baud rate (1L); Information capacity, Shanon's limit ,M-ary encoding, Introduction to the different digital modulation techniques	

		- ASK, FSK, PSK, BPSK, QPSK, mention of 8 BPSK, 16 BPSK	
	Day 15-16	Introduction to QAM, mention of 8QAM, 16 QAM without elaboration, Delta modulation, Adaptive delta modulation (basic concept and importance only,	
	Day 17-18	introduction to the concept of DPCM, Delta Modulation, Adaptive Delta modulation and their relevance ,Spread Spectrum Modulation – concept only	
Information Theory & Coding:			
4	Day-19--20	Introduction, News value & Information content ,Entropy	
	Day 21-22	Mutual information, Information rate, related problems	
	Day 23-24	Shanon-Fano algorithm for encoding ,Shannon's Theorem - Source Coding Theorem ,Channel Coding Theorem, Basic of Information Capacity Theorem,related problem	
	Day 25-26	basic principle Error Control & Coding	

Text Books :

4. Communication System by B.P.Lathi, Oxford publisher.
5. Data Communication and Networking by Behrouz A. Forouzan, Published by Tata McGraw-Hill
6. 3 Analog and Digital Communication System by Sanjay Sharma,Publisherd by Katson

References:

4. Communication Systems 4th Edition by Simon Haykin; Published by Wiley India (Student Edition)
5. Principles and Analog and Digital Communication by Jerry D Gibson, Published by MacMillan.
6. Communication Systems by A. B. Carlson, Published by McGraw-Hill.

LECTURE PLAN
CLASS : B.Tech 3rd Sem CSE,
SUBJECT :Communication Engg.& Coding Theory (EC(IT)-305)

NAME OF THE TEACHER : ShampaKarmakar

Module No.	Day (no. of Lecture classes)	TOPICS	
Elements of Communication system			
1	Day 1-2	Introduction of basic knowledge Elements of Communication system, Analog Modulation & Demodulation	
	Day 3	Noise, SNR, Basic ideas in brief Analog-to Digital Conversion	
	Day 4-5	Elements of Communication systems(mention of transmitter, receiver and channel); origin of noise and its effect Importance of SNR in system design, Basic principles of Linear Modulation (Amplitude Modulation),brief ideas about SSB-SC and DSB-SC(Generation and Detection not required)	
	Day 6-7	Basic principles of Non-linear modulation (Angle Modulation - FM, PM).Basics of PLL, Sampling theorem, Sampling rate, Impulse sampling, Reconstruction from samples, Aliasing(1L); Analog Pulse Modulation - PAM (Natural & flat topped sampling), PWM, PPM , Basic concept of Pulse Code Modulation, Block diagram of PCM, Multiplexing - TDM, FDM basic ideas	
Digital Transmission:			
2	Day 7-8	Details Concept of Quantisation&Quantisation error, Uniform Quantiser, Non-uniform Quantiser, A-law & μ -law. Companding Encoding, Coding efficiency ,Line coding & properties, NRZ & RZ, AMI, Manchester coding	
	Day 8-9	Baseband Pulse Transmission, Matched filter (mention of its importance and basic concept only), Error rate due to noise , ISI, Raised cosine function,	
	Day 10-12	Nyquist criterion for distortion-less base-band binary transmission, Eye pattern, Signal power in binary digital signals & related problems	
Digital Carrier Modulation & Demodulation Techniques:			
3	Day 13-14	Details Bit rate, Baud rate (1L); Information capacity, Shanon's limit ,M-ary encoding, Introduction to the different digital modulation techniques	

		- ASK, FSK, PSK, BPSK, QPSK, mention of 8 BPSK, 16 BPSK	
	Day 15-16	Introduction to QAM, mention of 8QAM, 16 QAM without elaboration, Delta modulation, Adaptive delta modulation (basic concept and importance only,	
	Day 17-18	introduction to the concept of DPCM, Delta Modulation, Adaptive Delta modulation and their relevance ,Spread Spectrum Modulation – concept only	
Information Theory & Coding:			
4	Day-19--20	Introduction, News value & Information content ,Entropy	
	Day 21-22	Mutual information, Information rate, related problems	
	Day 23-24	Shanon-Fano algorithm for encoding ,Shannon's Theorem - Source Coding Theorem ,Channel Coding Theorem, Basic of Information Capacity Theorem,related problem	
	Day 25-26	basic principle Error Control & Coding	

Text Books :

7. Communication System by B.P.Lathi, Oxford publisher.
8. Data Communication and Networking by Behrouz A. Forouzan, Published by Tata McGraw-Hill
9. 3 Analog and Digital Communication System by Sanjay Sharma,Publisherd by Katson

References:

7. Communication Systems 4th Edition by Simon Haykin; Published by Wiley India (Student Edition)
8. Principles and Analog and Digital Communication by Jerry D Gibson, Published by MacMillan.
9. Communication Systems by A. B. Carlson, Published by McGraw-Hill.

LECTURE PLAN

CLASS: B.Tech 7THSem ECE,

SUBJECT :WIRELESS COMMUNICATION(ECE-701)

NAME OF THE TEACHER : ShampaKarmakar

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-2	Cellular Mobile Wireless Networks: Systems and Design Fundamentals: Brief introduction to mobile wireless communication and systems, Description of cellular system, Cellular Structure, Frequency Reuse, Cell cluste ring, Capacity enhancement techniques for cellular networks, cell splitting, antenna sectoring, Co - channel and Adjacent channel interference	
3	Day 6-9	Characteristics of wireless channel and propagation path loss models: Different Multi - path propagation mechanisms, Multi - path effects on mobile communication, Fading, diff erent types of fading, small and large scale fading, slow and fast fading, narrowband and wideband fading, Inter symbol interference, fast fading model, Doppler effect due to velocity of mobiles, Rayleigh envelop, free space propagation model, two ray grou nd reflection model, log distance path loss model, log normal shadowing model, macro and micro cell propagation models, types of base stations and	

		mobile station antennas .	
4	Day 10	Modern Mobile Wireless Communication Systems Evo lution strategies – First Generation (1G) to Fourth Generation (4G), Personal Area Networks :PAN, Low Tier Wireless System: Cordless Telephone, Second Generation (CT2), Digital European Cordless Telecommunications (DECT), Public wide - area Wireless Network s: 1 G to 3G cellular networks .	
5	Day 11-12	Multiple Access Technologies in cellular communication : Time division multiple access (TDMA), narrowband and wideband TDMA, synchronous and asynchronous TDMA, Frequency division multiple access (FDMA), Code Division Multiple Access (CDMA), Direct - sequence CDMA, spread spectrum technique, spectral efficiency of different wireless access technologies: Spectral Efficiency in FDMA system, Spectral Efficiency in TDMA system, Spectral Efficiency for DS -	

		CDMA system	
6	Day 13-14	Cellular Communication Networks and Systems : Second generation (2G) Network: Global system for mobile communication (GSM): Architecture and Protocols Air Interface, GSM spectrum, GSM Multiple Access Scheme, GSM Channel Organization, Traffic Channel multi - frame, Control (Signaling) Channel Multi - frame, Frames, Multi - frames, Super - frames and Hyper - frames, GSM Call Set up Procedure, Location Update Procedure, Routing of a call to a Mobile Subscriber	
7	Day 15	The concept of packet dat a services The 2.5 G General Packet Radio Services: GPRS Networks Architecture, GPRS Interfaces and Reference Points, GPRS Mobility Management Procedures, GPRS Attachment and Detachment Procedures, Session Management and PDP Context, Data Transfer through GPRS Network and Routing, The IP Internetworking Model	
8	Day 16	Overview of CDMA systems: IS	

		- 95 Networks and 3G – The Universal Mobile Telecommunication System (UMTS) : CDMA based IS - 95 Systems, forward link and reverse link for IS -	
9	Day 17	95, handoff process in CDMA based IS - 95 network. UMTS Network Architecture – Release 99, UMTS Interfaces, UMTS Network Evolution UMTS Release 4 and 5, UMTS FDD and TDD, UMTS Channels, Logical Channels, UMTS Time Slots	

TEXT BOOKS:

1.Wireless Networks: Applications and Protocols,
T. S. Rappaport, Pearson Education
2.Wireless Communication and Networks : 3G and Beyond,I. SahaMisra, TMH Education.
3.Wireless Communications: Principles and Practice,T.S.Rappaport, PHI Learning.

CLASS : B.Tech, ECE, 4th Semester
SUBJECT :Digital Electronics (Code: EC 401)
NAME OF THE TEACHER : ALOKESH MONDAL

Module	Day (no.of Lectures)	TOPICS	Ref.
Module-1(a) (Number systems & Codes)	Day 1 (2)	Introduction to the basic number systems- Decimal, Binary, Octal and Hexadecimal numbers and their representation	
	Day 2(2)	Inter number conversion of Binary, Octal and Hexadecimal number systems, Basics of BCD,ASCII, EBDIC codes	
	Day 3 (2)	Gray code, Signed binary number representation with 1's complement and 2's complement methods and Arithmetic operations: Addition and Subtraction Multiplication and division	
Module-1(b) (Venn diagram, Boolean algebra)	Day 4(2)	Introduction to the basic logic gates-AND,OR,NOT, NAND,NOR,XOR and XNOR with their Symbols, truth tables and circuits. Basics of Universal NAND and NOR gates	
	Day 5(2)	Boolean algebra-Basic laws of Boolean algebra, De- Morgan's theorems. SOP and POS forms of expressions-Min term and max terms.	
	Day 6(2)	Minimization of logic expressions by algebraic method. Karnaugh map method for minimization of logic expressions.	
Module-2(a) **(Combinational circuits)**	Day 7(2)	Introduction to Binary Adder and Subtractor, BCD Adder and Substractor , Series & Parallel Adder, Carry Look Ahead, Comparator Circuit.	
	Day 8(2)	Basics of BCD to 7-segment LED display,Parity generator & Checker Circuit; Applications and circuits of Encoder and Decoder.	
	Day 9(2)	Basics of Comparator, Multiplexer, De-Multiplexer	
	Day 10(2)	Basic introduction to RAM and ROM	
	Day 11(2)	Basic introduction to EPROM and EEROM	
Module-	Day 12(2)	Design of combinational circuits-using ROM	

2(b)	Day 13(2)	Basic introduction to Programming logic devices(PLDs) and programmable logic array(PLAs)	
Module-3 (Sequential Circuits)	Day 14(2)	Basic memory element-Latch, Flip Flops -S-R, J-K, D and T.	
	Day 15(2)	Shift registers-Shift left and Shift right registers, Synchronous counters	
	Day 16(2)	Asynchronous counters-Ripple counter, Ring counter and Down counter and their design.	
	Day 17(2)	Propagation delay through Counter, Irregular counter. State table and state transition diagram & their design	
Module-4(a)	Day 18(2)	Basic introduction to Analog to digital (A/D) conversion, Successive approximation techniques.	
	Day 19(2)	Basic introduction to Digital to analog (D/A) conversion, R-2R ladder method	
Module-4(b) (Logic families)	Day 20(2)	Basics of TTL logic with its operation principle and specifications	
	Day 21(2)	Basics of ECL logic with its operation principle and specifications	
	Day 22(2)	Basics of MOS and CMOS logic with its operation principle and specifications	

Textbooks:

1. Morries Mano- Digital Logic Design- PHI
2. Kharate- Digital Electronics- Oxford
3. Floyed& Jain- Digital Fundamentals-Pearson

Reference:

1. R.P.Jain—Modern Digital Electronics, 2/e ,McGraw Hill
2. S.K.Mandal, Digital Electronics Principles and Applications- McGraw Hill.
3. P.Raja- Digital Electronics- Scitech Publications
4. S.Aligahanan, S.Aribazhagan, Digital Circuit & Design- Bikas Publishing

LECTURE PLAN

CLASS : B.Tech, ECE, 6th Semester
SUBJECT :VLSI Circuit & System (Code: EC 602)
NAME OF THE FACULTY :Swagata Mandal

Module	Day (no.of Lectures)	TOPICS
Module-1 (Introduction to VLSI Design)	Day 1 (2)	Introduction to the VLSI, Moore's Law, Scale of Integration (SSI, MSI, LSI, VLSI, ULSI- Basic Idea), VLSI design flow
	Day 2(2)	Design principles (Concept of Regularity, Granularity etc), Design Domains (Behavioral, Structural), Review of the MOSFET Characteristics.
	Day 3 (2)	Scaling of MOSFET, Small geometry effect, DC Analysis, Small Signal model (T and pi model)
Module-2 (Analog VLSI Circuit)	Day 4(2)	**Biasing of MOSFET, Discuss Different Model of MOSFET (CS, CG and CD)and their small signal model. Applications of these model**
	Day 5(2)	High frequency model of MOSFET, Discuss different internal and external capacitance of MOSFET. Cascode Amplifier.
	Day 6(2)	Analog VLSI design steps; Basic building blocks of Analog VLSI chips; MOS switch; Active load / resistors; Voltage dividers; CMOS Current source & sink
	Day 7(2)	CMOS Voltage references/voltage dividers; CMOS Differential amplifier; Output amplifiers; CMOS OPAMP; Switched capacitor filter
Module-3 (CMOS for Digital VLSI Circuits)	Day 8(2)	CMOS inverter characteristics with resistive load, with PMOS load and with depletion type MOSFET load.
	Day 9(2)	CMOS logic circuits, NAND & NOR Gates, Complex logic circuits. Half adder and Full adder circuit. Lay out and stick diagram. .
	Day 10(2)	CMOS Transmission GATE, Advanced CMOS Logic circuits. Pseudo NMOS gate.
	Day 11(2)	Complementary Pass Transistor logic. Sequential CMOS logic circuits; SR Latch circuit

	Day 12(2)	Clocked JK Latch/ Master-Slave JK, CMOS D-latch & Edge triggered flip-flop.
Module-4 (Micro-electronic Processes for VLSI Fabrication)	Day 13(2)	Silicon Semiconductor Technology- An Overview, Wafer processing, Oxidation
	Day 14(2)	Epitaxial deposition, Ion-implantation & Diffusion, Cleaning, Etching, Photo-lithography – Positive & Negative photo-resist
	Day 15(2)	Basic CMOS Technology – (Steps in fabricating CMOS), Basic n-well CMOS process, p-well CMOS process, Twin tub process.
	Day 16(2)	CAD Tools for VLSI Design: - VHDL Syntax: Basic concepts in VHDL and VHDL grammar, Structural specification, VHDL description of Inverter, NAND gate.
	Day 17(2)	Full adder. Layout design rules, Layout of inverters, NAND, NOR gates using LASI.

Textbooks:

1. Digital Integrated Circuit, J.M.Rabaey, Chandrasan, Nicolic, Pearson Education.
2. CMOS Digital Integrated Circuit, S.M.Kang&Y.Leblebici, TMH.
3. Modern VLSI Design, Wayne Wolf, Pearson Education.
4. VHDL, Bhaskar, PHI.
5. CMOS Analog Circuit Design by P.E. Allen & D.R. Holberg; OUP

Reference:

1. Digital Integrated Circuits, Demassa&Ciccone, John Willey &Sons .
2. Modern VLSI Design: system on silicon, Wayne Wolf; Addison Wesley Longman Publisher
3. Basic VLSI Design, Douglas A. Pucknell& Kamran Eshranghian, PHI
4. CMOS Circuit Design, Layout & Simulation, R.J.Baker, H.W.Lee, D.E. Boyee, PHI

CLASS : B.Tech, ECE, 8th Semester
SUBJECT :Nanotechnology (Code: EC801A)
NAME OF THE FACULTY : ALOKESH MONDAL

Module	Day (no.of	TOPICS	Ref.

	Lectures)		
Module 1 (The physical basis of quantum mechanics)	**Day1(2)**	Limitation of classical physics. Plank's quantum hypothesis.Einstein's photoelectric effect. Wave nature of particle.	
	Day2(2)	The uncertainty principle. Schrödinger's time dependent and independent wave equations	
	Day3(2)	Particle in a box. Harmonic oscillator & rigid rotator.	
Module 2 (Formalism of quantum mechanics)	**Day4(2)**	Linear operator-Hermitian operator. Postulates of Quantum mechanics-Simultaneous measurability of observable-equations in motion	
	Day5(2)	Linear harmonic oscillator. Operator method-particle moving in a spherically symmetric potential	
	Day6(2)	Hydrogen atom – Hydrogen orbital-Matrix representation of wave functions.	
Module 3 (Crystal structure)	**Day7(2)**	Atomic structure-Atomic bonding in solids. Crystalline state of solids-Unit cells and Space lattices. Crystal structures-Crystal planes and directions- Miller Indices	
	Day8(2)	Diffraction of X-rays by crystal - Bragg's equation. Correction to Bragg's equation. Reciprocal lattice.Crystal Defects-point, line and surface defects.	
Module 4 (Semiconductors and their properties)	**Day9(2)**	Band model of semiconductors - carrier concentrations in intrinsic semiconductors.	
	Day10(2)	Carrier concentrations in extrinsic semiconductors. Fermi level. Variation of conductivity and mobility with temperature. Law of mass action	

	Day11(2)	Hall effect-Hall coefficients for intrinsic and extrinsic semiconductors. Determination of Hall constant.Hall effect devices.	
Module 5 **(Fundamentals OF nanoscience and technology)**	**Day12(2)**	Scientific Revolutions -Types of Nanotechnology and Nanomachines- the Periodic table. Atomic Structure, Molecules and phases. Energy, Molecular and atomic size.	
	Day13(2)	Surfaces and dimensional space-top down and bottom up. Opportunity at the nano scale-length and time scale in structures,energy landscapes. Inter dynamic aspects of inter molecular forces.	
	Day14(2)	Evolution of band structure and Fermi surface. Quantum dots,Nanowires,Nano tubes - 2D and 3D films	
Module 5 **(Semiconductor nano devices)**	**Day15(2)**	Single Electron devices-Nano scale MOSFET Resonant Tunneling Transistor. Single Electron Transistors. Optical Fibers for Nanodevices-DNA Based Nanodevices	
	Day16(2)	Gas based Nanodevices, Schottky devices, Quantum Structures and Devices- Quantum layers, wells, dots and wires	
	Day17(2)	Carbon Nanotube based logic gates, optical devices-Connection with quantum dots, quantum wires, and quantum wells	

Books:

1. Quantum Physics – A. Ghatak
2.Quantum Mechanics - Bransden and Joachen

3. Statistical Physics by K. Huang
4. Statistical Mechanics-Landau &Lifshitz
5. Quantum wells, Wires & Dots,: Theoretical & Computational Physics of Semiconductors Nanostuructures, Paul Harrison
6. Principles of Quantum Mechanics 2nd ed. - R. Shankar
7. Thermodynamics and Statistical Mechanics - A N Tikhonov, Peter T Landberg, Peter Theodore
8. Thermodynamics and Statistical Mechanics by John M. Seddon , J. D. Gale

Analog Communication (EC402)
Sem: 4th, Year- 2019
Lecture Plans
Faculty: Prof. Sudip Mandal

(One Class equivalent to two periods)

Class 01.
Review on Different Signals (Impulse, Step, Ramp, Gate, Sinc, Signum),
Fourier Series, Fourier Transform, Frequency Domain Representation,
Power spectral density, Power Signal, Energy signal, Correlation and Convolution

Class 02.
Basic Analog Communication System, RF Spectrum, Bandwidth of signal,
Necessity of Modulation

Class 03.
AM- expression, waveform, Double Side Band: USB and LSB phase reversal
Modulation Index: Over, Critical, Under
Time Domain and Frequency Domain Analysis for Single Tone Modulation

Class 04.
Full and Suppress carrier, Power content in DSBFC (Single Tone and Multiple Tone AM),
Power Efficiency, Relationship with Modulation Index, Numerical Problem

Class 05.
Modulation Index calculation from modulated waveform, Types of AM:

AM Generation, Square Law Modulator

Class 06.
Balanced Modulator
Ring Modulator, Working Principle and Advantages

Class 07.
Demodulation of DSBSC: Frequency Domain Analysis
Synchronous Process, Phase and Frequency Mismatch in coherent Detection, Costa's Receiver
Asynchronous Process: Envelope detector

Class 08.
Quadrature Amplitude Modulation (QAM)
Single Side Band (SSB) Expression, Waveform, Generation (Phase Shift and Frequency Discrimination), Advantages, Hilbart Transform

Class 09.
Vestigial Side Band (VSB) Spectrum and Advantage
Comparisons between DSB, SSB, VSB
AM Broadcasting: Super Heterodyne Receiver, Image Frequency, Sensitivity, Selectivity, Fidelity

Class 10.
Angle Modulation: Classification, Instantaneous Frequency
Equation for FM and PM, Waveform, Modulation Index
Numerical Problems, Relationship Between FM and PM

Class 11.
FM Classification & BW calculation
NBFM: Modulation and Demodulation
Expression for WBFM
Carson Formula for Bandwidth Calculation, FM Spectrum

Class 12.
WBFM Generation: Direct & Indirect
Direct Method: Varactor Diode Method, Reactance Method
Indirect Method for WBFM generation, Armstrong Method

Class 13.
Demodulation of FM: Classification
Direct Demodulator: Phase Discriminator (Slope Detector) and Frequency Discriminator (Foster Seley Detector)

Class 14.
Indirect Demodulator for FM/PM: PLL, Envelope Detector
Band Pass Limiter

Class 15.
Effect of Distortion and Noise / Interference for AM and FM/PM
Pre-emphasis & De-emphasis, FM Broadcasting

Class 16.
Multiplexing: TDMA, FDMA
Noise: Classification

Class 17.
Miscellaneous Problems and Questions Discussion

Lecture plane

CLASS : B.Tech 2nd Sem ECE/IT
SUBJECT :ME – 201/101: Engineering Mechanics
NAME OF THE TEACHER :Madhab Chandra Mandal

SL. NO.	DATE	TOPICS	Remarks

5. Engineering Mechanics: Statics & Dynamics by Hibbeler & Gupta, 11th ed. – pearson.
6. Engineering mechanics [vol-1 & II] by Meriam & kraige, 5th ed. – Wiley india.

LECTURE PLAN

Class: **B. Tech 3rd Semester Mechanical Engineering**
Subject: Strength of Materials
Paper Code: ME 302
Contacts: 3L + 1T
Credits: 4
Name of the Teacher: Subrata Bhattacharya

Module	Syllabus	Contact Hrs.
1A. B.	Concept of mechanics of deformable solids; concept of stress developed against external force/pressure; brief review of normal and shearing stress and strain;	1L
C.	Deformation of axially loaded members, statically determinate and indeterminate problems.	4L
	Strain energy in tension and compression	1L
2.	Analysis of Biaxial stresses-Mohr's circle for biaxial stress; concept of normal stress, principal stress and pure shear. Shear strain and shear strain energy. Stresses in thin walled pressure vessels- tangential and Hoop stress. Relation between shear modulus and Young's modulus.	6L
3.	Stresses in beams; shear force (SF), axial force and bending moment (BM); differential relations for BM, SF and load; SF and BM diagrams; bending stresses in straight beams – symmetric loading; stresses in beams of various cross sections; stresses in built-up beams and beams of different materials.	7L
4.	Torsion of a circular shaft, shear energy in torsion. Concept of closed and open coiled helical springs, Stresses and deflection of helical springs under axial pull.	4L
5.	Deflection of statically determinate and indeterminate beams due to bending moment,	7L

	differential equation of elastic line, Area-moment method, Strain energy method- Catigliano's theorem, superposition method.	
6.	Theory of columns; eccentric loading of short strut; column buckling: Euler load for columns with pinned ends and other end restraints; Euler's curve; emperical column formulae – (i) straight line, (ii) parabolic and (iii) Rankine Gordon.	6L

Books Recommended:

1. Elements of Strength of Materials by Timoshenko & Young, 5th Ed.- East west press.
2. Introduction to Solid Mechanics by Shames & Pitarresi, 3rd Ed., Prentice Hall India.
3. Mechanics of Materials by Beer & Johnston, TMH.
4. Engineering Mechanics of Solids by E.P. Popov; 2nd Ed., Prentice Hall India.
5. Fundamentals of Strength of Materials by Nag & Chanda, Wiley India.
6. Strength of Materials by R.Subramanian, 2nd Ed., Oxford Univ. Press.
7. Strength of Materials by Ryder, Mcmillan press.

LECTURE PLAN

CLASS : B.Tech 3rd Semester ME
SUBJECT : Engineering Materials (ME – 303)
NAME OF THE TEACHER : Subhranta Roy Chowdhury

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-2	Introduction : Material Science — its importance in engineering Classification of Materials — metals, polymers , ceramics, composites; Advanced materials—semiconductors, smart materials, nano – materials.	
2	Day 3-5	. Crystal Structure : Fundamental concepts ; Unit cells ; seven crystal systems ; single crystal , polycrystalline and non - crystalline materials ; Metallic crystal	

		structures—FCC , BCC & HCP structures , Co - ordination number , Atomic Packing Factor, Planar Atomic Density,Miller Indices.	
3	Day 6	. Imperfections in Metals : Point defect, Line Defect, Surface Defect .	
4	Day 7-10	Phase Diagrams : Alloys and solid solutions, Definition and basic concepts ; solubility limit ; Phase equilibrium, Onediagram,binary phase diagram , interpretation of phase diagrams. Gibb's phase rule, Type I, II & III Equilibrium Phase Diagram, Lever Rule, Nucleation and grain growth..	
5	Day 11-12	Iron-carbon System: Allotropy of iron, iron-carbon modified phase diagram, properties and uses of plain carbon steel, Isothermal Transformation-TTT diagram, CCT diagram.	
6	Day 13-17	. Heat Treatment : Definition and purposes; Heat treatment processes for steels-Annealing, Normalising, Hardening & Harden ability, Tempering , Martempering , Austempering , Surface Hardening - Carburising , Nitriding , Flame Hardening , Induction Hardening ; Precipitation or Age Hardening of non-ferrous alloys , Major defects in faulty Heat treatment., Heat Treatment Furnaces.	
7	Day 18 - 21	Classification of Metals and Alloys- compositions, general properties and uses: Ferrous alloys : Classification – low carbon steels , medium carbon steels , high carbon steels , stainless steels, alloy steels, tool and die steel, cast irons. Non-ferrous alloys : Copper & Copper alloys ; Aluminium	

		alloys ; Zinc alloys ; Nickel alloys ; Lead & Tin alloys	
8	Day 22 - 25	Mechanical Properties of Materials : Elastic properties of materials — tensile and compressive stress and strain , tress-strain behaviour, modulus of elasticity (Young's modulus), yield strength, tensile strength, plastic deformation, true stress and strain ; Ductility ; Resilience ; Toughness , impact tests ; Hardness - Brinell , Rockwell and Vickers hardness and their testing procedures , correlation between hardness and tensile strength ; Fatigue strength ; Effect of temperature on tensile strength & impact properties , creep failure.	
9	Day 26 - 27	Thermal, Electrical ,Optical and Magnetic properties of material : Basic properties and application.	
10	Day 28 - 30	Polymers & Elastomers : Definition ; How polymers are made - polymerization ; Polymer molecular structures ; Thermoplastics & Thermosetting ,; Special characteristics like low sp. gravity, optical, electrical & thermal property, decorative colour, easy formability ,low corrosion etc; Uses of polymers and elastomers.	
11	Day 31 - 33	. Ceramic Materials: What is ceramics; common ceramic materials and their characteristics; How ceramics are made— sintering process; Ceramic structures; Properties and applications.	
12	Day 34 - 35	Composite materials: What is composites ; Polymers matrix and their applications ; Metal matri and ceramic matrix	

		composites and their applications; How composites are made.	
13	Day 36 - 37	Corrosion and Degradation of Engineering Materials : Definition ; Types of corrosion —uniform, pitting, crevice, Galvanic , stress corrosion cracking and erosion ; Corrosion control — material selection , environment control , proper design .	
14	Day 38-39	. Materials Selection Methodology : Selection of material based on required properties , availability and cost of material, environmental issues.	
15	Day 40-42	Class Tests & Class Performance Test	

Text Books:

1. Materials Science and Engineering by W.D. Callister and adapted by R. Balasubramaniam, Willey India, 2010 Ed.
2. Engineering Materials: properties and selection by Budinski&Budinski, 9th Ed., Prentice Hall India.
3. Engineering Materials and Metallurgy by R.Srinivasan, 2nd Ed., Tata McGraw Hill
4. Materials & Processes in Manufacturing by E.P.Degarmo and adapted by Black & Kosher, 10th Ed., Wiley India.
5. Materials Science and Engineering by V.Raghavan, 5th Ed., Prentice Hall India.
6. Materials Science by Kakani&Kakani, New Age Publication.

LECTURE PLAN

CLASS : B.Tech3RDSemEE
SUBJECT :ME(EE)-301 Elements of Mechanical Engineering
NAME OF THE TEACHER :MdNaim Hossain

SL. NO.	DATE	TOPICS	Remarks
Basic Concepts of Thermodynamics			
1	Day 1-2	Introduction, Microscopic and Macroscopic viewpoints Definition of Thermodynamic systems: closed, open and isolated systems	
2	Day 3-4	Concept of Thermodynamics state; state postulate.	
3	Day 5-7	Definition of properties: intensive, extensive & specific properties. Thermodynamic equilibrium	
4	Day 7-15	Thermodynamic processes; quasi-static, reversible &irreversible processes; Thermodynamic cycles, Zeroth law of thermodynamics. Concept of empirical temperature. Heat and Work, Definition& units of thermodynamic work. Examples of different forms of thermodynamic works; example of electricity flow as work. Work done during expansion of a compressible simple system, Definition of Heat; unit of Heat, Similarities & Dissimilarities between Heat & Work Ideal Equation of State, processes; Real Gas, Definition of Ideal Gas; Ideal Gas Equations of State. Thermodynamic Processes for Ideal Gas; P-V plots; work done, heat transferred for isothermal, isobaric, isochoric, isentropic &polytropic processes.	
5	Day 15-19	Equations of State of Real Gases: Van der Waal's equation; Virial equation of state. Properties of Pure Substancesp-v & P-T diagrams of pure substance like H2O, Introduction to steam table with respect to steam generation process; definition of saturation, wet & superheated status. Definition of dryness fraction of steam, degree of superheat of steam.	
1st Law of			

Thermodynamics			
6	Day 20-22	Definition of Stored Energy & Internal Energy, 1st Law of Thermodynamics for cyclic processes ,	
7	Day 23-25	Non Flow Energy Equation, Flow Energy & Definition of Enthalpy,Conditions for Steady State Steady flow: Steady State Steady Flow Energy Equation.	
2nd Law of Thermodynamics:			
8	Day 25-28	Definition of Sink, Source Reservoir of Heat.Heat Engine, heat Pump & Refrigerator; Thermal efficiency of Heat Engines & co-efficient of performance of Refrigerators, Kelvin – Planck &Clausius statements of 2nd Law ofThermodynamics , Absolute or Thermodynamic scale of temperature , Clausius Integral.	
9	Day 28-32	Entropy :Entropy change calculation for ideal gas processes.Carnot Cycle & Carnot efficiency , PMM-2; definition & its impossibility, Air standard Cycles for IC engines, Otto cycle; plot on P-V, T-S planes; Thermal efficiency, Diesel cycle; plot on P-V, T-S planes; Thermal efficiency , Rankine cycle of steam, h-s chart of steam (Mollier's Chart), Simple Rankine cycle plot on P-V, T-S, h-s planes , Rankine cycle efficiency with & without pump work ,(Problems are to solved for each module)	
Properties & Classification of Fluids and applications			

10	Day 32-35	Ideal & Real fluids, Newton's law of viscosity; Newtonian and Non-Newtonian fluids ,Compressible and Incompressible fluids, Fluid Statics: Pressure at a point, Measurement of Fluid Pressure	
11	Day 35-42	Manometers : simple & differential, U-tube , Inclined tube, Fluid Kinematics, Stream line, laminar & turbulent flow,external & internal flow , Continuity equation , Dynamics of ideal fluids, Bernoulli's equation, Total head; Velocity head; Pressure head , Application of Bernoulli's equation Measurement of Flow rate: Basic principles, Venturimeter , Pilot tube , Orifice meter.	

Text :

1 Engineering Thermodynamics - P K Nag, 4thedn, TMH.
2 Fluid Mechanics and Hydraulic Machines - R K Bansal

References :

1 "Fundamentals of Thermodynamics" 6e by Sonntag & Van Wylin published by Wiley India.
2 Engineering Thermodynamics – Russel &Adeliyi (Indian edition), OUP
3 Engineering Thermodynamics – OnkarSinghh, New Age International Publishers Ltd.
4 Basic Engineering Thermodynamics – R Joel, 5thEd., Pearson
5 Introduction to Fluid Mechanics and Fluid Machines - S.K.Som and G.Biswas. 2nd edn, TMH
6 Fluid Mechanics by A.K.Jain.

LECTURE PLAN

CLASS : B.Tech 4th Sem ME, January – June Even Semester
SUBJECT : ME401: Kinematics of Machines

NAME OF THE TEACHER : Gora Chand Chell

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-5	**Basic Concepts :** Kinematics and Dynamics, Mechanisms, machines, terminology, links, kinematic Pairs & classifications, kinematic chains, mobility and degree of freedom – Kutzbach and Grubler's criterion, kinematic inversion, Grashof's law, Mechanical Advantages.	
2	Day 6-8	**Miscellaneous Mechanism and Intermittent Motion Mechanisms :** Reciprocating mechanism, Swing or Rocking mechanism, Quick Return mechanism, Indexing mechanism, Ratchet and Escapement, Feed mechanism.	
3	Day 9-12	**Straight Line and Curve Generating Mechanism :** Path generation - exact straight line mechanism, approximate straight line mechanism, Peaucillier mechanism, Hart's mechanism, Scott – Russel mechanism, Watt's mechanism, Grasshopper mechanism, chebychev mechanism, Robert's mechanism, Steering gear mechanism, Hooke's joint.	
4	Day 13-16	**Analysis of Velocity :** Analytical method for reciprocating parts, Vector method, Instantaneous center of velocity, Aronhold – Kennedy theorem of three centers, Velocity analysis with instantaneous centers, angular velocity ratio theorem, Displacement, velocity and acceleration of the piston, velocity & acceleration of the connecting rod.	

5	Day 17-20	**Analysis of Acceleration :** Angular acceleration, Acceleration of slider crank mechanism, four bar mechanism, crank and slotted lever mechanism, Klein's Constrution, Coriolis component of Acceleration.	
5	Day 21=23	**Gear Tooth Profile :** Terminology, laws of gearing, velocity of sliding, involute profile, contact ratio, interference, types of gears, minimum number of teeth.	
6	Day 24-26	**Gear Trains :** Simple gear trains, Compound gear trains, Epicyclic gear trains.	
7	Day 27-30	**Cam Profile Analysis :** Terminology, Classification of cams and follower, Follower displacement diagram, Analysis of follower motion – constant velocity motion, simple harmonic motion, constant acceleration & deceleration, cycloidal motion, Graphical layout of cam profile.	
8	Day 31-34	**Belt Drive :** Length of belts, Ratio of tension, Power Transmission, Maximum power transmission, Centrifugal tension, Initial tension, V-belt pulley.	

Text Books :

1. Theory of Mechanisms & Machines - A. Ghosh & A.K. Mallik
Publ: AEWP
2. Theory of Machines - Thomas Bevan, Publ: CBS
3. Mechanism & Machines Theory - Rao, R.V. Dukkipati Wiley
4. Theory of Machines – S. S. Ratan

LECTURE PLAN

CLASS : B.Tech 4th Sem ME, January – June Even Semester
SUBJECT :Fluid Mechanics and Machineries

NAME OF THE TEACHER :Asim Mahapatra

SL. NO.	DATE	TOPICS	Remarks
Fluid Statics and Kinematics			
1	Day 1-2	Properties & Classification of Fluids; Newton's law of viscosity	
2	Day 3-5	**Fluid Statics,** Manometer, forces on submerged surfaces	
3	Day 6-9	meta-centric height, **Fluid Kinematic**	
4	Day 10	Rotation and Vorticity	
Fluid Dynamics			
5	Day 11	Euler's Equation of Motion, Bernoulli's Equation of Motion, Venturimeter, Orifice meter and Pitot- Tube.	
6	Day 12-13	Bernoulli's Equation of Motion, Venturimeter, Orifice meter	
7	Day 14-15	Darcy – Weisbach equation, Boundary layer,	
8	Day 16	Boundary layer separation	
Dimensional Analysis and Fluid Machines			
9	Day 17	orifice, mouthpiece, notches and weirs	
10	Day 18	Buckingham Pi theorem	
11	Day 19	basic concepts of drag and lift	
12	Day 20	Pelton wheel	
13	Day 21	Francis Turbine Kaplan Turbine	
14	Day 22	Centrifugal Pump	

Text Books :

1. Introduction to Fluid Mechanics & Fluid Machines – Som & Biswas, TMH.

2. Fluid Mechanics & Machinery – R.K.Bansal, Laxmi Publications.

3. Hydraulics & Fluid Mechanics including Hydraulic Machines – Modi & Seth, Standard Book House

LECTURE PLAN

CLASS : B.Tech4th Sem EE
SUBJECT : ME(EE)-401: Thermal Power Engineering
NAME OF THE TEACHER :MdNaim Hossain

Module	DATE	TOPICS	Remarks
Introduction to Boilers :			
1	Day 1-4	Water Tube & Fire Tube boilers,	
	Day 5-10	Circulating Principles, Forced Circulation, Critical pressure, Superheaters, Reheaters, attemperators, induced draught, forced draught and secondary air Fans, Boiler performance analysis and heat balance.	
	Day 11-15	Combustion Systems, Environmental Protection – ESP, Cyclone Separator, DustCollector etc.	
Rotary Thermodynamic devices:			
2	Day 16-20	Steam turbines & their classifications – Impulse & Reaction type Turbines,	
	Day 20-25	Thermodynamics of compressible fluid-flow, equation and continuity – Isentropic flow throughnozzles, velocity diagram,	
	Day 25-30	Blade efficiency, optimum velocity ratio, multi-staging, velocity & pressure compounding, losses in turbines, erosion of turbineblades, turbine governing, performance	

		analysis ofturbine, Condensing system.	
IC Engines:			
3	Day 30-33	classification. Analysis of a standardcycle, fuel characteristic of SI & CI Engine, Combustion,	
	Day 33-37	Engine performance. Automotive Engine exhaust emission and their control.	
4	Day 37-42	Regeneration - Reheating, Isentropic efficiency.Combustion efficiency.	

Text:

1. P.K.Nag- Engineering Thermodynamics – TMH ,2/e
2. P K Nag- Power Plant Engg. - TMH Pub
3. P.S. Ballaney- Thermal Engineering – Khanna Pub
4. Domkundwar& Arora- Power Plant Engineering –.Dhanpat Rai & Co.

Reference:

1. Cengel --- Thermodynamics , 3/e ,TMH
2. Et-Wakil—Power Plant Engineering , MH
3. M W Zemansky&R.H.Dittman -Heat and Thermodynamics – McGraw Hill ,7/e

LECTURE PLAN

Class: **B. Tech 5th Semester Mechanical Engineering**
Subject: Dynamics of Machines
Paper Code: ME 502
Contacts: 3L
Credits: 3
Name of the Teacher: Subrata Bhattacharya

Module No	Syllabus	Contact Hours
1.	Inertia force and inertia torque in reciprocating engine; Equivalent dynamical system; correction couple (torque); Turning moment diagram and flywheel design.	6
2.	Balancing: Static balancing; Dynamic balancing of rotating masses -graphical and analytical methods; Balancing of inline single cylinder and four cylinder engine; Balancing of symmetric two cylinder V-engine; Swaying couple; Hammer blow.	8
3.	Governors: Use and classification; Study and analysis of Porter, Proell and Wilson-Hartnell governors; Sensitiveness, stability, isochronism, hunting, effort and power of governors; Controlling force diagram and stability criteria analysis; coefficient of insensitiveness	5
4.	Gyroscope: Gyroscopic couple and precessional motion; Effect of gyroscopic couple on aeroplane and ship; Stability of two wheel and four wheel vehicles taking turn.	3
5.	Vibration: Definition & types of vibration; Differential equations of vibratory motions (longitudinal & torsional); Natural frequency of free longitudinal vibration-Equilibrium method, Energy method(Rayleigh's maximum energy principle); Effect of inertia in longitudinal vibration; Natural frequency of free transverse vibration of a beam due to point loads -Rayleigh's method. Whirling of shaft, synchronous whirling; critical speed -Dunkerley's method.	6 2
6.	Free damped vibration; Damping factor; Logarithmic decrement.	2
7.	Forced vibration, concept of under damped, critically damped and over damped system; Dynamic magnifier (magnification factor); Vibration isolation and transmissibility.	4

Recommended Books:

1. S.S. Rattan, Theory of Machines, Tata McGraw Hill.
2. Uicker, Pennock & Shigley, Theory of Machines and Mechanisms, Oxford University Press.
3. W.T. Thomson, Theory of vibration with Applications, McGraw Hill.
4. A. Ghosh & A.K. Mallik, Theory of Mechanisms and Machines, Affiliated East-West Publication.
5. Rao & Dukkipati, Mechanism and Machine Theory, New Age Int. Pub.
6. J.S.Rao, The Theory of Machines Through Solved Problems, New Age Int. Pub.

LECTURE PLAN

CLASS : B.Tech 5th. Semester ME
SUBJECT : Machining & Machine Tools (ME – 503)
NAME OF THE TEACHER : Subhranta Roy Chowdhury

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-2	Introduction : Machining: Basic principle, purpose, definition and requirements..	
2	Day 3-5	Geometry of cutting tools : Geometry of single point turning(shaping, planning and boring) tools in ASA, ORS and NRS systems.	
3	Day 6-7	Mechanism of machining : i) Chip formation mechanism, yielding and brittle fracture, chip reduction coefficient, cutting ratio, shear angle and cutting strain. ii) Orthogonal cutting and Oblique cutting.	
4	Day 8-9	. Machining chips : types Geometry of single point turning(shaping, planning and boring) tools in ASA, ORS and NRS systems and conditions,Built-up edge formation, cause, type and effects, chip formation in drilling and milling.	
5	Day 10-12	Mechanics of machining : i) Purposes of determination of cutting forces, Cutting force analysis for machining by single point tools, ,Analysis of forces under Orthogonalcutting and use of Merchant's circle diagram ORS and Merchant's circle diagram. ii)Determination of cutting forces by analytical methods. iii)Measurement of cutting forces, Dynamometers - construction and working principles of strain gauge type and piezoelectric crystals type turning, drilling, milling and grinding	

		dynamometers.	
6	Day 13	Cutting temperature : i) Heat generators and cutting zone temperature, sources, causes and effects on job and cutting tools, role of variation of the machining parameters on cutting temperature . ii) Control of cutting temperature and application of cutting fluids (purpose, essential properties, selection and methods of application).	
7	Day 14-16	Cutting tools-failure, life and materials : i)Major causes & Modes of failure of cutting tools, Mechanism of cutting tool wear,Measurement of tool wear ii) Tool life, definition, assessment and measurement, Taylor's tool life equation and its use iii) Cutting tool materials - essential properties, characteristics and applications of HSS, carbide(uncoated/coated), ceramic, diamond , CBN and newly developed cutting tools.	
8	Day 17-20	. Broaching and grinding : i) Modes and mechanisms of chip formation, selection and application. ii) Grinding wheel ,effect on surface roughness and types.	
9	Day 21	Machinabilityand machining economics : 1. Machinability(and grindability) : definition, assessment, improvement and evaluation of optimum cutting velocity and tool life.	
10	Day 22-23	Machine tools – Introduction : i) Purpose of use, definition ,classificationand general features of machine tools. ii)Generatrix and Directrix and tool – work motions in different operations of conventional machine tools.	
11	Day 24 -	. General constructions and function of machine tools and drives :	

	32	i) Major components and their functions in lathes; shaping , planning and slotting machines ; drilling machine , milling and grinding machines. ii) Machining operations and application of the common machine tools and their way of specification.	
12	Day 33	. Role & Forms of Kinematic structure in machine tools : Role and constituents of kinematic structure, different forms of machine tool kinematic structure, Mechanism commonly used in machine tool kinematic systems.	
13	Day 34 - 35	Control of speed and feed of machine tools : i) Need of wide ranges of speeds and feeds in machine tool drive. ii)Design of speed gear box, speed layout, gear layout, ray diagrams . iii)Control (selection and change) of feed in centre lathes and in hydraulically driven machine tools.	
14	Day 36 - 38	Machining time : Estimation of time required for various operations like turning , drilling , shaping , milling .	
15	Day 39 - 40	. Inspection and testing of machine tools.	
16	Day -41- 43	Class Test & Class Performance Test	

Books recommended:

1. A.B. Chattopadhyay, Machining and Machine Tools, Wiley India (P) Ltd., New Delhi.
2. G. Kuppuswamy, Principles of Metal Cutting, University Press, Hyderabad.
3. Stephenson &Agapion, Metal Cutting Theory and Practice, Taylor and Francis, NY.
4. M.C. Shaw, Metal Cutting Principles and Practices, Oxford University Press.
5. G.C. Sen and A. Bhattacharyya, Principles of Machine Tools, New Cantral Book Agency (P) Ltd., Kolkata.
6. Acharkan, Machine Tool Design, Vol. I, II, III and IV, Mir Publication, Moscow.

LECTURE PLAN

CLASS : B.Tech 5th Sem ME, July – December Odd Semester
SUBJECT : Design of Machine Elements ME-504
NAME OF THE TEACHER : Gora Chand Chell

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-2	Introduction to design, Review of common engineering materials and their properties, Stress – strain diagram, Improvement of properties through heat treatment and alloying ; codes and standards;	
2	Day 3-5	Modes of failure; Design/allowable stress; Factor of safety (FoS); Stress Concentration ; Theories of failure – maximum normal stress theory, maximum shear stress theory, Distortion energy theory.	
3	Day 6-14	Design of (i) Cotter joint; (ii) Knuckle joint and (iii) Fillet Welded joint of brackets under different types of loading.	
4	Day 15-21	Bolted joints : Metric thread, standard sizes, use of lock nuts and washers; Applications in structures including brackets, turn buckle; Pre-stressed bolts; Riveted joints : Unwin's formula; Brief discussion on single, double and triple row lap joints, butt joints with single or double strap / cover plate; simple strength design; joint efficiencies, boiler joint	
5	Day 22-28	Design of : (i) shafts - design based on strength and torsional rigidity; (ii) Shaft coupling-rigid, pin-bush and geared flexible type, alignment of coupling; (iii) Keys – Sunk key and Feather Key	

6	Day 29-32	Fatigue in metals; S-N curve; Endurance limit and fatigue strength; Stress concentration factors – effect of discontinuity, fillets and notches; Effect of size, surface finish, stress concentration and degree of reliability on endurance limit; Design for finite and infinite life; Goodman, modified Goodman and Soderberg diagrams with respect to fatigue failure under variable stresses; Cumulative fatigue damage – Miner's equation.	
7	Day 33-38	6. Design of: (i) Transmission screw, Screw jack (ii) Belt drives-geometrical relations, derivation of torque and power transmission by flat and V-belt drives,selection of belt from manufacturers' catalogues, pulley	
8	Day 39-42	Design of (i) Helical compression spring - stress and deflection equations, stiffness, curvature effect : Wahl's factor, springs in parallel and series; (ii) Multi-leaf springs : load-stress and load-deflection equations, Nipping	

Text Books :

1. V. B. Bhandari, Design of Machine Elements, TMH.
2. Shigley and Mischke, Mechanical Engineering Design, TMH.
3. Hall, Holowenko and Laughlin, Theory and Problems of Machine Design, TMH.
4. P.C. Gope, Fundamentals of Machine Design, PHI.
5. M.F. Spotts, Design of Machine Elements, Prentice Hall.

LECTURE PLAN

CLASS : B.Tech 6th Sem ME
SUBJECT : I.C.ENGINE & GAS TURBINE ME601 (6th Sem) (UG)
NAME OF THE TEACHER :Dr. Nimai Mukhopadhyay

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
1	Day 1-2	Introduction	
2	Day 3-4	Air standard cycle analysis	
	Day 4-5	Air fuel cycle analysis	
	Day 6	IC Engine Mechanical component analysis	
	Day 6-8	Classifications and working of basic engine types: 2 stroke, 4 stroke CI, SI	
	Day 9	Fuels. Classifications, HCV, LCV	
3	Day 10	Combustion of fuel in IC Engine	
	Day 11-13	Combustion in SI and CI engine	
	Day 14	Detonation, Knocking	
	Day 15-16	Combustion chamber types	
4	Day 17	Carburetor analysis	
	Day 18-20	Fuel injection system	
	Day 21	MPFI system in SI engine	
5	Day-22	Ignition system in CI and SI engine	
	Day 23-24	Battery, magneto and electronic ignition system	

6	Day 25	Supercharging, Scavenging, Turbo charging	
	Day 26-27	Lubrication of IC Engine, lubricating oil	
	Day 28	Cooling of IC engine	
7	Day-29	Performance & testing of IC Engine	
	Day 30-31	Pollution control of Emissions of IC Engine	
8	Day 32	Introduction to Gas Turbine cycles	
	Day 33-34	Performance analysis of Gas Turbine cycles	
	Day 35 -40	Solution of Gate Exam problems & Revision	

Text Books :

1. J.B.Heywood, 'Internal Combustion Engine Fundamentals', McGraw Hill Book Co, 1988.
2. V. Ganesan, 'Internal Combustion Engines', Tata McGraw Hill Book Co, Eighth Reprint, 2005.
3. Edward F.Obert, 'Internal combustion engines and air pollution' Harber and Row Publishers, 1973.
4. Internal combustion Engine – applied Thermoscience- Colin R. Ferguson, Allan T. Kirkpatrick- Johnwilly.
5. W.H.Crouse and A.L.Anglin, 'Automotive Emission Control', McGraw Hill Book Co, 1995.
6. G.S.Springer and A.J.Patterson, 'Engine emissions and pollutant formation', plenum press, Newyork,1985.

LECTURE PLAN

CLASS : B.Tech 6th Sem ME, January – June Even Semester

SUBJECT : Machine Design ME-603

NAME OF THE TEACHER : Gora Chand Chell

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-4	**Brakes:** Function, types; pivoted block brake (single and double block brakes), internal expanding shoe brake,self energizing and self locking; Pivoted block brake; Band brake-simple and differential; Block and band brake; Brake lining materials; Thermal considerations during braking.	
2	Day 5-8	**Clutches:** Function, types; Friction clutches – torque capacity based on uniform pressure and uniform wear theory for disc and cone clutch; Centrifugal clutch; Friction materials; Considerations for heat dissipation.	
3	Day 9-12	**Rolling contact bearings:** Bearing types, nature of load; Static and dynamic load capacity, Stribeck equation, Load - Life relation; Bearing selection from manufacturers' catalogues; Methods of lubrication; Bearing mounting on journal and bearing block .	
4	Day 13-15	**Sliding contact bearings:** Bearing types and materials; Stribeck Curve, Petroff equation, Hydrodynamic lubrication theory - pressure development; Reynolds equation, Finite bearings – Raimondi-Boyd charts, Heat generation & dissipation; Hydrostatic bearing; Plummer block.	
5	Day 16-19	**Gears:** Design objectives, types, terminologies, conjugate action and involute tooth profile, tooth systems, standard modules; Gear materials.	

		Spur Gear : Strength design, static and dynamic considerations in strength design, Lewis formula, Lewis form factor, beam strength, Buckingham equation for dynamic tooth load; Endurance strength and wear strength; Designing a pinion based on above considerations;	
6	Day 20-23	**Helical Gear**: Helix angle, minimum face width, virtual number of teeth; Strength design, Buckingham formulae for checking dynamic load and wear load.	
7	Day 24-30	**Bevel Gear:** Terminologies, formative number of teeth; Lewis equation, dynamic load, endurance strength and wear strength checking. **Worm- worm wheel:** Terminologies and their inter-relation; Preferred combination of various parameters;Efficiency; Materials.	
8	Day 31-35	**Pressure vessels**– thin cylinder, thick cylinder, Lame's equation, Clavarino's equation, Birnie's equation, Autofrettage– compound cylinders, End Covers, Opening in pressure vessel – area compensation method,Fired and unfired vessels – category, Industrial Code.	
9	Day 36-39	**Flywheel** design for application to: (i) Punching press; (ii) 2-stroke engine; (iii) 4-stroke engine, Torque analysis, Solid disc and rimmed flywheel	

Text Books :

1. V. B. Bhandari, Design of Machine Elements, TMH.
2. Shigley and Mischke, Mechanical Engineering Design, TMH.
3. Hall, Holowenko and Laughlin, Theory and Problems of Machine Design, TMH.
4. Hamrock, Schmid, Jacobson, Fundamentals of Machine Elements, Mcgraw Hill.
5. Burr and Cheatham, Mechanical Analysis and Design, Prentice Hall.
6. P. Kannaiah, Machine Design, Scitech Publications.

7. P.C. Gope, Fundamentals of Machine Design, PHI.

LECTURE PLAN

CLASS : B.Tech 6th Sem ME, January – June Even Semester
SUBJECT :Power Plant Engg
NAME OF THE TEACHER : Asim Mahapatra

SL. NO.	DATE	TOPICS	Remarks
Analysis of steam cycle			
1	Day 1-2	Rankine cycle	
2	Day 3-5	**Feed water heaters**	
3	Day 6-9	Super critical pressure cycle, steam power plant appraisal, combined cycle	
4	Day 10	Deaerator	
Fuel combustion and boilers			
5	Day 11	Coal analysis	
6	Day 12-13	Combustion reactions and related problems, draft	
7	Day 14-15	pulverized coal furnace, boilers	
8	Day 16	Mountings and accessories	
Turbines and condenser			
9	Day 17	nozzles	
10	Day 18	Simple impulse	
11	Day 19	Pressure coumpounding	
12	Day 20	Velocity compounding	
13	Day 21	condenser	

14	Day 22	Cooling tower	

Text Books :

1. Power Plant Engg.- P. K. Nag.

2. . Power Plant Engg.- R. K. Rajput

LECTURE PLAN

CLASS : B.Tech 5th. Semester ME
SUBJECT : Advanced Machine Tools (ME – 604)
NAME OF THE TEACHER : Subhranta Roy Chowdhury

SL. NO.	DATE	TOPICS	Remarks
1	Day 1-3	Automation Machine Tools: Introduction; Purpose,degree,type and economy of machine tool automation; examples of semi-automatic & automatic machine tools; transfer machine;	
2	Day 4-7	Thread Manufacturing systems, Gear Manufacturing Systems	
3	Day 8- 13	CNC machine tools and systems i) Basic Principles of NC system,Components and their functions in NC machines ii)Control : MCU, DPU and CLU iii)Feed drives : special motors and screw-nut system Advantages of CNC over NC machines	
4	Day 14-15	Basic systems of NC and CNC machines (i) coordinate system (ii) control – open loop and closed loop (iii) dimensioning – absolute and incremental	
5	Day 16 - 18	CNC machine tools ; (i) structure and working principle (ii) examples and use of CNC machines	
6	Day 19	. Control of tool – work travel ; (i) point – to – point and contouring (ii) interpolation – linear and circular	
7	Day 20 - 30	. Part programming for NC, CNC and MC systems: Manual part programming : (i) definition and codes used (ii) sequential	

		steps (iii) examples of part programming for machining in CNC lathes, drilling and milling machine	
8	Day 31 - 38	Computer aided part programming : (i) definition and advantages (ii) programming languages (iii) statements in APT (iv) examples of part programming in APT	
9	Day 39 - 42	Class Test & Class Performance Test	

LECTURE PLAN

Class: B. Tech 6th Semester Mechanical Engineering
Subject: Finite Element Methods
Paper Code: ME 605A
Contacts: 4L
Credits: 4
Name of the Teacher: Subrata Bhattacharya

Module	Syllabus	Contact

		Hours
1.	**Introduction**: Historical background, Relevance of FEM to design problems, Application to the continuum–Discretisation, Matrix approach, Matrix algebra– Gaussian elimination, Governing equations for continuum,Classical Techniques in FEM, Weighted residual method, Ritz method, Galerkin method.	8
2.	**One dimensional problems:** Finite element modeling– Coordinates and shape functions, Potential energy approach– Element matrices and vectors, Assembly for global equations, Boundary conditions, Higher order elements- Shapes functions, Applications to axial loadings of rods– Extension to plane trusses, Bending of beams– Finite element formulation of stiffness matrix and load vectors, Assembly to Global equations, boundary conditions, Solutions and Post processing, Example Problems.	8
3.	**Two dimensional problems– scalar variable problems:** Finite element modeling– CST element, Element equations, Load vectors and boundary conditions, Assembly, Application to heat transfer, Examples.	6
4.	**Two dimensional problems– vector variable problems:** Vector Variable problems, Elasticity equations– Plane Stress, Plane Strain and Axisymmetric problems, Formulation, element matrices, Assembly, boundary conditions and solutions Examples.	9
5.	**Isoparametric elements for two dimensional problems:** Natural coordinates, Iso parametric elements, Four node quadrilateral element, Shape functions, Element stiffness matrix and force vector, Numerical integration, Stiffness integration, Displacement and Stress calculations, Examples.	7
6.	**Computer implementation**: Pre-processor, Processor, Post-processor. Discussion about finite element packages.	4

ed Books:

ala, Finite Element Methods – Basic Concepts & Applications, PHI Learning.

y, An Introduction to the Finite Element Method, McGraw-Hill.

t, Finite Element Methods for Engineers , CENGAGE Learning.

, D.S. Malkus and M.E. Plesha, Concepts and Applications of Finite Element Analysis, Prentice Hall-India, New Delhi.
namoorthy, Finite Element Analysis, Tata McGraw Hill.
, Finite Element Procedures, Prentice Hall.
drupatla and A.D. Belegundu, Introduction to Finite Elements in Engineering, Prentice Hall of India.
kiewicz, R.L. Taylor, J.Z. Zhu, The Finite Element Method: Its Basis and Fundamentals, Elsevier.

LECTURE PLAN

CLASS : B.Tech 6th Sem ME

SUBJECT : Fluid Power Control (ME-605C)
NAME OF THE TEACHER : Nripen Mondal

SL. NO.	DATE	TOPICS	Remarks
Introduction of Fluid Power Control			
1	Day 1	Introduction fluid power control	
2	Day 2	Applications and advantages of fluid power	
3	Day 3-5	Different Components of a hydraulic and pneumatic system	
4	Day 6-7	Desired properties of a hydraulic fluid	
5	Day 8	Advantage of mineral oil over water	
6	Day 9-10	Very basic of the fluid property pressure, head, force, density, specific gravity, kinematic and absolute viscosity, compressibility and incompressibility.	
7	Day 11-13	Pascal's law analysis of simple hydraulic jack, Mechanical advantage; continuity equation; hydraulic power of a cylinder	
8	Day 14-15	Hydraulic Pumps positive displacement pumps; constructional features, working principle and volumetric capacity of external gear pump, vane pump, axial piston pump and radial piston pump	
9	Day 16-17	Hydraulic Actuators Constructional features of single acting and	

		double acting hydraulic cylinders; mounting of cylinders, cushioning of cylinder	
10	Day 18-20	Direction control valves operation and graphical symbol of 3 way and 4 way valves; different modes of activation of valves;	
11	Day 21-23	Operation and graphical symbols of check valves, pressure relief valve pressure reducing valve, unloading valve and flow control valve.	
12	Day 23-25	Analysis of hydraulic circuitssingle acting cylinder control, ii) double acting cylinder control, iii) regenerative circuit, iv) pump unloading circuit v) double pump hydraulic system, vi) cylinder synchronization circuit vii) speed control of a hydraulic motor viii) circuit to lift and hold heavy load, ix) automatic sequencing of two cylinders	
13	Day 26-27	Advantages & disadvantages of pneumatic system compared to hydraulic system	
14	Day 28-30	working principle and use of filter, pressure regulator, lubricator and silencer; symbols of different pneumatic components	
15	Day 31-33	Compressed air distribution system in a plant; drawing pneumatic circuits for different operations.	
16	Day 34-36	Electrical devices for controlling fluid circuits; function of electrical devices like push-button switches, limit switches,	
17	Day 38-40	pressure switches, solenoids, relays and timers and their symbols; concept of ladder diagram; study of following circuits using electrical control devices	
18	Day 41-42	i) control of a solenoid actuated cylinder using one limit switch; ii) reciprocation of a cylinder using pressure or limit switches, iii) two cylinder sequencing circuit using two limit switches.	

Texts & References:

1. Fluid power engineering M Galal Rabie
2. Fluid Mechanics and Fluid Power Engineering (Kumar D S)

Fluid power Technology Ram Srivastav

CLASS : B.Tech 7th Sem ME

SUBJECT Advanced Manufacturing Technology

Paper Code : ME-701

NAME OF THE TEACHER : SUMAN MONDAL

Module	DATE	TOPICS	Remarks
Manufacturing Systems and Automation			
1	Day 1-2	Job shop, Flowlines, Transfer lines, Project shop, Continuous processes,	
	Day 3-4	Flexible Manufacturing System, Cellular Manufacturing System.	
	Day 5-6	degree of automation and their justified application in different levels of production. benefits and draw backs of employing automation	
	Day 7-9	Group Technology and Computer-aided Process Planning. Computer-aided Quality Control.	
Non Traditional Machining:			
2	Day 10-11	Introduction. classification, characteristics of all processes, Advantages and limitations.	
	Day 12-14	Abrasive Jet Machining (AJM): Working principle with help of layout, Applications, Effect of pressure,strand-off distance, grain size, abrasive flow rate on material removal rate(MRR) . Mechanism of material	

		removal.Advantages and limitations.	
	Day 15-16	Water Jet Machining: Introduction, Machining System, Basic principle,Process parameters, Applications, Advantages and Disadvantages.	
	Day 17-19	Ultrasonic Machining (USM): Schematic Diagram of USM- Working principle, Functions of each equipment used in the set up, Material removal process. Influence of Process parameters on (i) machining rate (ii) Surface finish and accuracy and repeatability, Applications.	
	Day 20-21	Plasma Arc Machining : Basic principle, applications.	
	Day 22-23	Chemical Machining- Introduction, Blanking, Chemical Machining to multiple depths, Design factors, advantages and disadvantages.	
	Day 24-25	Electro-Chemical Machining- Process principle, Equipment, Applications.	
	Day 26-27	Electron Beam Machining : Set up, Basic Principle, Applications.	
	Day 28-30	Electrical Discharge Machining (EDM) : Diesinking- Basic principle, Schematic diagram of EDM setup, Dielectric fluid, Electrode materials.System for maintaining the spark gap constant, Effect of cutting parameterspulse-on-time, pulse off time, peak current setting, no load voltage, servo reference voltage, Applications	

	Day 31-32	Wire-cut EDM: Schematic diagram, working principle Dielectric fluid, use. Advantages & Disadvantages of EDM, Applications.	
	Day 33-34	Laser Beam Machining (LBM) : Characteristics of Laser light, Basic mechanism of Ruby laser, Energy level diagram of Ruby laser. Carbon Dioxide laser, Energy level diagram.Commercial lasers available for machining, welding Heat treating, cladding.	
	Day 35-37	Hybrid Machining- Introduction, Methodology for Hybrid Machining ,thermal interaction, chemical and electrochemical interaction, mechanical interaction, Electromechanical Discharge Machining (ECDM/ECAM), Electrical Discharge Machining with Ultrasonic Assistance (EDMUS).	
Rapid Prototyping:			
3	Day 38-39	Overview of Rapid Prototyping, Basic Process- CAD Model Creation, Conversion to STL format, Slice the STL File, Layer by layer construction, Clean and finish.	
	Day 40-42	Principles, systems, relative advantages and applications of the common RP methods ; (i) stereo lithography (SLG) (ii) selective laser sintering (SLS) (iii) fused deposition modelling (FDM) (iv) laminated objects manufacturing (LOM)	

		(v) 3-D Inkjet Printing	

Text Books :

1. Fundamentals of Modern Manufacturing by Mikeel P. Grover– 3E Wiley
2. Automation, Production systems and CIM – M.P. Groover , Prentice Hall
3. Non conventional machining – P.K. Mishra, Narosa
4. Manufacturing science – Ghosh&Mullick, EWP
5. Rapid prototyping – A. Ghosh, EW Press
6. Non traditional Manufacturing Processes by Gary F. Benedict– Marcel Dekker
7. Micromaching of Engineering Material by McGeongh, J.A. – Marcel Dekker
8. Advanced Machining Process, Nontraditional and Hybrid Machining

LECTURE PLAN

CLASS : B.Tech 7th Sem ME

SUBJECT : Metrology & Measurement (ME702)

NAME OF THE TEACHER : Nripen Mondal

SL. NO.	DATE	TOPICS	Remarks
Introduction of Metrology & Measurement			
1	Day 1	Introduction: Definition and importance of Metrology Measurement	
2	Day 2-3	Methods of measurements – direct, indirect, comparison, substitution, transposition, deflection and null measurement; Errors in measurement – absolute, relative, parallax, alignment, loading, dynamic and calibration error;	
3	Day 4	Introduction :Limit, Fits, Tolerance and Gauges:	
4	Day 5-6	Tolerance, Selective Assembly, Interchangeability, Limits of Size, Allowances, Clearances, Interference, IS 919-1993, Fits, Selection of Fits, Numerical problems on Limits of Size and	

5	Day 7	Tolerance, Taylor's Principle, Gauge Design, hole and shaft base system, Go and No Go limit gauges; Plain plug Gauge	
6	Day 8-9	Metrology: Least count for Vernier Calipers; micrometers	
7	Day 10-11	construction and use of Vernier calliper, Vernier height and depth gauge, Feeler gauge, slip gauges.	
8	Day 12-14	Angular Metrology: Working principle and use of universal bevel protractor, Vernier bevel protractor, spirit level, clinometers, angle gauges, sine bar and slip gauges	
9	Day 15-17	Measurements of: (i) Level using spirit-level; (ii) Flatness using straight edge, interferrometry (Newton's rings) and surface plate; Parallelism, cylindricity and concentricity using dial indicator.	
10	Day 18-20	Definition, classification, use and essential features of Comparators; working principle and application of different type of comparators	
11	Day 21-23	mechanical comparators (dial indicator, sigma comparator) Cook optical comparator, back pressure Bourdon gauge pneumatic comparator, optical comparator-profile projector, relative advantages and disadvantages	
12	Day 24-26	Measuring Instruments: Functional elements of an instrument – sensing, conversion & manipulation, data transmission and presentation element ix) automatic sequencing of two cylinders	
13	Day 27-29	Characteristics – accuracy, precision, repeatability, sensitivity, reproducibility, linearity, threshold, calibration, response, dynamic or measurement error	
14	Day 30-32	Measurement of Surface Finish: Definition; Terminologies – geometrical surface, effective surface, surface roughness, roughness (primary texture), waviness (secondary texture), form, lay, terminology as per IS 3073-1967,direction of lay, sources of lay and its significance, sampling length;	
15	Day 33-35	Principle of operation of a few measuring instruments: displacement by LVDT; force by strain – gauge load cell and piezoelectric load cell	
16	Day 36-38	pressure by Bourdon – tube gauge; temperature by liquid-in-glass thermometer,.	

17	Day 39-41	thermocouples, optical pyrometer; liquid velocity by pitot tube; water flow by orifice meter	

Texts & References:

1. E.O. Doebelin and D.N. Manik, Measurement Systems– Application and Design, Tata McGraw Hill.
2. R. Rajendra, Principles of Engineering Metrology, Jaico Pub. House.
3. Beckwith, Lienhard and Marangoni, Mechanical Measurements, Pearson.
4. Bewoor and Kulkarni, Metrology & Measurement, TMH.
5. R.K. Jain, Metrology, Khanna Publication, New Delhi.
6. Alan S. Morris- Principles of Measurement and Instrumentation, Prentice Hall of India.
7. B.C. Nakra and K.K. Chaudhary- Instrumentation, Measurement and Analysis, TMH.
8. by D. S. Kumar, Kataria & Sons- Mechanical Measurements

LECTURE PLAN

CLASS : B.Tech 8th Sem ME
SUBJECT : Industrial Engineering & Management
Paper Code : ME-801
NAME OF THE TEACHER : Suman Mondal

Module	DATE	TOPICS	Remarks
Industrial Engineering			
1	Day 1-2	Production Planning and Control; Product: product design,	
	Day 3-4	customer requirements, value engineering, , Work study and Time and Motion study, Work/job evaluation, Group Technology,	
	Day 5-6	Plant: location, layout	
	Day 7-9	material handling, equipment selection, maintenance of equipment and facilities;	
	Day 10-11	Processes: Job, batch and flow production methods,	

	Day 12-14	Resource planning: production/ operation control,	
	Day 15-16	forecasting, capacity management,	
	Day 17-19	scheduling and loading, line balancing, break-even analysis	
	Day 20-21	Quality control (SPC), control charts;	
	Day 22-23	quality, reliability, service life, competitiveness;	
	Day 24-25	Inventory of materials and their control,	
	Day 26-27	Purchasing procedures, store, manufacturing planning, MRP - II, JIT.	
Management:			
2	Day 28-30	Principles and functions of Management:	
	Day 31-32	Leadership and decision making,	
	Day 33-34	Human resources: personnel management, industrial legislation and relations, industrial psychology,	

	Day 35-37	manpower planning, training and development, health, safety, welfare, remuneration and incentive schemes.	
	Day 38-39	Sales and Marketing Management.	
	Day 40-42	Cost Accounting and Control, Budget and Budgetary control	

Text Books:

1. Production, Planning and Inventory Control by S.L.Narasimhan, D.W.McLeavey, P.J.Billington,Prentice Hall.
2. "Production and Operations Management" - E. S. Buffa, New Age International (P) Ltd., New Delhi.
3. "Production Systems: Planning, analysis and Control" - J. L. Riggs, John Wiley & Sons, New York.
4. "Production and Operations Management" - S. N. Chary, Tata McGraw-Hill Publishing Co. Ltd., New Delhi
5. Productions and Operations Management by A.Muhlemann, J.Oakland and K.Lockyer, Macmillan
6. Total Quality Control, A. V. Feigenbum Mcgraw-Hill Book Company
7. Quality Control Handbook – Juran's , McGraw Hill Book Company

CLASS : B.Tech 7th Sem ME

SUBJECT : Advanced Mechanical Vibration (ME 703B)

NAME OF THE TEACHER : Madhab Chandra Mandal

Module	DATE	TOPICS	Remarks
Introduction to Mechanical Vibration:			
1	Day 1	Types of vibrations, Definitions,	
	Day 2	Simple Harmonic Motion (S.H.M.), Principle of super position applied to SHM,	

	Day 3-5	Beats, Fourier theorem and problems.	
Free Undamped Single Degree of Freedom Vibration System:			
2	Day 6	Longitudinal, transverse, torsional vibration system,.	
	Day 7-8	Derivations for spring mass systems by Newton, Energy and Rayleigh's Method	
	Day 9-11	Natural frequencies of simple systems, Springs in series and parallel.	
Free Damped Single Degree of Freedom Vibration System:			
3	Day 12-14	Damping. Analysis with viscous damping- Derivations for over, critical and under damped systems,	
	Day 15-16	Logarithmic decrement and Problems.	
Forced Single Degree of Freedom Vibratory System:			
4	Day 17-18	Analysis of forced vibration with constant harmonic excitation , magnification factor,	
	Day 19-20	rotating and reciprocating unbalances, excitation of support (relative and absolute amplitudes),	
	Day 21-23	force and motion transmissibility, Energy dissipated due to damping and Problems,	

	Day 24	Critical / Whirling speeds of shafts with and without damping.	
Vibration Measuring Instruments :			
5	Day 25-26	Vibrometers, Accelerometer, .	
	Day 27-28	Frequency measuring instruments and Problems	
Two Degree of Freedom Systems and Multi Degree of Freedom Systems :			
6	Day 29-30	Principle modes of vibrations, Normal mode and natural frequencies of systems (without damping)	
	Day 31-33	spring mass systems, masses on tightly stretched strings,double pendulum, torsional systems,	
	Day 34-35	combined rectilinear and angular systems, geared systems and Problems.	
	Day 36-38	Influence coefficients, Rayleigh's method, Dunkerley's method, Stodola method	
	Day 39-40	Holzer's method, Orthogonality of principal modes, method of matrix iteration and Problems	
Continuous System and Vibration Control:			
7	Day 41-42	Equation of motion, free-vibration of string, bar, shaft & beam.	

	Day 43-44	Vibration isolation vibration absorbers and Problems.	

Text Books :

1. Singiresu S. Rao, 'Mechanical Vibrations', Pearson Education.
2. S Timoshenko, D H Young, W Weaver, 'Vibration problems in engineering', Wiley.
3. W T Thomson, 'Theory of vibration with applications', Allen and Unwin.
4. J P den Hartog, 'Mechanical Vibrations', McGraw Hill.
5. C F Beards, 'Vibration analysis and control system dynamics', Ellis Horwood.
6. C F Beards, 'Structural vibration - Analysis and Damping', Ellis Horwood.
7. M Lalanne, P Berthier, J der Hagopian, 'Mechanical vibrations for engineers', Wiley..
8. R F Steidel, 'An introduction to mechanical vibrations', 3rd Edition, Wiley

LECTURE PLAN

CLASS: 7th Sem, ME ME704A (UG) (B.Tech)
SUBJECT: OPERATIONS RESEARCH Paper Code : ME 704A
NAME OF THE TEACHER : Dr. Nimai Mukhopadhyay

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
1	Day 1-2	Introduction	
2	Day 3	LPP problem introduction	
	Day 4-5	LPP problem exercise solution	
	Day 6	Simplex problem Introduction	
	Day 6-8	Simplex problem exercise solution	
	Day 9	Dual problem solution	
3	Day 10	Transportation problem introduction	

	Day 11-13	Transportation problem solution	
	Day 14	Assignment problem introduction	
	Day 15-16	Assignment problem exercise solution	
4	Day 17	Inventory control introduction	
	Day 18-20	Inventory control problem solution	
	Day 21	Store management and Purchase procedure	
5	Day-22	Waiting line theory problem (Queuing theory) introduction	
	Day 23-24	Waiting line theory problem solution	
6	Day 25	Project Management introduction	
	Day 26-27	PERT CPM problem introduction	
	Day 28	Network diagram problem solution	
7	Day-29	Game theory introduction	
	Day 30-31	Game theory problem solution	
8	Day 32	Decision theory introduction	
	Day 33-34	Decision theory problem solution	
	Day 35 -40	Solution of Gate Exam problems & Revision	

Text Books :

1. R. Panneerselvam, Operations Research, Prentice Hall of India
2. F.S. Hillier and G.J. Lieberman, Introduction to Operations Research, The McGraw Hill Companies.
3. "Introduction to Operations Research" - Frederick S. Hiller, Gerald J. Lieberman, McGraw Inc.

4. "Operations Research, Principles and Practice"- Avindran, Phillips and Solberg, John Willey & Sons.

LECTURE PLAN

CLASS : M.Tech 2nd Sem ME
SUBJECT : Quality Assessment and Control (PG) (M.Tech) 2nd Sem(PTM 203)
NAME OF THE TEACHER :Dr. Nimai Mukhopadhyay

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
1	Day 1-2	Introduction	
2	Day 3	Quality function and concept of quality cycle	
	Day 4-5	Quality policy and objectives	
	Day 6	Quality considerations in design	
	Day 6-8	Cost of quality	
	Day 9	Evaluation of quality cost	
3	Day 10	Process control	
	Day 11-13	Machine and process capability analysis	
	Day 14	Use of control charts	
	Day 15-16	Acceptance sampling	
4	Day 17	Total quality control	
	Day 18-20	TQM	
	Day 21	PDCA cycles	
5	Day-22	Quality Standards	
	Day 23-24	ISO 9000	

6	Day 25	Waste elimination	
	Day 26-27	Pareto analysis	
	Day 28	Cause and effect diagram	
7	Day-29	Quality circle	
	Day 30-31	Brain storming	
8	Day 32	Quality function deployment	
	Day 33-34	JIT, Force field analysis	
	Day 35 -40	Emerging concepts of quality	

Text Books :

1."Quality Control Handbook"- J. Juran, McGraw-Hill Book Company.
2. "Quality Planning and Analysis", M. Juran, F. M. Gryana, Tata McGraw Hill (3rd Edition), 1995
3. "Statistical Quality Control"- M. Mahajan, Dhanpat Rai publication
4. "Handbook of Total Quality Management"- R.P. Mohanty and R.R. Lakhe, Jaico Publishing House

LECTURE PLAN

CLASS : M.Tech 1st Sem ME
SUBJECT : Production Planning and Control
Paper Code : PTM-102
NAME OF THE TEACHER : Suman Mondal

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
Introduction:			
1	Day 1-3	Organisation, organisational structure, types of organisation structure.	
	Day 4-5	multi-plant organisation	
Production:			
2	Day 6-8	Types of Production System and its element,	
	Day 9- 10	Generalized model Production System.Products and Services, Design & Development.	
Forecasting			
3	Day 11-12	Importance the marketing interface, the materials interface,	
	Day 13-14	Basic Techniques.	
System Economics			
4	Day 15-16	Tactics & Strategies, Break-Even-Analysis,	
	Day 17-18	Life Cycle analysis and capacity planning.	
The plant or facilities			
5	Day-19-22	Location and design of the plant or facilities, Layout of the facilities, Equipment selection,	
	Day 23-25	Maintenance of the facilities and equipment.	

Inventory			
6	Day 26-29	Material and Inventory Management	
Demand analysis			
7	Day 30-32	Resource Planning, Aggregate Production Planning, Line Balancing.	
	Day 33-36	Materials requirement planning, Sequencing and Scheduling	
Production Monitoring			
8	Day 37-38	Production Monitoring and Control, Performance Criteria and evaluation, Case Studies and Example.	
	Day 39-40	Human Factors, Manpower planning, Placement, Training, Motivation, Safety.	

Text Books:

1. "Production and Operations Management" - E. S. Buffa, New Age International (P) Ltd., New Delhi.
2. "Production Systems: Planning, analysis and Control" - J. L. Riggs, John Wiley & Sons, New York.
3. "Production and Operations Management" - S. N. Chary, Tata McGraw-Hill Publishing Co. Ltd., New Delhi

LECTURE PLAN

CLASS : M.Tech 1st Sem ME,
SUBJECT :Theory of Machining
Paper Code : PTM-103
NAME OF THE TEACHER : Madhab Chandra Mandal

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
Introduction:			
1	Day 1-4	Machining definition and objectives. Geometry of cutting tools; turning, milling and drilling - in different reference systems like machine reference systems, tool reference system and work reference systems.	
	Day 5	Sharpening and re-sharpening of cutting tools.	
Mechanics of machining :			
2	Day 6-9	Theoretical estimation and experimental determination of cutting forces and experimental determination of cutting forces & power consumption. .	
	Day 10	Dynamometers; types, design, construction and use.	
Thermodynamics of machining			
3	Day 11-12	Sources of heat generation, cutting temperature modeling, measurement of cutting temperature.	
	Day 13-14	Cutting fluids; purpose, essential characteristics, selection and methods of application.	

Cutting tools:			
4	Day 15-16	Types of Cutting tools, Essential properties,methods of failure, mechanics of tool wear,	
	Day 17-18	Assessment of tool life and cutting tool materials.	
Economics of machining :			
5	Day-19-22	principal objectives, main parameters and their role on cutting forces, cutting temperature, tool life and surface quality,	
	Day 23-25	Selection of optimum combination of parameters.	
vibration and chatter :			
6	Day 26-29	Causes of vibration and chatter in machining, and their remedy.	
Grinding and Advanced machining techniques:			
7	Day 30-32	Mechanics of grinding, characteristics, specification and selection of grinding wheels.	
	Day 33-36	Process and wheel parameters in grinding. Grinding forces, grinding fluid applications, grinding ratios and surface integrity	
	Day 37-38	Advanced techniques of grinding and modern grinding wheels.	
	Day 39-40	Cryomachining & high speed machining	

Text Books :

"Metal Cutting : Theory and Practice" - A. Bhattacharyya , Central Book Publishers, Kolkata

"Metal Cutting Principles" - M. C. Shaw, Oxford University Press CBS

"Fundamentals of Metal Machining & Machine Tools" - G. Boothroyd, McGraw Hill

"Introduction to Machining Science" - G. K. Lal ,New Age International Pub., New Delhi

"Metal Cutting Theory and Cutting Tool Design" - V. Arshinov and G. Alekseev Mir Publishers, Moscow
"Manufacturing Science" - A. Ghosh and A. K. Mallik, Affiliated East-West Press Pvt. Ltd., New Delhi
"Metal Cutting" - E. M. Trent and P. K. Wright, Butterworth Heinemam Publication
"Metal Cutting Mechanics" - N. N. Zorev, Pergamon Press.
"Grindings Technology: Theory and Application of Machining with abrasives" - S.Malkin, Ellis Harwood Publication, U. K., 1990

LECTURE PLAN

CLASS : M.Tech 1st Sem,
SUBJECT : Operations Research
NAME OF THE TEACHER : Sudip Mukherjee

SL. NO.	DATE	TOPICS	Remarks
Linear programming			
1	Day 1-2	Introduction, Principles of modeling, Implementation, Linear Programming - problem formulation, simplex procedure, degeneracy, dual simplex method, sensitivity analysis	
2	Day 3-6	Simplex Method, Big M Method, Two-phase Method and associated problems.	
3	Day 7-9	Transportation –formulation, balanced and unbalanced problems, Stepping Stone Method	
4	Day 10-12	Assignment – formulation, balanced and unbalanced problems	
Decision Theory:			

5	Day 13	Decision Theory: Structure of decision making problem.	
6	Day 14-15	Types of Decision making criteria, Problems	
7	Day 16-17	Decision tree analysis, Problems	
Project scheduling:			
8	Day 18	Critical Path Method (CPM), Network construction and determination of critical path.	
9	Day 19	Crashing, Resource smoothing, Resource leveling.	
10	Day 20	PERT analysis.	
Non Linear Programming:			
11	Day 21	Non Linear Programming: Graphical illustrations.	
12	Day 22-24	Integer Linear Programming applications, Graphical solution, branch and bound solution.	
13	Day 25-26	Dynamic programming.	
Inventory Management:			
14	Day 27-28	Inventory Models: EOQ model, Sensitivity analysis in EOQ model, economic lot size model.	
15	Day 29-31	EOQ with planned shortage, quantity discounts for EOQ model.	
16	Day 32	Probabilistic models.	
Sequencing:			
17	Day 33-34	Waiting Line Models; Structure of single channel waiting line model.	
18	Day 35-36	Multiple channel waiting line models.	

19	Day 37	Economic analysis of waiting line models.	

Forecasting Techniques:

20	Day 38	Introduction & History of forecasting.
21	Day 39-41	Regression analysis, Time series analysis, Exponential smoothing

Text Books :

1. "Introduction to Operations Research" - Frederick S. Hiller, Gerald J. Lieberman, McGraw Inc.
2. "Operations Research, Principles and Practice"- Avindran, Phillips and Solberg, John Willey & Sons.
3. "Fundamentals of Operations Research"- R.L. Ackoff, M. W. Sasieni, West Publishing Co.
4. "An Introduction to Management Science" - Anderson, Sweeney, Williams, West Publishing Co.
5. "Operations Research: An Introduction"- H. A. Taha, PHI
6. "Operations Research : Theory and applications" - J. K . Sharma, MacMillan.

LECTURE PLAN

CLASS : M.Tech 1st Sem ME
SUBJECT :Automation in Manufacturing Systems and Processes
Paper Code : PTM-201
NAME OF THE TEACHER : Madhab Chandra Mandal

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
Introduction:			
1	Day 1-5	Review of basic principles of automation, type and degree of automation, hard automation, flexible automation,	
	Day 6-7	Standalone automatic machine tools, transfer machines.	

	Day 8-10	Introduction to computer aided designing(CAD) and computer aided manufacturing (CAM) systems, basic building blocks of computer integrated manufacturing (CIM).	
Numerical Control Machines and Systems :			
	Day 11	CNC, DNC (Direct and Distributed),	
	Day 12 - 13	Flexible Manufacturing System, Cellular Manufacturing System.	
	Day 14 - 15	Planning and programming CNC machine tools, tool of CNC machines; adaptive control systems,	
	Day 16 - 18	Tool and work handling systems involving robot, AGV and AS/RS	
	Day 19 - 26	Detailed part programming using G and M codes, APT	
Robotics:			
3	Day 27 - 31	Types, anatomy, drives, kinematics, controls,	
	Day 32 - 33	Applications of the robot	
Automatic inspection systems:			
4	Day 34-35	Use of coordinate measuring machines (CMM), control systems, process monitoring.	
Manufacturing from product design :			
5	Day 36-38	Concept of group technology (GT), CAD-CAM interface.	
	Day 39-40	CAPP, computer aided production planning and control.	

Text Books :

1. "Automation, Production Systems, and Computer-Integrated Manufacturing"¬ M.P. Groover, Prentice Hall of India.
2. "CAD/CAM - Theory and Practice", Ibrahim Zeid, Tata McGraw-Hill PublishingCo. Ltd., New Delhi.
3. "CAD/CAM" - M. P. Groover and E. W. Zimmers Jr., Prentice Hall of India
4. "CAD/CAM/CIM"- P. Radhakrishnan, S. Subramanyan and V. Raju, New Age In ternational Publishers.
5. "Computer Aided Manufacturing"- P.N. Rao, N.K. Tewari and T.K. Kundra, Tata McGraw- Hill Publication.
6. "Robotics Technology and Flexible Automation"- S.R. Deb, Tata McGraw-Hill Publication.
7. "Industrial Robots and Computer Integrated Manufacturing"- S. Kumar, Oxford & IBH Publishing Co. Ltd.

LECTURE PLAN

CLASS : M.Tech 2nd Sem ME
SUBJECT : Non-Traditional Machining Processes
Paper Code : PTM-202
NAME OF THE TEACHER : Suman Mondal

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
Introduction:			
1	Day 1-2	Non traditional machining, Specific Applications and Advantages over Traditional Machining Processes.	
Mechanical processes			
	Day 3-4	Abrasive Jet Machining-Process details, parametric effects, recent advancements and modeling	
	Day 5-6	Water Jet Machining-Process details, parametric effects, recent advancements and modeling	
	Day 7	Abrasive Water Jet Machining- Process details, parametric effects, recent advancements and modeling	
	Day 8-11	Ultrasonic Machining- Process details, parametric effects, recent advancements and modeling	
Chemical and Electrochemical processes			
	Day 12-13	Chemical Machining- Process details, parametric effects	
	Day 14-17	Electro Chemical Machining- Process details, parametric effects, recent advancements and modeling	
Thermal processes			
3	Day 18-21	Electro discharge Machining- Process details, parametric effects, recent advancements and modeling	

	Day 22-24	Laser Beam Machining- Process details, parametric effects, recent advancements and modeling	
	Day 25-27	Electron Beam Machining- Process details, parametric effects, recent advancements and modeling	
	Day 28-29	Plasma Arc Machining- Process details, parametric effects, recent advancements and modeling	
Hybrid-type systems			
4	Day 30-31	Electrochemical grinding- Process details, parametric effects, recent advancements	
	Day 32-33	Electro discharge grinding- Process details, parametric effects, recent advancements	
	Day 34-37	Ultrasonic assisted Electro Discharge Machining and other types- Process details, parametric effects, recent advancements	
Micro and Nano machining:			
5	Day 38-40	Micro and Nano machining, Environment friendly machining.	

Text Books:

1. "Modern Machining Processes"- P.C. Pandey and H.S. Shan, Tata McGraw-Hill Publication.
2. "Non-Conventional Machining"- P.K.Mishra, Narosa Publishers.
3. "Manufacturing Science"- A.Ghosh and A.K. Mallik, E~st-West Publications.
4. "Laser Machining and Welding"- N. Rykalin, A. Uglov and A. Kokora, Mir Publishers, Moscow.
5. "Manufacturing Engineering and Technology"- S. Kalpakjian, Addison Wesley.
6. "Materials and Processes in Manufacturing"- E.P. DeGarmo, J.T. Black and R.A. Kohser, Prentice Hall of India.
7. "A Text Book of Production Technology" - O.P. Khanna and M. Lal, Dhanpat Rai and Sons.
8. "Rapid Prototyping: A BriefIntroduction"- A. Ghosh, East West Publication.
9. "Manufacturing Processes"- Amstead, Ostwald and Begeman, John Wiley and Sons.

10. "Micromachines", I. Fujimasa, Oxford University Press.
11. "Precision Engineering in Manufacturing", R.L.Murty, New Age International Publishers.

LECTURE PLAN

CLASS :M.Tech 1st Sem ME
SUBJECT Production Management (M.Tech) 1st Sem (PTM101) (PG)
Paper Code: (PTM 101)(PG)
NAME OF THE TEACHER : Dr. Nimai Mukhopadhyay

Module No.	Day (no. of Lecture classes)	TOPICS	Remarks
1	Day 1-2	Introduction to production /operations management	
2	Day 3	Product life cycle	
	Day 4-5	Types of productive system, Process life cycle	
	Day 6	Forecasting	
	Day 6-8	Forecasting problem solution	
	Day 9	Operations scheduling	
3	Day 10	Statistical quality control	
	Day 11-13	SQC, SPC, Charts	
	Day 14	Statistical quality control problem solutions	
	Day 15-16	Acceptance sampling	
4	Day 17	Inventory planning & control introduction	
	Day 18-20	Inventory control problem solution	
	Day 21	Store management and Purchase procedure	
5	Day-22	MRP I	

	Day 23-24	MRPII	
6	Day 25	Location theory & distribution	
	Day 26-27	Work measurement	
	Day 28	Facility lay out and assembly line balancing	
7	Day-29	Generic enterprise strategies	
	Day 30-31	Role of productivity improvement	
8	Day 32	Operations system of future	
	Day 33-34	Computer integrated factory of the future	
	Day 35 -40	Customer centric system and case studies	

Text Books :

1. Production, Planning and Inventory Control by S.L.Narasimhan, D.W.McLeavey, P.J.Billington,Prentice Hall.
2. "Production and Operations Management" - E. S. Buffa, New Age International (P) Ltd., New Delhi.
3. "Production Systems: Planning, analysis and Control" - J. L. Riggs, John Wiley & Sons, New York.
4. "Production and Operations Management" - S. N. Chary, Tata McGraw-Hill Publishing Co. Ltd., New Delhi

LECTURE PLAN

CLASS : M.Tech 3rd Sem,
SUBJECT : Robot Application & Design
NAME OF THE TEACHER : Sudip Mukherjee

SL. NO.	DATE	TOPICS	Remarks
Introduction to Robotics:			
1	Day 1-2	Automation & robotics, Robot definition Robotic systems - Its role in automated manufacturing.	
2	Day 3-5	Robot anatomy; robot classifications and specification.	
3	Day 6-7	Robot control – analysis of different control systems	
Robot kinematics:			
4	Day 8-9	Robot kinematics, forward and reverse transformations.	
5	Day 10-11	Homogeneous transformation.	
Robot Dynamics:			
6	Day 12-13	Robot Dynamics: Introduction to Force Analysis.	
7	Day 14-15	Trajectory generation.	
Robot actuators and control:			
8	Day 16-17	Robot actuators and control.	
9	Day 18-19	Pneumatic, hydraulic and electrical drives and controls used in robots.	
Robot end-effectors:			

10	Day 20-21	Robot end-effectors- mechanical grippers.	
11	Day 22-25	Magnetic and vacuum grippers, gripping forces RCC and design features of grippers.	
Robot sensors:			
12	Day 26-27	Robot sensors- contact and non-contact sensors.	
13	Day 28-29	Features of sensors and uses.	
Robot vision:			
14	Day 30-32	Robot vision and their interfaces.	
Robot languages:			
15	Day 33-35	Robot languages and programming techniques.	
Applications of robots:			
16	Day 36	Applications of robots in materials handling.	
17	Day 37-38	Applications of robots in machine loading/unloading, inspection, welding, spray painting and finish coating.	
18	Day 39	Applications of robots in assembly.	
Economic performance and evaluation:			
19	Day 40	Economic performance and evaluation strategies.	
20	Day 41	Robot installation and planning.	
21	Day 42	Safety features.	

Text Books :

1. "Introduction to Robotics"- J.J. Craig, Addison-Wesley.

2. "Fundamentals of Robotics Analysis and Control"- R.J. Schilling, Prentice Hall of India.
3. "Robotics Technology and Flexible Automation"- S.R. Deb, Tata McGraw-Hill Publication.
4. "Foundations of Robotics Analysis and Control"- T. Yoshikawa, Prentice Hall of India.
5. "Robotics for Engineers"- Y. Koren, McGraw-Hill Book Company, New York.
6. "Industrial Robots and Computer Integrated Manufacturing"- S. Kumar, Oxford & IBH Publishing Co. Ltd.
7. "Automation, Production Systems, and Computer-Integrated Manufacturing" M. P. Groover, Prentice Hall of India.
8. "Computer Aided Manufacturing"- P.N. Rao, N.K. Tewari and T.K. Kundra, Tata McGraw-Hill Publication.
9. "Robotics: Control, Sensing, Vision and.lntelligence"- K.S. Fu, R.C. Gonzales and C.S.G. Lee, McGraw Hill, 1997
10. "Analytical Robotics and Mechatronics", W. Stadler, McGraw Hill Book Co.

Electrical Engineering Department

Infrastructural facilities in the Academic Department:

A) Class Rooms/ Lab/Workshops etc.

Sl. No.	Infrastructure	Number available	Area (Approx. in Sq.m)
1.	Class rooms with White or Black board	05	EE-1 42ftX24ft
			EE-2 42ftX24ft
			EE-3 38ftX24ft
			EE-4 38ftX24ft
2.	Class rooms with LCD Projector	01	53ftX15ft
3.	Class rooms with wifi/ LAN facilities	05	EE-1, EE-2, EE-3, EE-4, EE-5
4.	Class rooms with AC	00	----
5.	Seminar Hall	01	53ftX15ft
6.	Seminar Hall with ICT facility	01	53ftX15ft
7.	Tutorial Rooms	01	30ftX15ft
8.	Laboratories	13	Analog Lab 20ftX24ft
			Drives Lab 20ftX24ft
			Circuit Lab 20ftX24ft
			Power Electronics Lab 20ftX24ft

				Power System Lab-I 31ftX14ft
				Measurement Lab 22ftX16ft
				Control Lab-I 42ftX24ft
				Conrol Lab-2 26ftX24ft
				Digital Lab 21ftX24ft
				Microprocessor Lab 42ftX24ft
				Electrical Machine Lab 73ftX48ft
				Power System Lab-2 36ftX15ft
				Basic Electrical Engg Lab43ftX23ft
	9.	Research Laboratories	01	20ftX23ft
	10.	Work Shops	01	20ftX23ft
	11.	Drawing Hall	-	-
	12.	Faculty & Staff rooms	12	14ftX10ft
	13.	Any Other rooms	Store Room	15ftX23ft

B) IT Equipments:

Item	**Total Number of items available**	**In working Conditions/ Usable/ in use**
Desktop Computers	78	78
Internet Connection points	102	102
Laptops	08	08

Printers	10	10
Scanners	12	12
Printers with Scanners	06	06
Projectors	03	03
External Hard disk	10	10
Pen Drives	08	10
Software with Lic (Provide detail)	--	--

Laboratory Facilities

Name of Lab	Paper Code/s of the Lab	List of Experiments Performed
Basic Electrical Engineering Lab	**EE-291**	1. Characteristics of Fluorescent lamps 2. Characteristics of Tungsten and Carbon filament lamps 3. (a) Verification of Thevenin's theorem. (b) Verification of Norton's theorems. 4. Verification of Maximum power theorem. 5. Verification of Superposition theorem 6. Study of R-L-C Series circuit 7. Study of R-L-C parallel circuit 8. Calibration of ammeter and voltmeter. 9. Open circuit and Short circuit test of a single phase Transformer. 10. No load characteristics of D.C shunt Generators 11. Starting and reversing of speed of a D.C. shunt 12. Speed control of DC shunt motor. 13. Measurement of power in a three phase circuit by two wattmeter method.

Analog & Digital Electronic Circuit Lab..	**EC(EE)-391**	1.Study of Ripple and Regulation characteristics of full wave rectifier with and without capacitor filter. 2. Study of Zener diode as voltage regulator. 3. Construction of two stage R-C coupled amplifier & study of its gain and Bandwith. 4. Study of class A, C & Push pull amplifier. 5. Realisation V-I & I-V converter using Operational Amplifier. 6. Study of timer circuit using NE 555 and configuration of Monostable and Astable Multivibrator. 7. Study of DAC & ADC 8. Realisation of basic gates using Universal logic gates. 9. Realisation of RS-JK & D filpflop using logic gates. 10. Design of Combinational circuit for BCD to decimal conversion to drive 7-segment display using Multiplexer. 11. Realisation of Synchronous Up/Down counter. 12. Construction of simple Decoder & Multiplexer circuits using logic gates. 13. Construction of adder circuit using Shift register & Full adder
Electric Circuit Theory Lab	**EE-391**	1.Transient response of R-L and R-C network: simulation with PSPICE /Hardware 2. Transient response of R-L-C series and parallel circuit: Simulation with PSPICE/ Hardware 3. Determination of Impedance (Z) and Admittance (Y) parameter of two port network: Simulation /Hardware. 4. Frequency response of LP and HP filters: Simulation / Hardware. 5. Frequency response of BP and BR filters: Simulation /Hardware. 6. Generation of Periodic, Exponential, Sinusoidal, Damped Sinusoidal, Step, Impulse, Ramp signal using MATLAB in both discrete and analog form. 7. Determination of Laplace transform and Inverse Laplace transform using MATLAB. 8. Amplitude and Phase spectrum analysis of different signals using MATLAB. 9. Verification of Network theorem using SPICE
NUMERICAL METHODS	**M(CS)-491**	1. Assignments on Newton forward /backward, Lagrange's interpolation. 2. Assignments on numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule. 3. Assignments on numerical solution of a system of linear equations using Gauss elimination and Gauss-Seidel iterations.

		4. Assignments on numerical solution of Algebraic Equation by Regular-falsi and Newton Raphson methods. 5. Assignments on ordinary differential equation: Euler's and Runga-Kutta methods. 6. Introduction to Software Packages: Matlab / Scilab / Labview / Mathematica.
: Thermal Power Engineering Lab. 1	**ME(EE)-491**	1. Study of Cut Models – Boilers IC Engines • Lanchashire Boiler • Bahcock & Willcox Boiler • Cochran Boiler • Vertical Tubular Boiler • Locomotive Boiler • 4S Diesel Engine 4S Petrol Engine • 2S Petrol Engine 2. Load Test on 4 Stroke Petrol Engine & Diesel Engine by Electrical Load Box. 3. Load Test on 4 Stroke Diesel Engine by Rope Brake Dynamometer. 4. Heat Balance on 4 Stroke Diesel Engine by Rope Brake Dynamometer & by Electrical Load Box. 5. Valve Timing Diagram on 4S Diesel Engine Model & 4S Petrol Engine Model. 6. To find the Calorific Value of Diesel Fuel & Coal by Bomb Calorimeter. 7. To find the Flash Point & Fire Point of Petrol & Diesel Fuel. 8. To find the Cloud Point & Pour Point of Petrol & Diesel Fuel. 9. To find Carbon Particle Percentage in Diesel Engine Exhaust Smoke by Smokemeter and trace theBHP Vs. % Carbon Curve. 10. Measurement of the Quality of Steam – Enthalpy & Dryness fraction. 11. To find out the Boiler performance – Boiler efficiency & Steam evaporation rate. 12. To visit a Thermal Power Station & study of the followings : a) Boiler b) Steam pipe c) Furnaced) h) Water treatment plant i) E. S. P.
Electrical Machines-I Lab.	**EE-491**	1. Study of the characteristics of a separately excited DC generator. 2. Study of the characteristics of a DC motor 3. Study of methods of speed control of DC motor

		4. Study of the characteristics of a compound DC generator (short shunt). 5. Measurement of speed of DC series motor as a function of load torque. 6. Study of equivalent circuit of a single phase transformer. 7. Polarity test on a single phase transformer & study of different connections of three phase transformer. 8. Study of equivalent circuit of three phase Induction motor by no load and blocked rotor test. 9. Study of performance of wound rotor Induction motor under load.
ELECTRICAL& ELECTRONIC MEASUREMENT Lab.	**EE-492**	Instrument workshop- Observe the construction of PMMC, Dynamometer, Electro-thermal and Rectifier type of instruments, Oscilloscope and Digital multimeter. 2. Calibrate moving iron and electrodynamometer type ammeter/voltmeter by potentiometer. 3. Calibrate dynamometer type wattmeter by potentiometer. 4. Calibrate AC energy meter. 5. Measurement of resistance using Kelvin double bridge. 6. Measurement of power using Instrument transformer. 7. Measurement of power in Poly-phase circuits. 8. Measurement of frequency by Wien Bridge. 9. Measurement of Inductance by Anderson bridge 10. Measurement of capacitance by De Sauty Bridge. 11. Measurement of capacitance by Schering Bridge.
Electrical Machines-II Lab	**EE-591**	1. Different methods of starting of a 3 phase Cage Induction Motor & their comparison [DOL, Auto transformer & Star-Delta] 2. Speed control of 3 phase squirrel cage induction motor by different methods & their comparison [voltage control& frequency control]. 3. Speed control of 3 phase slip ring Induction motor by rotor resistance control. 4. Determination of regulation of Synchronous machine by a. Potier reactance method. b. Synchronous Impedance method. 5. Determination of equivalent circuit parameters of a single phase Induction motor. 6. Load test on single phase Induction motor to obtain the performance characteristics. 7. To determine the direct axis resistance [Xd] & quadrature reactance [Xq] of a 3 phase synchronous machine by

		slip test. 8. Load test on wound rotor Induction motor to obtain the performance characteristics. 9. To make connection diagram to full pitch & fractional slot winding of 18 slot squirrel cage Induction motor for 6 poles & 4 pole operation. 10. To study the performance of Induction generator. 11. Parallel operation of 3 phase Synchronous generators. 12. V-curve of Synchronous motor
Power System-I Lab.	**EE-592**	1. Determination of the generalized constants A.B, C, D of long transmission line. 2. Simulation of DC distribution by network analyzer. 3. Measurement of earth resistance by earth tester. 4. Dielectric strength test of insulating oil. 5. Determination of breakdown strength of solid insulating material. 6. Different parameter calculation by power circle diagram 7. Study of different types of insulator. 8. Active and reactive power control of alternator. 9. Study and analysis of an electrical transmission line circuit with the help of PSPICE. 10. Dielectric constant, tan delta, resistivity test of transformer oil.
Control System-I Lab.	**EE-593**	1. Familiarization with MAT-Lab control system tool box, MAT-Lab-simulink tool box & PSPICE 2. Determination of Step response for first order &Second order system with unity feedback on CRO &calculation of control system specification like Time constant, % peak overshoot, settling time etc. from theresponse. 3. Simulation of Step response & Impulse response for type-0, type-1 & Type-2 system with unity feedback using MATLAB & PSPICE. 4. Determination of Root locus, Bode plot, Nyquist plot using MATLAB control system tool box for 2nd ordersystem & determination of different control system specification from the plot. 5. Determination of PI, PD and PID controller action of first order simulated process. 6. Determination of approximate transfer functions experimentally from Bode plot. 7. Evaluation of steady state error, setting time , percentage peak overshoot, gain margin, phase margin with addition of Lead

MICROPROCESSOR & MICROCONTROLLER Lab.	**CS(EE)-591(c)**	1. Familiarization with 8085 register level architecture and trainer kit components including the memory map. Familiarization with process of storing and viewing the contents of memory as well as registers. 2. (a) Study of prewritten program on trainer kit using the basic instruction set (data transfer, load/store, arithmetic, logical) (b) Assignment based on that. 3. (a) Familiarization with 8085 simulator on PC (b) Study of prewritten program using basic instruction set (data transfer, load/store, arithmetic, logical). (c) Assignment based on that. 4. Programming using kit/simulator. (a) Lookup table (b) Copying a block of memory (c) Shifting a block of memory. (d) Packing and unpacking of BCD numbers. (e) Addition of BCD number (f) Binary to ASCII conversion (g) String matching 5. Program using subroutine calls and using IN/OUT instruction using 8255 PPI on thetrainer kit e.g. subroutine for delay, reading switch state and glowing LEDs accordingly,finding out frequency of pulse train etc. 6. Interfacing any 8 bit latch (74LS373) with trainer kit as a peripheral mapped output port with absolute address decoding. 7. Interfacing with I/O module : (a) ADC (b) Speed control of DC motor with DAC (c) Keyboard (d) Multi digit display with multiplexing. (e) Stepper motor 8. Study of 8031/8051 Micro controller kit and writing program for the following task using the kit (a) table look up (b) basic arithmetic and logical operation (c) interfacing of keyboard and stepper motor.
Control System –II Lab.	**EE-691**	1. Study of a practical position control system obtaining closed step responses for gain setting corresponding to over-damped and under-damped responses. Determination of rise time and peak time using individualized components by simulation. Determination of un-damped natural frequency and damping ration from experimental data.

		2. Tuning of P, PI and PID controller for first order plant with dead time using Z-N method. Process parameters(time constant and delay/lag) will be provided. The gain of the controller to be computed by using Z-N method. Steady state and transient performance of the closed loop plant to be noted with and without steady disturbances. The theoretical phase margin and gain margin to be calculated manually for each gain setting. 3. Design of Lead, Lag and Lead-Lag compensation circuit for the given plant transfer function. Analyze step response of the system by simulation. 4. Obtain Transfer Function of a given system from State Variable model and vice versa. State variable analysis of a physical system - obtain step response for the system by simulation. 5. State variable analysis using simulation tools. To obtain step response and initial condition response for a single input, two-output system in SV form by simulation. 6. Performance analysis of a discrete time system using simulation tools. Study of closed response of a continuous system with a digital controller and sample and hold circuit by simulation. 7. Study of the effects of nonlinearity in a feedback controlled system using time response. Determination of step response with a limiter nonlinearity introduced into the forward path of 2nd order unity feedback control systems. The open loop plant will have one pole at the origin and other pole will be in LHP or RHP. To verify that (i) with open loop stable pole, the response is slowed down for larger amplitude input (ii) for unstable plant, the closed loop system may become oscillatory with large input amplitude by simulation 8. Study of effect of nonlinearity in a feedback controlled system using phase plane plots. Determination of phase plane trajectory and possibility of limit cycle of common nonlinearities.
Power Systems-II Lab.	**EE-692**	1. Study of the characteristics of on delay relay and off delay relay. 2. Test to find out polarity, ratio and magnetization characteristics of CT and PT. 3. Test to find out characteristics of(a) under voltage relay(b) earth fault relay. 4. Study on DC load flow 5. Study on AC load flow using Gauss-seidel method 6. Study on AC load flow using Newton Raphson method. 7. Study on Economic load dispatch.

		8. Study of different transformer protection schemes by simulation. 9. Study of different generator protection schemes by simulation. 10. Study of different motor protection schemes by simulation. 11. Study of different characteristics of over current relay. 12. Study of different protection scheme for feeder.
Power Electronics Lab.	**EE-693**	1. Study of the characteristics of an SCR. 2. Study of the characteristics of a Triac 3. Study of different triggering circuits of an SCR 4. Study of firing circuits suitable for triggering SCR in a single phase full controlled bridge. 5. Study of the operation of a single phase full controlled bridge converter with R and 6. Study of performance of single phase half controlled symmetrical and asymmetrical bridge converters. 7. Study of performance of step down chopper with R and R-L load. 8. Study of performance of single phase controlled converter with and without source inductance R-L load. (simulation) 9. Study of performance of step up and step down chopper with MOSFET, IGBT and GTO as switch(simulation). 10. Study of performance of single phase half controlled symmetrical and asymmetrical bridge converter.(simulation) 11. Study of performance of three phase controlled converter with R & R-L load. (simulation) 12. Study of performance of PWM bridge inverter using MOSFET as switch with R and R-L load. 13. Study of performance of three phase AC controller with R and R-L load (simulation) 14. Study of performance of a Dual converter. (simulation) 15. Study of performance of a Cyclo-converter (simulation)
DBMS Lab.	**CS(EE)-691(b)**	**1. Creating Database:** • Creating a Database • Creating a table • Specifying Relational Data Types • Specifying Constraints • Creating Indexes. **2 .Table and record Handling** **1.** INSERT statement **2.** Using SELECT and INSERT together **3.** DELETE, UPDATE, TRUNCATE statements **4.** DROP, ALTER statements

		3. Retrieving Data from Database • The SELECT statement • Using the WHERE clause • Using Logical Operators in the WHERE clause • Using IN, BETWEEN, LIKE, ORDER,BY GROUP BY and HAVING **4. Clause** • Using AGGREGATE function • Combining Tables using JOINS • Sub queries **5. Database Management**. • Creating views • Creating Column Aliases • Creating Database Users
Electric Drives Lab.	**EE-791**	1. Study of thysistor controlled DC Drive. 2. Study of Chopper fed DC Drive 3. Study of AC Single phase motor-speed control using TRIAC. 4. PWM Inverter fed 3 phase Induction Motor controlusing PSPICE / MATLAB / PSIM Software. 5. VSI / CSI fed Induction motor Drive analysis using MATLAB/DSPICE/PSIM Software. 6. Study of V/f control operation of 3Φinduction motor drive. 7. Study of permanent magnet synchronous motor drive fed by PWM Inverter using Software. 8. Regenerative / Dynamic braking operation for DC Motor - Study using software. 9. Regenerative / Dynamic braking operation of AC motor - study using software. 10. PC/PLC based AC/DC motor control operation.
Digital Signal Processing Lab. Simulation Laboratory using standard Simulator: Processor and Xilinx FPGA: **1. Writing & execution of small programs related to arithmetic operations and convolution using Assembly Language of TMS320C 5416/6713 Processor, study of MAC instruction.** **2. Writing of small programs in**	**EC(EE) - 791(b)**	1. Sampled sinusoidal signal, various sequences and different arithmetic operations. 2. Convolution of two sequences using graphical methods and using commands- verification of the properties of convolution. 3. Z-transform of various sequences – verification of the properties of Z-transform. 4. Twiddle factors – verification of the properties. 5. DFTs / IDFTs using matrix multiplication and also using commands. 6. Circular convolution of two sequences using graphical methods and using commands, differentiation between linear and circularconvolutions.

VHDL and downloading onto Xilinx FPGA. **3. Mapping of some DSP algorithms onto FPGA.**		7. Verifications of the different algorithms associated with filtering of long data sequences and Overlap –add and Overlap-save methods. 8. Butterworth filter design with different set of parameters. 9. FIR filter design using rectangular, Hamming and Blackman windows. **Hardware Laboratory using either 5416 or 6713**
Digital Communication Lab.	**EC(EE)-791(d)**	1. Design, implementation and study of all the properties of 7-length and 15-length pn sequences using shift register. 2. Study of PAM and demodulation. 3. Study of PCM and demodulation. 4. Study of line coders: polar/unipolar/bipolar NRZ ,RZ and Manchester. 5. Study of delta modulator and demodulator. 6. Study of adaptive delta modulator and demodulator. Study of BPSK modulator and demodulator. 7. Study of BFSK modulator and demodulator. 8. Study of ASK modulator and demodulator. 9. Study of QPSK modulator and demodulator. 10. Simulation study of probability of symbol error for BPSK modulation. 11. Simulation study of probability of symbol error for BFSK modulation.

CSE Department

Infrastructural facilities in the Academic Department:

A) Class Rooms/ Lab/Workshops etc.

Sl. No.	Infrastructure	Number available	Area (Approx. in Sq.m)
1.	Class rooms with White or Black board	3	
2.	Class rooms with LCD Projector	2	
3.	Class rooms with wifi/ LAN facilities	3	
4.	Class rooms with AC	1	
5.	Seminar Hall	1	
6.	Seminar Hall with ICT facility	1	
7.	Tutorial Rooms	0	
8.	Laboratories	4	
9.	Research Laboratories	1	
10.	Work Shops	0	
11.	Drawing Hall	0	

12.	Faculty & Staff rooms	8	
13.	Any Other rooms	1	

B) ITEquipments:

Item	Total Number of items available	In working Conditions/ Usable/ in use
Desktop Computers	150	90
Internet Connection points	150	100
Laptops	8	8
Printers	9	9
Scanners	0	0
Printers with Scanners	6	6
Projectors	6	6
External Hard disk	4	4
Pen Drives	12	12
Software with Lic (Provide detail)	0	0

Laboratory Facilities

Name of Lab	Paper Code/s of the Lab	List of Experiments Performed
Principles of Computer programming	CS291	**1.** Write a program to display "hello world" in C and then add two numbers, where input taken from keyboard without using 3rd variable and display its sum.
		2. Write a program to calculate simple and compound interest.
		3. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
		4. Write a program to find the largest of three numbers using ternary operators.
		5. Write a Program to Check Whether a Number is Prime or not.
		6. Write a program to check number is Armstrong or not.
		7. Write a program to find whether a character is consonant or vowel using **switch statement**.
		8. Write a program to print positive integers from 1 to 10 using while and do-while.
		9. Write a program to find factorial of a number.
		10. Write a program to Generate Pascal's triangle.
		11. Write a program to print all prime numbers from 1 to 300. (Use nested loops, **break** and **continue**)
		12. Write a C program to generate the first n terms of Fibonacci series. Take value of n from key board.
		13. Write a program to calculate factorial of a number using recursion.
		14. A positive integer is entered through the keyboard, write a function to find the binary equivalent of this number using recursion.
		15. Write a program to find if a square matrix is symmetric.
		16. Write a C program that uses functions to perform the following operations: i) To insert a sub-string in to given main string from a given position ii) To delete n Characters from a given position in a given string
		17. Write a program in C program to reverse an array using pointers.
		18. Write a program in C to concatenate two strings using pointer.
Data Structure & Algorithm Lab	CS 392	1. Write a program in C language to generate first n Fibonacci numbers using (A) While loop (B) for loop (C) do while loop. Where the value of n is taken as input dynamically. 2. Write a menu driven program in C language to perform the following operations: 1→To check whether a given number is prime or not?

		2→To check whether a given number is Armstrong or not? 3→Find out the largest number among three numbers. 4→exit 3. Write a program in C language to store all elements in an array and display them and search the position of a given item in functional way. 4. Write a program in C language to take a string as an input having length n (dynamically) and generate all possible strings from the n symbols of your given string and display the total number of strings. For example: Input: ABC Output: ABC ACB BCA BAC CAB CBA Total number of strings: 3! =6 5. Write a program in C language to calculate the length of given string and reverse this given string without using any string library function.
		6. Write a menu driven program in C to create the diagrams of line, circle, rectangle and triangle using functions and perform the following operations on your created diagrams: a) Translation operation b) Rotation operation with respect to a given point c) Scaling operation
		7. Write a program in C to implement an Analogue Clock and Digital Clock using graphics where the time will be set by the user according his / her choice (manually or system clock). 8. Write a menu driven program in C to implement the following basic operation of FILE:

		A) Reading a file B) Writing a file C) Closing a file D) Reading and writing strings to a file E) Reading and writing binary files 9. Write a menu driven program in C to implement the following basic operation of FILE: a) Print the contents of file b) Copy contents of one file to another file c) Merge contents of two file into a third file d) Delete a specific file
		10. Write a menu driven program in C to read name and marks of n number of students from user and store them in a file and perform the following operations using functions: a) Append new record of a student to the existing file b) Delete a record of a specific student c) Update a field of student record d) Display all records 11. Write program in C to convert a given gray level image file (*.pgm) into negative image. 12. Write a program in C to implement a student database (*.CSV File) and perform the insertion, deletion, updating and searching operation on your created CSV file.
		4. Write a program in C to perform the following operations in Array data structure: a) Creation b) Display c) Linear Search d) Binary Search e) Insertion Operation f) Deletion by a given position g) Deletion by a given item

		5. Write a program in C to perform the following Sorting operations using Array data structure: a) Creation b) Display c) Selection sort d) Bubble sort e) Modified bubble sort f) Insertion operation g) Merge Sort
		6. Write a program in C to perform the following operation of single Dynamic Link list: a. Creation b. Display c. Display using recursive function d. Searching e. Insertion f. Deletion g. Reverse print h. Reverse the linked list
		7. Write a program in C to perform the following operation of dynamic double link list. a. Creation b. Display c. Display in recursive way d. Searching e. Insertion f. Deletion g. Reverse print h. Reverse the linked list
		8. Write a program in C to implement the following operations on circular linked list: a) Creation b) Display c) Insertion d) Deletion

		e) Searching 9. Write a program in C to implement the following functions in stack: a) Push b)Pop c)Display
		10. Write a program in C to convert a given infix expression into an equivalent postfix expression. 11. Write a program to implement the postfix evaluation algorithm.
		12. Write a program in C to implement a) static queue b) dynamic queue c) circular queue to perform the following operations: a) Insert b) delete c) display 13. Write a program in C to implement tower of Hanoi problem
		14. Write a program in C to implement Binary Search Tree (BST) to perform the following operations a) Creation b) In order traversal c) Post order traversal d) Pre order Traversal e) Searching f) Insertion g) Deletion
		15. Write a program in C to implement Heap Tree (Max Heap) using Array to perform the following operations a) Creation b) In order traversal c) Post order traversal d) Pre order Traversal e) Sorting f) Display the original list and sorted list
Computer Organization Lab	CS393	1. Implement a full adder circuit with a 3 to 8 decoder and other required gates. Draw the complete logic circuit.
		2. Implement the following function using MUX: F(A.B,C,D)= ∑ (0,1,2,4,5,9,13,15). Draw the complete logic circuit.

		3. Implement a 8 to 1 multiplexer using gates. Draw the complete logic circuit.
		4. Implement a 4 bit full adder using gates. Draw the complete logic circuit.
		5. Implement an Adder- Sub tractor Composite Unit.
		6. Implement a 4 Carry Look Ahead adder using gates. Draw the complete logic circuit.
		7. Implement a 4 bit full adder using gates. Draw the complete logic circuit.
		8. Implement a 4 bit full adder using Carry Look Ahead Adder. Draw the complete logic circuit.
		9. Implement a 4 BCD adder. Draw the complete logic circuit.
		10. Implement a 4-bit Arithmetic unit of 8 arithmetic functions.
Analog and Digital Electronics Lab	CS 394	1. Design a Class A amplifier
		2. Design a Phase-Shift Oscillator
		3. Design of a Schmitt Trigger using 555 timers
		4. Design a Full Adder using basic gates and verify its output / Design a Full Subtractor circuit using basic gates and verify its output.
		5. Construction of simple Decoder & Multiplexer circuits using logic gates.
		6. Realization of RS / JK / D flip flops using logic gates.
		7. Design of Shift Register using J-K / D Flip Flop.
		8. Realization of Synchronous Up/Down counter.
		9. Design of MOD- N Counter.
Operating System Lab	CS 492	**Write Shell Program for the following:**
		1. To check whether a number is palindrome or not?
		2. To check whether a number is an Armstrong Number or not?
		3. To generate Fibonacci Series up to nth term.
		4. To check a whether a year is Leap Year or not?
		5. To find GCD and LCM of two Number.
		6. To find Prime numbers between a range.
		7. Display Pascal Triangle.
		8. To broadcast Temperature from a file.
		9. To sort using Bubble Sort.
		10. To calculate age from current date.
		11. To check a Regular File & to find no. of character, words & lines of the file.
		12. To find Maximum of Three Numbers.
		13. To check a file and its permission.

		14. To create a Directory & an Empty File in it.
		Write C Program in Linus for the following
		15. Program to create a chain of processes and every parent has only one child
		16. Program that takes an integer along the command line and creates a process chain with that many processes in the chain.
		17. Program in which same value of global variable will be printed in both parent and child. Child increment the value and prints it, but the changes will not be reflected in parent.
		18. Program to print date in a desirable format.
		19. Program that waits for user name from user for a specified time period, if not entered the program will exit automatically.
		20. Program that acts as a command interpreter.Each command has no optional arguments.
		21. Program that waits for child to execute a command up to specified time limit, if not executed then kills the child after time out.
		22. Program in which parent process takes a year as input and child checks whether that is leap year or not?
Object Oriented Programming Lab	CS-493	1. Programs involving class and constructor.
		2. Programs involving operator s overloading using friend function and without friend function.
		3. Programs involving constructor overloading, method overloading, static block, static method and nested class.
		4. Programs involving inheritance, compile time polymorphism, run time polymorphism and method overriding.
		5. Programs involving interfaces, multiple inheritances, and extending interfaces.
		6. Programs involving creating package, accessing packages and different types of access modifier.
		7. Programs involving different ways of exception handing.
		8. Programs involving multithreaded programming and setting thread priority,
		9. Program involving threads synchronization and inter thread communication.
		10. Simple Applet programs
		11. Programs involving String and File operations.
Microprocessor & Micro-controller Lab	CS-591	1. Write an Assembly Language program using 8085 mP simulator to multiply two 16-bit number.
		2. Write an Assembly Language program using 8085 mP to divide two 16 bit number.
		3. Write an Assembly Language program using the instruction set of

		8085 mP for finding factorial of a no. using stack operation.
		4. Write an assembly language program using the instruction set of 8085 mP to add two BCD number.
		5. Write an assembly language program using the instruction set of 8085 mP to find the nth Fibonacci series.
		6. Write an assembly language program using the instruction set of 8085 mP Addition of two 8 bit numbers.
		7. Write an assembly language program using the instruction set of 8085 mP to store the data into memory using direct addressing.
		8. Write an assembly language program using the instruction set of 8085 mP to store the data into a memory using indirect addressing.
		9. Write an assembly language program using the instruction set of 8085 mP to Exchange the data in two memory location address using direct addressing.
		10. Write an assembly language program using the instruction set of 8085 mP to Exchange the data in two memory location address using indirect addressing mode.
		11. Write an assembly language program using the instruction set of 8085 mP to find the factorial of a positive numbers.
		12. Write an assembly language program using the instruction set of 8085 mP to arrange n numbers in descending order.
		13. Write an assembly language program using the instruction set of 8085 mP for finding the even number from a list of n numbers.
Discrete Mathematics Lab	CS-594	1. Write a python program to find the nth term of Fibonacci series.
		2. Write a python program for sequence of nth generation term.
		3. Write a python program to check whether a number is palindrome or not
		4. Write a python program to check whether a string is palindrome or not
		5. Write a python program to calculate the factorial of an integer using recursion.
		6. Write a python program to implement the merge sort algorithm.
		7. Write a python program to design a mini calculator.
		8. Write a python program to calculate the intersection, union, complement and difference of two sets.
		9. Write a python program to implement the DFS and BFS for a given graph.
		10. Write a python program to find out the shortest path algorithm.
		11. Write a python program to generate the spanning tree from a graph.
Computer Architecture Lab	CS595	1. Implementation of logic gates, AND, OR, XOR, NOT, NAND, NOR with HDL.
		2. Implementation of Adder (Half adder, Full adder) with HDL.

		3. Write HDL program to design 4-bit Adder.
		4. Write HDL program to perform Multiplication of two 4-bits numbers.
		5. 4-bit Register design with HDL.
		6. 8-bit Register design with HDL.
		7. Write a program in any programming language to verify different types of page replacement policies.
		8. Study the pipeline problem with C programming to find the collision vector, state transition diagram, simple cycle, greedy cycle and MAL from a given reservation table.
Database Management Systems Lab	CS691	1. Select all information of various tables 1.1 Salgrade 1.2 Emp 1.3 Dept
		23. See the structure of the above tables.
		24. List all information whose salary in between 1000 and 3000. Use EMP table.
		25. List all employee name and dept no who are in dept 10 and 30. Use EMP table.
		26. Display all employees whose name starts with 'S'. Use EMP table
		27. Display all employees whose name has four characters only. Use EMP table..
		28. Display all employees whose name ends with 'L'. Use EMP table.
		29. List all employees who joined in the year 1991. Use EMP table..
		9. Create a EMP10 table which has the following fields Empno NUMBER(2) Ename VARCHAR2(25) Date_join DATE Deptno NUMBER(2) Salary NUMBER(10,2) Job VARCHAR2(10) Comm NUMBER(7,2).
		10. Create another table with the following fields. Empno NUMBER(2) Ename VARCHAR2(25) Date_join DATE Deptno NUMBER(2) Salary NUMBER(10,2) Job VARCHAR2(10) Comm NUMBER(7,2)
		Use the Insert Into Command to add your data to each table.
		11. Find employee(s) who earn the highest salary in each job type. Sort in descending order of salary
		12. Show the following details for any employee who earns a salary

		greater than the average for their department.
		13. Use ALTER TABLE *table name* MODIFY COLUMN *column name datatype*; Use rename for tablename,column name etc.
		14. Use add constraints to alter table for adding primary key, foreign key, checking field values etc.
		15. Demonstrate commands for joining of Tables, Query that requires more than 2 tables Using IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING Clause. 16. Write a PL/SQL program to demonstrate cursors.
		17. Write a PL/SQL program to demonstrate triggers.
Computer Graphics Lab	CS 693A	**Write C Program for the following experiments:**
		1. Implement the point plotting, line & regular figure algorithms.
		2. Implement the raster scan line algorithms.
		3. Implement the raster scan circle drawing algorithms.
		4. Implement the Clipping & Windowing algorithms for points and lines.
		5. Implement the Clipping & Windowing algorithms for polygons.
		6. Implement the 2-D transformations (Rotation, Reflection, Scaling, Shearing, Translation etc.).
		7. Implement the 3-D transformations (Rotation, Reflection, Scaling, Shearing, Translation etc.).
		8. Implement the Filling algorithms (Boundary Fill Algorithm and Flood Fill Algorithm).
Advanced Java Lab	CS-694	1. Programs involving multi thread program, thread synchronization and Inter thread communication.
		2. Applet Programs: Scrolling a given message using thread, animate a circle, displays all font families in a system, giving input using text field.
		3. Programs involving swing- componentsand containers - the swing packages - Painting in a Swing - Exploring Swing: Jlabel and ImageIcon - JtextField - The Swing Buttons - Jtabbed Pane - Jscroll Pane - Jlist - JcomboBox -Trees- Jtable.
		4. Programs involving different types of lay out managers and menus - Images.
		5. Programs working on event handling, and adapter class, AWT classes and controls.
		6. Programs involving different steps of java data base connectivity, storing data into and retrieving data from a given database using Statement and PreparedStatement interfaces.

		7. Programs involving BLOB, CLOB data type and batch update. 8. Simple servlet program involving The servlet API - Servlet Package - Handling HTTP Request and Response. 9. Web application programs using servlet involving Java Database Connectivity. 10. Simple JSP program involving JSP Overview - JSP syntax and semantics - Expressions, scriptlets and Declarations etc. 11. Web application program using JSP involving Java Database Connectivity. 12. Program involving a web application according to MVC architecture.
Artificial Intelligence Lab	CS-792	1. Programs to solve n queen problem and graph colouring problem. 2. Programs to solve n puzzle problem and Hamiltonian Cycle Path problem. 3. Program to solve Tic –Tac-Toe problem where computer plays first. 4. Program to solve Tic-Tac-Toe problem where user plays first. 5. Programs to implement DFS and BFS algorithms. 6. Program involving heuristic search technique to solve n puzzle problem. 7. Write simple fact for the statements using PROLOG. 8. Write predicates one converts centigrade temperatures to Fahrenheit, the other checks if a temperature is below freezing using PROLOG. 9. 10. Write predicates one converts centigrade temperatures to Fahrenheit, the other checks if a temperature is below freezing using PROLOG. 11. a) Write a program to solve the Monkey Banana problem using PROLOG. b) Write a PROLOG program to implement factorial of a given number. 12. Write a program to solve 4-Queen problem. 13. Write a PROLOG program to generate Fibonacci numbers. 14. Write a PROLOG program to solve travelling salesman problem. 15. Write a program to solve water jug problem using LIPS
Web Technology	CS795	1. Start your web page with an <html> tag i) Add a heading. ii) Add a title. iii) Start the <body> section. iv) Add the following text using <H1> and </H1> tags: This Web page was designed by (your name)

		v) Add the following text using <H2> and </H2> tags: My HTML assignment vi) Add a horizontal line vii) Insert an image to your web page. Note: You should then refer to your image with just the filename, and NOT the entire pathname to the file. viii) Add another horizontal line. ix) Enter a paragraph of text. Write about things you have learned in html. Make sure the text in this paragraph is a color other than black, but something one can see. Add a link that takes you to your favorite webpage. x) Start a new paragraph. Add a three item ordered list. Make it creative (don't just say item 1, item 2, etc… and keep it clean)! xi) Close out your body and html tags.
		2. Start your web page with an <html> tag i) Add a heading. ii) Add a title. iii) Start the <body> section. iv) Start a new paragraph. Use alignment attribute, Use bold, italic, underline tags, Use font tag and associated attributes, Use heading tags, Use preserve tag, Use non breaking spaces (escape character).
		3. Start your web page with an <html> tag i) Add a heading. ii) Add a title. iii) Start the <body> section. iv) Start a new paragraph. Create Hyperlinks: (a) Within the HTML document.

		(b) To another URL. (c) To a file that can be rendered in the browser
		4. Start your web page with an <html> tag i) Add a heading. ii) Add a title. iii) Start the <body> section. Create an unordered list, Create an ordered list, Use various bullet styles, Created nested lists, Use the font tag in conjunction with lists, Create definition lists, Use graphics as bullets.
		5. Start your web page with an <html> tag i) Add a heading. ii) Add a title. iii) Start the <body> section. a) Create a simple table Create borders and adjust border size. Adjust table cell spacing. Change border color. Change table background color. b) Align a new table on HTML page. Perform cell text alignment, Create multi-column tables, Display information about your academic qualification into this table.
		6. Start your web page with an <html> tag i) Add a heading. ii) Add a title. iii) Start the <body> section. Create a frameset: Use frame tags,

		Create vertical (column) frames, Create horizontal (row) frames, Create complex framesets, Use the hyperlink tag to target displaying an HTML page to another frame.
		7. Write a Program to Create a banner using Applet
		8. Write a program to display clock using Applet
		9. Validate the fields of a form using JavaScript
		10. Write a program to display clock using JavaScript
		11. Write a socket program to get the current date and time from the server
		12. Write a server and a client program to implement TCP chat server-client
E-Commerce Lab	CS 892	1. Creating Online Shopping Portal with java platform.
		2. Creating and using Java Web Services with MySQL.

Mechanical Engineering Department

Manufacturing Process Lab	ME 492	**1.** To make a standard test specimen for permeability testing
		2. To make a mould and perform casting operation
		3. Study of casting defects and remedies
		4. To determine the GFN of moulding

		sand
		5. To make chisel by hot forging process
		6. To make a butt joint on a test specimen by GMAW and record the varying operating parameter
Fluid Mechanics & Machinery Lab	ME 493	1.Calibration of Venturimeter
		2.Determination of orifice Co-efficent
		3.Calibration of a rectangular Weir
		4.Determination of Chezy's Constant for open channel flow
		5.Characteristic of a centrifugal pump
		6. Characteristic of pelton wheel at constant head
		7. Characteristic of pelton wheel at constant speed
		8. Investigate the validity of Bernoullis equation steady flow of water in a tapered duct
Thermal Power Engg Lab	ME(EE) 491	1. Study of Cut Models – Boilers IC Engines.
		2. Study Of Single Cylinder Four Stroke Diesel Engine.
		3. Valve Timing Diagram on 4S Diesel Engine Model
		4. Load Test on 4 Stroke Diesel Engine by Rope Brake Dynamometer.
		5. Performance Test Of A Double Cylinder Four Stroke Diesel Engine With Electrical Dynamometer
Heat Transfer Lab	ME 591	1. To determine local and overall heat transfer coefficients, Nusselt numbers along the length of a heated vertical tube/plate under natural convection situation.
		2. To determine heat transfer coefficient, rate of heat transfer and effectiveness of a

		pin fin under steady state condition for forced convection and plot temperature distribution along its length.
		3. To determine emissivity of a material.
		4. To verify Stefan-Boltzmann constant for radiation
		5. To determine LMTD, overall heat transfer coefficient and heat transfer rate of a heat exchange under parallel and counter flow conditions.
Dynamics of Machines Lab	ME 592	1. Study of Dynamic Balancing Machine and balancing of a Rotor.
		2. Study of a Proell Governor.
		3. Study of a Gyroscope.
		4. Determination of Natural Frequency of a Cantilever Beam.
		5. To study the Forced Lateral Vibrations of the Beam for different Damping.
		6. To study the Free Vibrations of two Rotor System and to determine the Natural Frequency of Vibration theoretically and experimentally.
Machine Tools Lab	ME 593	1. Measurement of cutting forces (Pz and Px or Py) in straight turning at different feeds and velocities
		2. Measurement of average cutting temperature in turning under different speed – feed combinations
		3. Measurement of surface roughness in turning under different conditions
		4. Study of chip formation (type, color & thickness) in turning mild steel and

		evaluation of role of variation of cutting velocity and feed on chip reduction coefficient /cutting ratio and shear angle
		5. Measurement of tool – wear and evaluation of tool life in turning mild steel by HSS or carbide tool
		6. Geometrical and kinematic test of a centre lathe or a drilling machine
		7. Producing a cast iron vee – block by machining
		8. Production of a straight toothed spur gear from a cast or forged disc
I.C.Engine Lab	ME 691	1. Study Of Single Cylinder Four Stroke Diesel Engine.
		2. Valve Timing Diagram on 4S Diesel Engine Model
		3. Load Test on 4 Stroke Diesel Engine by Rope Brake Dynamometer.
		4. Performance Test Of A Double Cylinder Four Stroke Diesel Engine With Electrical Dynamometer
		5. Performance Test of A Four Cylinder Four- Stroke Petrol Engine With Eddy Current Dynamometer.
		6. Morse Test of A Four Cylinder Four Stroke Petrol Engine.
Advanced Machine	ME 694	1. To make Step turning and Taper

Tools Lab		Turning on Lathe machine
		2. Thread cutting and knurling on lathe machine
		3. To make a counter sank drill on a specimen
		4. To make multi drill on a specimen using drilling jig
		5. To make a flat surface on a specimen using shaping machine
		6. To produce a square slot on a specimen
		7. To produce a spur gear with predetermined number of teeth and a matching pinion
		8. Tabulate the different parameter obtained in the produced spur gear
CAD/CAM Lab	ME 791	1. 2D Drawing using AUTOCAD
		2. 3D modelling using AUTOCAD
		3.Study, demonstration and programming of ER-4U Robot.
		4. Part programming & Simulation of CNC turning
		5. Part programming & Simulation of CNC milling
		6. APT part programming & Simulation
		7. Machining of job on CNC Machine Tool.
Metrology & Measurement Lab	ME 792	1. To measure inside taper with Ball and micrometer Depth Gauge
		2. To measure outside taper by Rollers, Vernier Caliper and Slip gauge
		3. To measure and find out the

		elements of a given spur gear by using Vernier Slide Calipers or Travelling Microscope
		4. To measure and find out the elements of a given screw thread by using Travelling Microscope, Outside Micrometer, Screw Thread Micrometer
		5. Determine of radius of curvature of a concave surface
		6. Measurement of Irregular Area by Planimeter
		7. To measure the internal radius by depth gauge and roller
Industrial Engineering Lab	ME 891	1. Queuing model case study analysis
		2. Inventory ABC model case study analysis
		3. PERT / CPM model case study analysis 4. Taguchi Regression model case study analysis 5. Inventory EOQ model
Computer Aided design Lab.	PTM191	1. Designing through AUTO CAD
		2. Analysis of engineering problem by using software like ANSYS,
Computer Aided Manufacturing Lab.	PTM192	1. Part programming -CNC turning
		2. Part programming -CNC milling
		3. Simulation of Part programming in CNC milling & turning
		4. APT part programming.
		5. Machining of job on CNC Machine Tool.
Manufacturing	PTM291	1. Part programming – Canned cycle.
		2. Part programming – using subroutine

System& Process Lab.		3. Simulation of Part programming
		4. APT part programming & Simulation
		5. Machining of job on CNC Machine Tool.

Sessional/ Practical-wise List of jobs / Sheets :

Name of Sessional/ Practical	Paper Code/s of the Sessional/Practical	List of Jobs/ Sheets Performed
Engineering Drawing & Graphics	**ME-191**	1. INTRODUCTION TO ENGINEERING DRAWING
		2. LETTERING, DIMENSIONING, SCALES
		3. GEOMETRICAL CONSTRUCTION AND CURVES
		4. PROJECTION OF POINTS, LINES, SURFACES
		5. PROJECTION OF REGULAR SOLIDS
		6. COMBINATION OF REGULAR SOLIDS, FLOOR PLANS
		7.ISOMETRIC PROJECTIONS:
Workshop Practice	**ME-292**	1.Making a gauge from MS plate
		2. To make a pin
		3. To make a MS prism
		4. To make a wooden pattern and a

		sand mould with that pattern for casting a cast iron block
		5. To join two thin mild steel plates or sheets by gas welding
		6. To join two thick steel plates or sheets by arc welding
		7. Forming a cone
Machine Drawing-I	ME 391	1. Orthographic projections of machine elements
		2. Sectional views- full, auxiliary sections and Isometric projection of components
		3. Types of welding joint and pipe joint
		4. Assembly drawing such as tool head of a shaping machine, tailstock of a lathe
		5.Understanding a 2 D orthographic view of a machine part
		6.To learn the method of drawing a machine part.
Workshop Practice	ME 392	1. Make a single piece pattern mould
		2. To make spilt pattern mould
		3. To make mould and core and assemble it
		4. To make a ring of mild steel by

		cold forging process
		5. To make S-hook by hot forging process
Machine Drawing-II	ME 491	1. Assembly drawing such as fuel injector, machine vice, non-return valve (light duty), screw jack etc.
		2. Part drawing such as lathe speed gear box, crane hook, automobile gear box etc.
		3. Production drawing reading
		4.Understanding a 2 D orthographic view of a machine part
		5.To learn the method of drawing a machine part.
Design Practice-I	ME 594	1. Introduction and Engineering Material
		2.Rivet Joint
		3.Welding Joint
		4. Shaft
		5.Screw Jack
		6. Design against variable load.
Design Practice-II	ME 692	**1.Two assignments** on 2-D and 3-D modelling of mechanical components and systems using software packages like AUTOCAD, CATIA, PRO E or similar software
		2. Design problem related to

		Brakes, Clutch, Bearings, Gears, Pressure vessels
Seminar	ME 693	
Project-I	ME 793	
Seminar on Industrial Training	ME 794	
Comprehensive Viva	ME 892	
Project-II	ME 893	
Seminar- I	PTM181	
Seminar – II	PTM281	
Comprehensive Exam (Viva-Voce)	PTM282	

A) Class Rooms/ Lab/Workshops etc.

Sl. No.	**Infrastructure**	**Number available**	**Area (Approx. in Sq.m)**
1.	Class rooms with White or Black board	5	500
2.	Class rooms with LCD Projector		
3.	Class rooms with wifi/ LAN facilities		

4.	Class rooms with AC		
5.	Seminar Hall	1	100
6.	Seminar Hall with ICT facility		
7.	Tutorial Rooms		
8.	Laboratories	5	1100
9.	Research Laboratories		
10.	Work Shops		
11.	Drawing Hall		
12.	Faculty & Staff rooms	15	200
13.	Any Other rooms		

B) IT Equipments:

Item	**Total Number of items available**	**In working Conditions/ Usable/ in use**
Desktop Computers	35	
Internet Connection points	50	

Laptops	12	
Printers	14	
Scanners		
Printers with Scanners	4	
Projectors	6	
External Hard disk	12	
Pen Drives	12	
Software with Lic (Provide detail)		

ECE Department

Infrastructural facilities in the Academic Department:

A) Class Rooms/ Lab/Workshops etc.

Sl. No.	Infrastructure	Number available	Area (Approx. in Sq.m)
1.	Class rooms with White or Black board	3+ 1(Comm)	
2.	Class rooms with LCD Projector	No	
3.	Class rooms with wifi/ LAN facilities	3	
4.	Class rooms with AC	No	
5.	Seminar Hall	No	
6.	Seminar Hall with ICT facility	No	
7.	Tutorial Rooms	3	
8.	Laboratories	5	
9.	Research Laboratories	No	

10.	Work Shops	No	
11.	Drawing Hall	No	
12.	Faculty & Staff rooms	7	
13.	Any Other rooms	1	

B) ITEquipments:

Item	**Total Number of items available**	**In working Conditions/ Usable/ in use**
Desktop Computers	67	7
Internet Connection points		
Laptops	6	0
Printers	11	0
Scanners	8	2
Printers with Scanners	3	3
Projectors	2	2
External Hard disk	6	4
Pen Drives	16	7
Software with Lic (Provide detail)	9	0

Laboratory Facilities

Name of Lab	Paper Code/s of the Lab	List of Experiments Performed
Digital Signal Processing lab	EC691	1.Linear and circular convolution 2.DFT and IDFT using MATLAB 3.Butterworth Filter design and its characterization 4.Chebyshev Filter design and its characterization 5.FIR filter design using different windowing techniques 6.FIR filter design using frequency sampling method 7.FIR filter design using Equiripple method 8.Adaptive filter design using LMS method
VLSI Circuit and system Lab	EC692	1.Simulation of Transfer characteristics and output characteristics of NMOS & PMOS transistor using PSPICE 2.Design and simulation of CMOS inverter and its characteristics 3.Design and simulation of CMOS NAND & NOR gate 4.Design and simulation of Full adder using Half adder by hierarchical model in PSPICE 5. Realization of XOR and XNOR circuits in PSPICE 6.Introduction to VHDL and demonstration of different models by simple digital circuits (e.g. 2:4 decoder)
Digital Electronics Laboratory	EC491	1.Construction of various logic gates universal gates. 2. Construction of Binary to gray code converter using Logic gates. 3. Construction of BCD to excess-3 converter using logic gates.

		2.Measurement of unknown impedance using shift in minima technique using a waveguide test bench. 3.Study of the characteristics of a Reflex Klystron oscillator. 4.Study of Gunn-oscillator Characteristics using X-band waveguide test bench. 5.Measurement of coupling factor, Directivity, Insertion loss and Isolation of a Directional coupler using X-band waveguide test bench set up. 6.Scattering matrix of a magic tee, E-plane tee, H-plane tee using waveguide test bench at X-band.
Microprocessors & Microcontrollers lab	EC-592	1. Firstly students get familiar to kits of 8085,8051, peripheral devices. 2. Study of prewritten programs on trainer kit using the basic instruction set (data transfer, Load/Store, Arithmetic, Logical) Assignments based on above 3. Table look up, Copying a block of memory, Shifting a block of memory, Addition of BCD number 4. Program using subroutine calls and IN/OUT instructions using 8255 PPI on the trainer kit e.g. subroutine for delay 5. Student are advised or given task to design project using microprocessor or microcontroller kit using peripheral devices
Analog Communication Lab	EC492	1. Measurement of modulation index of an DSB-AM . 2. Study of Under, Over and Critical Modulation for DSB. 3. Study of SSB signal. 4. Study of spectrum (USB and LSB) for a DSBFC and DSBSC-AM signal using spectrum analyzer 5. Study of Envelope Detector. 6. Study of a super heterodyne receiver.

		7. Study of FM modulator and calculation of Bandwidth 8. Design a FM demodulator using PLL.
BASIC ELECTRONICS ENGG. LAB	EC 191/EC291	Introduction of electronics component, vi characteristic of p-n junction diode, vi characteristic of zener diode, out-put characteristic of transistor at CE mode and CB mode, rectifiers, fet,
Analog & Digital Electronic Circuit Lab	EC(EE)-391	Study of Ripple and Regulation characteristics of full wave rectifier with and without capacitorfilter. Study of Zener diode as voltage regulator Realisation V-I & I-V converter using Operational Amplifier. Study of timer circuit using NE 555 and configuration of Monostable and AstableMultivibrator, Realisation of basic gates using Universal logic gates, Construction of simple Decoder & Multiplexer circuits using logic gates.
Measurement and instrumentation lab	EC694B	1. Study of Static characteristics of Measuring Instrument 2. Study of Dynamic Characteristics of a Measuring Instrument 3. Acquaintance with basic structure of DMM and measurement of different electrical parameter 4. Realization of a V-to-I & I-to-V converter. 5. Statistical analysis of errors in measurement . 6. Study of VCO (Voltage controlled oscillator) & PLL (Phase Locked Loop).tatic Characteristics of a Measuring Instrument
Digital Communication Lab	**EC591 & EE(EC)791**	1) Study of PAM and demodulation. 2) Study of PCM and demodulation. 3) Study of line coders: polar/unipolar/bipolar NRZ ,RZ and Manchester. 4) Study of delta modulator and demodulator. 5) Study of adaptive delta modulator and demodulator. 6) Study of BPSK modulator and demodulator. 7) Study of BFSK modulator and demodulator.

		8) Study of ASK modulator and demodulator.

Civil Engineering Department

Infrastructural facilities in the Academic Department:

A) Class Rooms/ Lab/Workshops etc.

Sl. No.	Infrastructure	Number available	Area (Approx. in Sq.m)
1.	Class rooms with White or Black board	04	332.0
2.	Class rooms with LCD Projector	04	332.0
3.	Class rooms with wifi/ LAN facilities	04	332.0
4.	Class rooms with AC	-	-
5.	Seminar Hall	-	-
6.	Seminar Hall with ICT facility	-	-
7.	Tutorial Rooms	-	-
8.	Laboratories	09	990.0
9.	Research Laboratories	01	47.0
10.	Work Shops	-	-

11.	Drawing Hall	01	73.0
12.	Faculty & Staff rooms	11	227.0
13.	Any Other rooms	05	138.0

B) IT Equipments:

Item	**Total Number of items available**	**In working Conditions/ Usable/ in use**
Desktop Computers	30	22
Internet Connection points	39	30
Laptops	-	-
Printers	7	7
Scanners	-	-
Printers with Scanners	4	3
Projectors	5	4
External Hard disk	8	8
Pen Drives	8	8

	Software with Lic (Provide detail)	-	-
	Laboratory Facilities		

Name of Lab	Paper Code/s of the Lab	List of Experiments Performed

Engineering Geology Lab	CE391	1. Study of Physical Properties of Minerals, Study of Different Group of Minerals. 2. Identification of Minerals: Actinolite, Apatite, Asbestos, Augite, Biotite, Calcite, Chlorite, Corundum, Fluorite, Galena, Garnet, Graphite, Gypsum, Hematite, Hornblende, Jasper, Kyanite, Magnetite, Microcline, Muscovite, Olivine, Opal, Orthoclase, Plagioclase, Quartz, Staurolite, Talc, Topaz, Tourmaline. 3. Identification of Igneous Rocks: Andesite, Anorthosite, Aplite, Basalt, Diorite, Dolerite, Dunite, Gabbro, Granite, Granodiorite, Obsidian, Nephelinite, Norite, Pegmatite, Peridotite, Syenite, Volcanic Tuff. 4. Identification of Sedimentary Rocks: Breccia, Conglomerate, Limestone, Sandstone, Shale. 5. Identification of Metamorphic Rocks: Amphibolites, Charnockite, Gneiss, Granulites, Khondalite, Marble, Phyllite, Quartzite, Schist, Slate. 6. Study of Topographical Features from Geological Maps, Identification of Symbols in Maps.
Survey Practice- I Lab.	CE392	1. Measurement of distance by chaining and ranging. 2. Determination of area of a polygon by chain and cross staff survey. 3. Measurement of bearings of sides of traverse with prismatic compass and computation of correct included angle. 4. Determination of elevation of various points with dumpy level by collimation plane method and rise & fall method. 5. Measurement of horizontal angles with theodolite by

		method of repetition. 6. Measurement of vertical angles with theodolite. 7. Locating given building by plain table traversing. 8. Three point problem in plane table traversing., Contour plan of given area.
Fluid Mechanics Lab	CE491	1. Determination of Orifice co-efficient. 2. Calibration of Orifice meter. 3. Calibration of V- Notch. 4. Measurement of velocity of water in an open channel using a Pitot tube. 5. Measurement of water surface profile for flow over Broad Crested Weir. 6. Preparation of Discharge Rating Curve for a sluice. 7. Measurement of water surface profile for a Hydraulic jump. 8. Determination of efficiency of a Centrifugal pump. 9. Determination of efficiency of a Reciprocating pump. 10. Determination of efficiency of a Pelton wheel Turbine. 11. Determination of efficiency of a Francis Turbine. 12. Measurement of Evaporation loss of water by using ISI Standard Pan. 13. Measurement of Rainfall by using Symon'sRaingauge .
Solid Mechanics Lab	CE591	1. **Determination of Modulus of Elasticity (E) of the rectangular section (i) Wooden Beam (ii) Steel Beam, by Bending Test.** 2. **Determination of Modulus of Rigidity of the material of a rod by Torsion Test.**

		3. **Determination of the Modulus of Rigidity (G) of the material closely coiled helical spring.** 4. **Determination of Charpy Impact Value of a material of standard size and shape by S winging Hammer Testing Machine.** 5. **Brinell Hardness Test.** 6. **Rockwell HardnessTest.** 7. **To conduct Tensile test of (i) M.S. Flat, (ii) M.S. Wire and to determine its Yield Strength, Ultimate Strength, Breaking Strength and Elongation.** 8. To study the action of wood under compressive loading parallel to the grain also perpendicular to the grain.
Soil Mechanics Lab.- I	CE592	1. Field identification of different types of soil as per Indian standards [collection of field samples and identifications without laboratory testing], determination of natural moisture content. 2. Determination of specific gravity of i) Cohesionless ii) cohesive soil. 3. Determination of In-situ density by core cutter method & sand replacement method. 4. Grain size distribution of cohesion less soil by sieving & fine grained soil by hydrometer analysis. 5. Determination of Atterberg's limits (liquid limit, plastic limit & shrinkage limit). 6. Determination of Relative Density of sand. 7. Determination of Differential Free-swell Test. 8. Determination of co- efficient of permeability by constant head permeameter (coarse grained soil) & variable head

		parameter (fine grained soil).
Concrete Lab- I	CE593	1. Tests on cement – specific gravity, fineness, soundness, normal consistency, setting time, compressive strength of cement mortar cubes. 2. Tests on fine aggregate – specific gravity, bulking, sieve analysis, fineness modules, moisture content, bulk density and deleterious materials. 3. Tests on coarse aggregate - specific gravity, sieve analysis, fineness modulus, bulk density. 4. Tests on bricks and tiles (Roofing and Flooring) - Water absorption, breaking loads.
Soil Mechanics Lab.- II	CE691	1. Determination of compressibility characteristics of soil by Oedometer test (co-efficient of consolidation & compression Index) 2. Determination of unconfined compressive strength of soil. 3. Determination of Shear parameter of soil by Direct shear test. 4. Determination of un-drained shear strength of soil by Vane shear test. 5. Determination of shear parameter of soil by Tri-axial test (UU). 6. Determination of compaction characteristics of soil: Standard Proctor test. 7. Determination of compaction characteristics of soil: Modified Proctor test. 8. Determination of CBR value of compacted soil: Un-soaked. 9. Determination of CBR value of compacted soil: Soaked.

		10. Auger boring, Bore-log writing & Standard Penetration Test.
Concrete Lab.- II	CE692	1. Tests on Fresh Concrete: Workability: Slump, Vee-Bee, Compaction factor tests. 2. Hardened Concrete: Compressive strength on Cubes, Split tensile strength, Static modulus of elasticity, Flexure tests, Non-destructive testing (Rebound hammer & Ultrasonic pulse velocity). 3. Mix Design of Concrete.
Environmental Engineering Lab.	CE693	1. Determination of turbidity for a given sample of water. 2. Determination of color for a given sample of water. 3. Determination of solids in a given sample of water: Total Solids, Suspended Solids and Dissolved Solids. 4. Determination of pH for a given sample of water. 5. Determination of concentration of Chlorides in a given sample of water. 6. Determination of carbonate, bi-carbonate and hydroxide alkalinity for a given sample of water. 7. Determination of hardness for a given sample of water. 8. Determination of the Chemical Oxygen Demand (COD) for a given sample of wastewater. 9. Determination of amount of Dissolved Oxygen (DO) in a given sample of water. 10. Determination of Acidity in a given sample of water.
Highway & Transportation Engineering Lab	CE791	1. Tests on highway materials – Aggregates- Impact value, Crushing Value, Los-Angeles Abrasion value water absorption, Elongation & Flakiness Index. 2. Bitumen & bituminous materials: Specific gravity,

		penetration value, ductility, softening point, loss on heating, Flash & Fire point. 3. Determination of stripping value for bitumen and bituminous materials. 4. Determination of CBR value of compacted road materials: Un-Soaked. 5. Determination of CBR value of compacted road materials: Soaked. 6. Determination of Bitumen Content by Centrifuge Extractor. 7. Determination of Marshall Stability Value. 8. Design of B.C. & S.D.B.C. Mix by Marshal method of mix design 9. Benkelman beam Test.

IT Department		
Name of Lab	Paper Code/s of the Lab	List of Experiments Performed
DBMS Lab	IT 691	**1.Table creations, Introduction to different data types in SQL:-** 1. Create the following tables. Table 1:Customer table Attributes: i)cusname;varchar 2,size 40 ii)cus_street;varchar 2,size 40 ii)cus_city;varchar 2,size 40 Table 2:Borrower table i)cus_name;varchar 2,size 40;references Customer table;primary key ii)loan_no;varchar 2,size 40;references Loan table

		Table 3:Loan table i)loan_no;varchar 2,size 10;primary key ii)br_name;varchar 2,size 40;references Branch table iii)amount;;number,size 40 Table 4:Depositor table i)cus_name;varchar 2,size 40;references Customer table;primary key ii)acc_no;varchar 2,size 40;references Account table Table 5:Account table i)acc_no;varchar 2,size 10;primary key ii)br_name;varchar 2,size 40;references Branch table iii)balance;;number,size 40 Table 6:Branch table i)br_name;varchar 2,size 10;primary key ii)br_city;varchar 2,size 10 iii)assets;number,size 10. 2. Insert data into the tables from the table instance diagram given in sd_dbms.jpg file.
		2. **Different DDL commands** Viewing DATA in table: • All rows and all Columns: *SELECT * FROM <Table name>* SELECT * FROM Customer; • Selected columns and ALL rows: *SELECT <column_name1>,<column_name2> FROM <Table name>;* Select c_name from Customer; Select city from Customer; • Selected Rows and All Columns: *SELECT * FROM <Table name> WHERE <condition>;* Select * from Customer where city=”Jalpaiguri”; Select * from Loan where amount>=30000; • Selected Rows and Selected Columns: *SELECT <column_name1>,<column_name2> FROM <Table name>*

		WHERE <condition>; Select c_name from Customer where city=”Jalpaiguri”; Select loan_no,br_name from Loan where city=”Jalpaiguri”; 1. Eliminating DUPLICATE ROWS when using a SELECT statement:”DISTINCT” keyword. *SELECT DISTINCT<column_name1>,<column_name2> FROM <Table name> WHERE <condition>;* Select distinct c_name from Customer where city=”Jalpaiguri”; 2. Sorting Data in a Table:”ORDER BY “ keyword *SELECT * FROM <Table name>* ORDER BY <column_name1>,<column_name2><[Sort order]>; Select * from Customer order by c_name; 3. Delete Operations: • Removal of All rows: *DELETE FROM <Table name>;* Delete from Customer; • Removal of Specific rows: *DELETE FROM <Table name> WHERE <condition>;* Delete from Customer where c_name=’Amit’; 4. Updating The Contents of a Table: • Updating all rows: *UPDATE <Table name>* *SET* *<column_name1=Exptression1>,<column_name2=Exptression2>;* Update C-name Set c_name=’Ranjan’; • Updating Selected rows: UPDATE <Table name> SET <column_name1=Exptression1>,<column_name2=Exptression2> WHERE <condition>; Update C-name Set city=’Kolkata’ where c_name=’Simul’; 5. Modifying the structure of a Table: • Adding new Columns:

ALTER TABLE <Table name> ADD
(<NewColumnname><datatype>(<size>),
<NewColumnname><datatype>(<size>);

Alter table Customer add (balance number(4,2));

- Dropping Column of a table:
  ALTER TABLE <Table name> DROP COLUMN <Columnname>;
- Modifying Existing Columns:
  ALTER TABLE <Table name> MODIFY
  (<Columnname><NEWdatatype>(<NEWsize>));
  Alter table Customer modify (balance number(10,5));

6. Renaming Tables:
   RENAME <Table_name1> to <Table_name2>;
   Rename Customer to Customer1;
7. Truncating table:
   Truncate Table <Tablename>;
   Truncate table Customer;
8. Destroying table:
   DROP Table <Tablename>;
   Drop table Customer;

3. Where clause,Arithmaticoperations,logicaloperations,aggregatefunctions,grouping data:-

1. Where Clause:

i) List the name of the customers who live in " Palo alto".
Select cus_name from Customer where city=' Palo alto';

ii) List the loan numbers of loans which is given from main branch.

iii) List the account numbers in which balance is between 15000 and 25000.

iv) List the account numbers of depositors which does not belong to city branch of bank.

v) List the branch names where balance is greater than 15000.

vi) List the branch names where balance is greater than or equal to 20000.

2. Arithmetic Operations:

Oracle allows arithmetic operators when viewing records from a table. they are:

i) addition ii)Subtraction iii) multiplication
iv) Division v) exponentiation vi) enclosed operation

Example

(i)Suppose the bank gives 5% bonus for the branches for its 100th birthday. Retrieve the branches new assets value.

*Select br_name, (assets+assets*5/100) "new assets" from Branch ;*

3. Logical Operations: AND ,OR NOT.

Example:

i) List the name of the customers who live in "Gangtok" or " siliguri".
Select cus_name from Customer where city='Gangtok' or city='Siliguri';

ii) List the account numbers where balance is greater than 1000 and branch is main branch of the bank.

iii) List the name of the customers who does not live in " jalpaiguri".

iv) List the account numbers which does not belong to city branch and whose assets is greater than 10000.

4. Like Operators:

i) List the name of the Customers whose name starts with 'A'.
Select cus_name from Customer where cus_name like 'A%';

ii) List the name of the cities of residence of customers whose name starts with 'J' or "G".

iii) List the name of the Customers whose name starts with 'R' and which is a 5 letter word.

iv) List the name of the Customers whose name starts with 'Si'.

5. In and Not In Predicate:

i) List the city information of customers named 'Adams','Curry', and 'Hayes'.
*Select city from Customer where cus_name in('*Adams','Curry', and 'Hayes'*);*

ii) List the name of the customers who does not reside in Harrison or Brooklyn.

6. **Aggregate functions: Max, min,count, avg**

i) Count the number of customers from customer table.
Select count(cus_name) from Customer;

ii) Count the number of cities of residence from customer table.
Select count(distinct city) from Customer;

iii) Retrieve the maximum balance of customers.
Select max(balance) from Account;

iv) Retrieve the minimum balance of customers.

v) Retrieve the average loan allotted to customers.

vi) Retrieve the number of rows of customer table including duplicates and those with null values.
Select count(*) from Customer;

7. Grouping Data: Group by, having

i) Find how many customers reside in each of the cities Gangtok and Jalpaiguri.
Select count(cus_name),city from Customer group by city;

ii) Find how many customers reside in Siliguri.
Select count(cus_name),city from Customer group by city having city='siliguri';

Lab 4:

Joining of Tables:

1. Retrieve the name, account number and balance of the customers with account number 'A-101'.
2. Retrieve the

4.Joining Tables:-

1. Find out the amount of loan taken by Mr. Kartick.
2. Find the account balance of MrAmit.
3. Find the name, city and street information of the customers who has taken loan from the bank.
4. Find the name, city and street information of the customers who has account at the bank.
5. Find the name and city of the customers who has account at the city branch of the bank.
6. List the customers who have an account/loan/both at the bank.
7. List the customers who have an account and loan at the bank.
8. List the customers who have an account but no loan at the bank.

5. On join, correlation, group by, sub query etc:

From Banking Database:
Customer(cus_name,street,city)
Borrower(cus_name,loan_no)
Depositor(cus_name,acc_no)
Loan(loan_no,br_name,amount)
Account(acc_no,br_name,balance)
Branch(br_name,br_city,assets)

A. GROUP BY ,HAVING CLAUSE:

1. Find the number of depositor in each bank.

Select br_name,count(distinct cus_name)
From Depositor, Account

Where
Depositor.acc_no=Account.acc_no
Group by br_name;

2. Find the number of depositor in the branches in which the average account balance is greater than 1200.

Select br_name,count(distinct cus_name)
From Account,Depositor
Group by br_name
Having avg(balance)>1200;

3. Find the average balance for each customer who lives in "Kolkata" and has atleast three accounts.

Select D.cus_name, avg(balance)
From Depositor D,AccountA,Customer C
Where
D.acc_no=A.acc_no and
D.cus_name=C.cus_name and
Cus_city='kolkata'
Group by D.cus_name
Having count(distinct D.acc_no)>=3;

B. Nested sub-queries:

4. Find the customers who have both a loan and an account at the bank.

Select distinct cus_name
From Borrower
Where
Cus_name in(Select cus_name from Depositor);

5. Find all customers who have loan but no account at the bank.

Select distinct cus_name
From Borrower
Where
Cus_name not in(Select cus_name from Depositor);

6. Find the names of all branches that have assets greater than atleast one branch located in Kolkata.

Select distinct T.br_name
From Branch as T, Branch as S
Where
S.br_city='kolktata' and T.assets>S.assets;

		Madaline network. 8. Write C program to implement McCulloh-Pitts model to generate AND, OR functions. Genetic Algorithm 9. Write a Matlab code for maximizing F(x)=x2, , where x ranges from say 0 to 31 using Genetic Algorithm. 10. Use of Genetic Algorithm toolbox in matlab for optimization problem solving. **11.** Implantation Simple Genetic Algorithm in C for solving optimization problem.

List of equipments (Cost more than 50,000/-)

(a) Laboratories and Equipments:

Sr. No.	Equipment Name (Costing more than Rs.1 lakh only)	Category* (A/B/C/D)	Date of Purchase	Commissioned? (Yes/No)		Stock Register No.	No. of Instructors trained by the supplier on the use/operation of the equipment	No. of Persons who have used the equipment since installation	Provision of in-house Maintenance			Availability of adequate quantity of Consumables and essentials (Yes/No)	Existence of operating manuals (Yes/ No)	Location of the equipment (provide name of the lab/
				If yes, date of commissioning	If no, give reasons				Yes/ No	If No, whether Annual Maintenance Contract is given Yes/ No	If No, give reasons			

1.	i. Xeon Server (LINUX) + ii.Xeon Server(windows)	A	10.04.06	08.08.06	NA	3/12	04	**250**	Under Warranty	NA	NA	Yes	Yes	Lab of EE Department
2.	Spectrum Analyzer	A	31.08.06	22.05.07	NA	12/80	03	66		NA	NA	Yes		
3.	Complete set up of Thyristor & motor control	A	31.08.06	28.05.07	NA	12/78	03	66		NA	NA	Yes		
4.	3ph.AC induction motor controller using V-F controller	A	31.08.06	28.05.07	NA	**12/78**	03	66		NA	NA	Yes		Lab of EE Department
5.	DSP based AC/DC motor control Trainer	A	31.08.06	28.05.07	NA	**12/78**	03	66		NA	NA	Yes		
6.	Generator protection simulation study kit	A	31.08.06	15.06.07	NA	12/81	02	66		NA	NA	Yes		
7.	Transformer protection simulation study unit	A	31.08.06	15.06.07	NA	12/82	02	66		NA	NA	Yes		
8.	Set up simulation of DC distribution by network analyzer	A	31.08.06	15.06.07	NA	12/83	02	66		NA	NA	Yes		
9.	AC motor protection study unit	A	31.08.06	15.06.07	NA	12/85	02	66		NA	NA	Yes		
10.	Electrical Power Transmission Line Training System	A	16.05.07	30.01.08	NA	12/93	02	66		NA	NA	Yes		
11.	Ready to use set up for measurement of DC, Tan Delta etc. for Transformer Oil	A	16.05.07	30.01.08	NA	12/94	02	66		NA	NA	Yes		
12.	Lab CBR Apparatus	A	31.03.05	29.09.05	NA	1	03	**75**	Under Warr	NA	NA	Yes	Yes	Soil Lab

13.	Ultrasonic Instrument	A	01.09.06	02.11.06	NA	9	02	60		NA	NA	Yes	Yes	Conc. Lab
14.	UV Spectrophotometer	A	01.09.06	16.02.07	NA	8	3	65		NA	NA	Yes	Yes	Env. Lab
15.	BOD Incubator with Shaker	A	01.09.06	16.02.07	NA	25	3	75		NA	NA	Yes	Yes	Env. Lab
16.	Autocleave	A	21.12.06	16.02.07	NA	25	3	70		NA	NA	Yes	Yes	Env. Lab
17.	Refrigerator	A	21.12.06	16.02.07	NA	25	1	65		NA	NA	Yes	Yes	Env. Lab
18.	Automatic Weather Monitoring Station	A	01.09.06	30.03.07	NA	29	1	65		NA	NA	Yes	Yes	WRE Lab
19.	Automatic Water Level Monitor with Data logger	A	01.09.06	30.03.07	NA	28	1	65		NA	NA	Yes	Yes	WRE Lab
20.	Mechanical Shaker Centrifuge	A	01.09.06	18.06.07	NA	36	2	65		NA	NA	Yes	Yes	Env. Lab
21.	Distilled water plant (Ultra pure water system)	A	22.12.06	05.06.07	NA	35	**3**	65			NA	Yes	Yes	Env. Lab
22.	Digital pH Meter Digital Balance	A	01.09.06	34	NA	34	3	65		NA	NA	Yes	Yes	Env. Lab
23.	Smoke Meter	A	28.03.05	Yes	NA	3	**2**	60		NA	NA	Yes	Yes	I. C. Engine Lab
24.	Multi Gas Analyzer	A	09.03.07	Yes	NA	44	2	60		NA	NA	Yes	Yes	I. C. Engine Lab
25.	Basic Hydraulic Bench	A	04.10.05	Yes	NA	14(01)	3	60		NA	NA	Yes	Yes	Hydraulics Lab

26.	Bernoulli's Theorem Demonstration with relevant software	A	04.10.05	Yes	NA	14(02) a	4	60		NA	NA	Yes	Yes	Hydraulics Lab
27.	Variable Compression Ration Diesel Engine Test Rig with Eddy current dynamomete	A	05.03.07	Yes	NA	46	3	60		NA	NA	Yes	Yes	I. C. Engine Lab
28.	CVS Echo Sounder with battery 12V 40Ah and Battery Charger 12V 6 Amps	A	30.06.07	06.09.07	NA	37	3	60		NA	NA	Yes	Yes	WRE Lab
29.	Digital Aerosol Monitor	A	05.03.07	Yes	NA	47	3	60		NA	NA	Yes	Yes	I. C. Engine Lab
30.	Laser Doppler Velocity Meter (LDV Meter)	A	05.03.07	Yes	NA	62	3	60		NA	NA	Yes	Yes	I. C. Engine Lab
31.	Francis Turbine	A	09.03.07	Yes	NA	60	3	60		NA	NA	Yes	Yes	Fluid Lab
32.	Series Parallel Pump Apparatus	B	04.10.05	Yes	NA	14 (03) a	2	60	Under Warranty	NA	NA	Yes	Yes	Hydraulics Lab.
33.	Vibscanner Handheld vibration analyzer with complete accessories	B	09.03.07	Yes	NA	49	2	60		NA	NA	Yes	Yes	Fluid Lab
34.	Kaplan Turbine	B	09.03.07	Yes	NA	61	3	60		NA	NA	Yes	Yes	Fluids Lab
35.	Micro Processor Gas Chromatograph	B	21.12.06	01.02.07	NA	24	2	60		NA	NA	Yes	Yes	Env. Lab

36.	Total Station with all relevant accessories	B	01.09.06	23.10.06	NA	7	2	60	Under Warranty	NA	NA	Yes	Yes	HOD Room of CE Deptt.
37.	Static cone penetration set up (Complete)	B	01.09.06	23.03.07	NA	31	2	60		NA	NA	Yes	Yes	Soil Lab
38.	MIG Welding Machine, COMET-250, SURARC Make	A	20.12.06	2203.07	NA	1	7	60		NA	NA	NO	Yes	Tiny Smity shop
39.	TIG Welding Machine, QUANTUM-400, SURARC	A	20.12.06	22.03.07	NA	2	7	60		NA	NA	NO	Yes	Tiny Smity shop
40.	Hydraulic Press, 10 Ton Capacity	A	20.12.06	27.04.07	NA	3	7	60		NA	NA	NO	Yes	Foundry Shop
41.	BHN Testing Machine	A	20.12.06	27.04.07	NA	4	7	60		NA	NA	NO	Yes	Tiny Smity shop
42.	Motorized Bending Roller, PATHAK Make	A	20.12.06	29.04.07	NA	6	7	60		NA	NA	NO	Yes	Tiny Smity shop

43.	Seam Welding Machine, Model: SMW-75	A	24.05.07	05.10.07	NA	9	7	60		NA	NA	NO	Yes	Tiny Smity shop
44.	Arc Welding Generator	A	24.05.07	23.08.07	NA	15	7	60		NA	NA	NO	Yes	Tiny Smity shop
45.	Robotic Training System with Accessories	C	16.12.05	Yes	NA		7	60		NA	NA	NO	Yes	Lab of ME Deptt.
46.	Atomic Absorption Spectrophotometer	C	01.09.06	16.12.07	NA	25	2	60	Under Warranty	NA	NA	NO	Yes	Env. Lab
47.	Computerized Multi Cylinder Petrol Engine Test set up with Eddy current Dynamometer	C	05.03.07	Yes	NA		2	80		NA	NA	NO	Yes	Lab of ME Deptt.
48.	Server, Storage, PCs and LCD Projector	D	28.06.07	Yes	NA		10	1400		NA	NA	NO	Yes	CCC

* A: Rs. ≥ 1 lakhs & <Rs.5 lakhs
B: Rs. ≥ 5 lakhs & <Rs.10 lakhs
C: Rs. ≥ 10 lakhs & <Rs.20 lakhs
D: Rs. ≥ 20 lakhs

6.1B Equipment Utilization for the equipments covered under 6.1A (Category C & D only i.e. Costing Rs. ≥ 10 lakhs)

Sr	Equipme	Name	Ex.	Hou	Utilization in Hours per month = **from 9:15a.m. to 5:00p.m. on all working days**

					By students (UG and PG) according to the official schedule of classes	Research (PhD)	Continuing Education Classes	Networking activities			Services to community activities (unorganized/organized sector)	Sponsored Projects and Consultancy Services	Total hours
								Programme institutions	Non programme academic institutions and R&D organizations	Industry			
45	Robotic Training System with Accessories	B. Tech	Yes	30 hours	UG	NA	NA	NA	NA	NA	NA	NA	30 hours
46	Atomic Absorption Spectropho-tometer	B. Tech	Yes	30 hours	UG	NA	NA	NA	NA	NA	NA	NA	30 hours
47	Computerized Multi Cylinder Petrol Engine Test set up with Eddy current Dynamometer	B. Tech	Yes	30 hours	UG	NA	NA	NA	NA	NA	NA	NA	30 hours
48	Server, Storage, PCs and LCD Projector	B. Tech	Yes	720 hours	UG	NA	NA	NA	Yes	NA	NA	Yes	720 hours

Note : Sr. No. of the equipment in this sheet must also be same as of previous one. (include Category C & D only i.e. Rs. $\geq$ 10 lakhs)

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE

CLASS ROUTINE OF 3RD SEMESTER FOR THE SESSION 2020-21 WITH EFFECT FROM 1ST SEPTEMBER, 2020

DAYS	DEPT	PERIODS						
		I	II	III	IV	V	VI	VII
		10.00 - 10:50	10:50– 11.40	11.40-12.30	12.30-1.20	2.35 –3.20	3.20–4.05	4.05–4.50
MON	CE	ENERGY SC. & ENGG. [SG]		HS 301		Basic Electronics Lab CE(ES)391 (A) [AKP /SYB, MCH]/CE(ES)393 (B)		
	EE	ES-ME301 [NH]	Analog Electronics (PC-EE302) [RRG]	PC-EE301(SS)		PC-EE391(A)(MSe)		MC-EE301
	ME	BS-M 301 [DC]		Basic Electronics Engineering[ES-ECE301] [AKP/SYB]				
	CSE	HSMC-301 [HU]		BSC-301 [MATH]				
	ECE	Probability and Statistics[BS-M301]	Signal & Systems EC-303[MTB]	Electron Device EC301[AVC]		Electron device lab-EC391(GR.-B)[AVC,MLD]/ Data structure-ES-CS391(GR-A)		
	IT	CH301 Basic Environmental Engineering &Elementary Biology (NA)		CS304 Analog & Digital Electronics(DMS)		M(CS)-391-Numerical Methods Programming LAB (PPS)(A) CS-394-Analog & Digital Electronics LAB(DMS)(B)		
TUES	CE	HS 301	ENGG. MECHANICS [GB]		MATHS-III [SR]	CAD (A) [PR,BCM]		
	EE	BS-M301[SP]	ES-ME301 [NH]	PC-EE303(SD)		PC-EE391(MSe)(B)		
	ME	BIOLOGY [BS-BIO-301]	MANF. PROCESS [PC-ME 302] [SRC]	ENGG. MECHANICS [ES-ME 301] [AM]		THERMODYNAMICS [PC-ME 301] [SM]		
	CSE			ESC 301 [SB]		ESC391 [Gr.-B] [SB/MG] / PCC-CS-393 [Gr.-A] [SKR]		
	ECE	Environmental Sc.(MC-301)	SIGNAL & SYSTEMS-EC-303[MTB]		NET. TH.-EC-304[JSM]	ELECTRON DEVICE LAB-EC391(GR.-B)[AVC,TNP,MLD]		
	IT	CS302-DataStructure &Algorithm(JD)		EC(CS)305 –Communication Engineering and Coding Theory(SK)		SESSIONAL(ITPAPER)		
WED	CE	CE(BS)301		HS 301	INTRO. TO CE [PR]	MATHS-III [SR]		
	EE	PC-EE301(SS)		BS-M301[SP]	Analog Electronics (PC-EE302) [RRG]	PC-CS 391 [Gr.-A] [SP]		
	ME		Basic Electronics Engineering[ES-ECE301] [AKP/SYB]	ENGG. MECHANICS [ES-ME 301] [AM]	BS-M 301 [SR]	PRACTICE OF MANF. PROCESS [PC-ME 391] (B)		
	CSE	PCC-CS302 [SR]		PCC-CS301 [DKK]		PCC-CS391 [Gr. A][DKK/JD]/ PCC-CS392[Gr. B][SR/PG]		
	ECE	ES-CS 301 [SVD]	DIGITAL SYSTEM DESIGN-EC-302[AKM]	NETWORK THEORY-EC-304[JSM]		DIGITAL SYSTEM DESIGN LAB-EC-392(GR.-A)[AKM,RRG]/ ES-CS391(GR-B.) [SVD/MG]		
	IT	PCC-CS 302 [DM]		PCC-CS 301 [AH]		PCC-CS391 [Gr.-A] [AH/JD] /PCC-CS 392 [Gr.-B] [DM/PG]		
THURS	CE			ENGG. MECHANICS [GB]		CAD (B) [PR,BCM]		
	EE	BS-EE301	PC-EE303(SD)	BS-M301[SP]	ES-ME301 [NH]	PC-CS 391 [Gr.-B] [SP]		
	ME	BIOLOGY [BS-BIO-301]		MANF. PROCESS [PC-ME 302] [SRC]	ENGG. MECHANICS [ES-ME 301] [AM]	PRACTICE OF MANF. PROCESS [PC-ME 391] (A)		
	CSE	BSC-301 [MATH]		ESC 301 [SB]		ESC391 [Gr.-A] [SB/MG]/PCC-CS393[Gr.-B] [SKR]		
	ECE	Environmental Sc.(MC-301)	ELECTRON DEVICE-EC301[AVC]	DIGITAL SYSTEM DESIGN-EC-302[AKM]		DIGITAL SYSTEM DESIGN LAB-EC-392(GR.-A)[AKM,PRB]		
	IT	CS304-Analog&Digital Electronics(DMS)		EC(CS)305 –Communication Engineeringand Coding theory(SK)		CS394-Analog & Digital Electronics LAB (DMS)(GR-A) M(CS)391-Numerical Methods Programming(B)		
FRI	CE		Basic Electronics Lab CE(ES)391 (A) [AKP /SYB, MCH]\ CE(ES)393 (A)			CE(BS)301	MATHS-III [DC]	
	EE	Analog Electronics (PC-EE302) [RRG]	Analog Electronics Lab PC-EE392 (Gr. B) [RRG,PRB,MLD]			MC-EE301		
	ME		BS-M 301 [DC]	MANF. PROCESS [PC-ME 302] [SRC]		THERMODYNAMICS [PC-ME 301] [SM]		
	CSE	PCC-CS301 [DKK]		PCC-CS302 [SR]		PCC-CS391 [Gr.-B] [DKK/JD] / PCC-CS392[Gr.-A][SR/PG]		
	ECE	ES-CS 301 [SVD]		Probability and Statistics [BS-M301]		ES-CS 391 [Gr.-A] [SVD/MG]		
	IT	PCC-CS 301 [AH]		PCC-CS 302 [DM]		PCC-CS391 [Gr.-B] [AH/JD] / PCC-CS392[Gr.-A] [DM/PG]		
SAT	CE		INTRO. TO CE [PR]					
	EE	Analog Electronics Lab PC-EE392 (Gr. A) [RRG,PRB,MLD]		BS-EE301				
	ME							
	CSE	HSMC-301 [HU]		ESC 301[ANALOG PART] [AKM]				
	ECE	Environmental Sc. [MC 301]						
	IT	M(CS)-301-Numerical Methods(PPS)		CS302-DataStructure &Algorithm(JD)				

(Dr. A. Roy)
Principal
Jalpaiguri Govt. Engineering College
Jalpaiguri

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE

CLASS ROUTINE OF 5TH SEMESTER FOR THE SESSION 2020-21 WITH EFFECT FROM 1ST SEPTEMBER, 2020

DAYS	DEPT	PERIODS						
		I	II	III	IV	V	VI	VII
		10.00 - 10:50	10:50– 11.40	11.40-12.30	12:30-1.20	2:35 –3.20	3.20-4.05	4.05-4.50
MON	CE	SOIL MECHANICS-II [BCM]		TE [SK]	ENGG. HYDROLOGY [SG]	SOIL MECH. LAB. (A) [MKM,BCM]/ RC DESIGN (B) [UKM]		
	EE	PC-EE504 (SD)		PC-EE501(GKP)		PC-EE591(A)(SS)/PC-EE592(B)(SMI)		
	ME			Heat Transfer [PC-ME501] [SM]		Mechanical Engineering Laboratory I (Thermal)[AM,NH] [A] / Machine Drawing II [SRC, NRM] [B]		
	CSE	MC-CS501	PCC-CS501[SKR]					
	ECE	COMPUTER ARCHITETURE (EC-502)[DBS]		PEC-IT501C[SB]		PCC-CS591[Gr.-A] [SKR]		
	IT			Electromagnetic Waves EC-501[MRR/SKS]		Electromagnetic Waves Lab EC-591 (Gr.B) [MRR,SDM] / Digital Signal Processing Lab EC593 (Gr.A) [JSM,AKM,TNP]		
TUES	CE	Signals & System ESC501		Signal & Systems(ESC 5010 [SKK]		Introduction to Industrial Management (Humanities III)HSMC-501		
	EE	STRUCTURAL ANALYSIS-I [BC]		ENGG. HYDROLOGY [MKM]		RC DESIGN (A) [UKM] / CACE (B) [KK,SG]		
	ME		PE-EE501A(SS)	OE-EE501[CSE][CG]	PC-EE503(SM)	PC-EE591(B)(SS)/PC-EE492(A)(SMI)		
	CSE		Humanities [HM-HU501]	Solid Mechanics [PC-ME502] [MCM]	Kinematics & Theory of Machines [PC-ME503] [GCC]	Machine Drawing II [AM,SUM] [A]		
	ECE	PCC-CS502 [DM]		Signal & Systems(ESC 501) [RRG]		PCC-CS592 [Gr.-B] [DM]		
	IT	Open Elective (OE-EC501A/B/C/D)	COMP. ARCHITETURE (EC-502)[DBS]	Electromagnetic Waves EC-501[MRR/SKS]	Power Electronics EC 505C [SWM]	Electromagnetic Waves Lab EC-591(Gr.A) [MRR,MTB]		
WED	CE	Operating System PCC-CS502(AKS)		Object Oriented Programming PCC-CS503(AG)		Seminar		
	EE	EE-II [SD]		SOIL MECH-II [BCM]		EE LAB. (A) [SD, SK] / SOIL MECH. LAB. (B) [MKM, BCM]		
	ME		PC-EE504(SD)		PC-EE502(SMI)	PC-EE593(B)(UD/BL)/PC-EE594(SD)(A)		
	CSE		Humanities [HM-HU501]	Solid Mechanics [PC-ME502] [MCM]	Kinematics & Theory of Machines [PC-ME503] [GCC]	Mechanical Engineering Laboratory I (Thermal)[SB,SM] [B]		
	ECE	PCC-CS501 [SKR]		PCC-CS503 [SS]	HSMC-501 [HUMANITIES DEPT.]	PCC-CS591 [Gr.-B][SKR] /PCC-CS593[Gr.-A][SS]		
	IT	Effective Tech. Edu.(MC-HU501)	Digital Signal Processing [EC 504] JSM/MRR	Digital Comm. and Stochastic Process EC-503[SDM]		Digital Communication Lab EC592 (Gr.A) [SDM, MCH]		
THURS	CE	Compiler design(SKM) PCC-CS501		Theory of computation/AI PEC-IT501(DKK/AKS)	Signal & Systems(ESC 5010 [SKK]	Constitution of India/Essence of Indian knowledge tradition MC-IT501		
	EE	TE [SK]		DRCS [UKM]		CACE (A)[KK, SG] / TE LAB (B) [AB, BC]		
	ME	PC-EE503(SM)		OE-EE501[CSE][CG]	PC-EE501(GKP)	PC-EE593(A)(UD/BL)/PC-EE594(SD)(B)		
	CSE		Humanities [HM-HU501]	Kinematics & Theory of Machines [PC-ME503] [SB]		Heat Transfer [PC-ME501] [SM]		
	ECE	CS502 [DM]		PCC-CS503 [SS]	Signal & Systems(ESC 501) [RRG]	PCC-CS592 [Gr.-A] [DM]		
	IT	Digital Comm. and Stochastic Proc.EC 503[SDM]		Power Electronics EC 505C [SWM]		Digital Signal Processing Lab EC593(Gr. B) [JSM,SWM]		
FRI	CE	Object Oriented Programming (AG)PCC-CS503		Theory of computation/AI (DKK/AKS)PEC-IT501				
	EE	EE-II [SD]	STRUCTURAL ANALYSIS-I [BC]	CE(MC)501 [GB]		TE LAB (A) [AB/PR] / EE LAB. (B)[SD,SK]		
	ME	PE-EE501A(SS)		PC-EE502(SMI)		CS(EE)591 (SD) (B)/EE593(BL,SG)(A)		
	CSE			Solid Mechanics [PC-ME502] [MCM]		Project-I		
	ECE	PEC-IT501C [SB]		PCC-CS503 [SS]		PCC-CS593 [Gr. B][SS]		
	IT	Effective Tech. Edu.(MC-HU501)		Digital Signal Processing [EC 504] JSM/MRR		Digital Communication Lab EC592 (Gr. B)[SDM, MCH]		
SAT	CE	System and Signals ESC501		Operating system(AKS) PCC-CS502		Seminar		
	EE	DRCS [UKM]						
	ME			OE-EE501(CSE)[CG]				
	CSE	MC-CS501	PCC-CS503 [SS]	HSMC-501 [HUMANITIES DEPT.]				
	ECE			Open Elective (OE-EC501A/B/C/D)				
	IT							

(Dr. A. Ray)
Principal
Jalpaiguri Govt. Engineering College
Jalpaiguri

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE

CLASS ROUTINE OF 7TH SEMESTER FOR THE SESSION 2020-21 WITH EFFECT FROM 1ST SEPTEMBER, 2020

DAY	DEPT.	PERIODS						
		I	II	III	IV	V	VI	VII
		10:00- 10:50	10:50– 11:40	11:40-12:30	12:30-1:20	2:35 –3:20	3:20-4:05	4:05-4.50
MON	CE	ADRS [KK]		HU-701	WRE [MKM]	ESDP (A) [BC,SD] / CPCE (B) [SG, KK]		
	EE	HU-701	HU-701	EE701 (PKS)		EE-783		
	ME		Adv. Welding Technology [ME703A] [AR]	Operation Research [ME704A] [NM]	Metrology & Measurement [ME702] [NRM]	PROJECT		
	CSE	Principle of Management (HS-HU701)	CS792 [Gr.-A][SS] /CS795 [Gr.-B][CG]					
	ECE	CS 782	Artificial Intelligence EC-705A [SDM]		Embedded System EC704A [MTB]	CS703B[AH]		
	IT	IT701-Internet Technology (AG)		IT703-Computer Graphics (PPS)		IT791-Internet Technology LAB(AG)(GR-B); IT783-Group Discussion (AKS)(GR-A)		
TUES	CE	FOUNDATION ENGG. [AB]		TE-II [SD]		HTE LAB (A)[AB, SK] / ESDP (B) [BC, SD]		
	EE	Digital Signal Processing EC(EE)-701B(MRR)			EE-703(a)(TKM)	EE791(SM)(A)/ Digital Signal Processing Lab EC(EE)791 (B) [DRS,TNP]		
	ME		Advanced Manufacturing Technology [ME701] [SUM]		Adv. Welding Technology ME703A] [AR]	PROJECT		
	CSE	CS702[SS]		CS701[DKK]				
	ECE	FPGA & RECONFIG. COMP. EC-703 B [SWM]		MICRO WAVE ENGG. & RADAR EC-702 [JYL]		CS 782		
	IT	IT704A- Data warehousing and Mining (SB) IT704B Mobile Computing		IT701-Internet Technology (AG)		Industrial Training EC781 [PRB]		
WED	CE	HU-701	WRE [SG]	FOUNDATION ENGG. [AB]		IT792-Soft Computing LAB(SR)(GR-A)		
	EE		HU-701	EE701(PKS)		IT-782 Project Part-I(AKS/SKM/DMS/PPS/ AG)		
	ME		Metrology & Measurement [ME702] [NRM]		O R[ME704A] [NM]	HTE LAB (B) [AB, PR] / CPCE (A) [SG, KK]		
	CSE	CS 782		CS705[CG]		EE791.(SM)(B)/ Digital Signal Processing Lab EC(EE)791(A) [MRR,DRS]		
	ECE	MICRO WAVE ENGG. & RADAR EC-702[JYL]		Wireless Communication EC-701 [AKM]		CAD/CAM LAB [ME 791] (B) [SRC, AM] / M & M LAB [ME 792] (A) [NRM,SUM]		
	IT	IT-702SoftComputing (SR)		IT705E-Advance Data Communication and Coding ()IT705C-Cryptography and Network Security (DMS)		CS703B[AH]		
THURS	CE	TE-II [SD]		ADRS [KK]		FPGA and Reconfig. Computing Lab EC-793 B (Gr.B) [SWM,MTB] / MICRO WAVE Lab EC-792(Gr.A) [JYL,SKK]		
	EE	HU-701	Digital Signal Processing EC(EE)-701B(MRR)		EE782(UD/BL)	IT791-Internet Technology Lab(AG)(GR-A) IT783-Group Discussion (AKS)(GR-B)		
	ME		A M T [ME701] [SUM]	Advanced Welding Technology [ME703A] [AR]		PROJECT		
	CSE	CS702[SS]		CS704B[SR]		EE-783		
	ECE	Wireless comm. EC-701 [SYB]		Embedded System EC704A [MTB]		ME 781-INDUSTRIAL TRAINING EVALUATION		
	IT	IT702-Soft Computing (SR)		IT704A-Data warehousing and Mining(SB) IT704BMobile Computing		CS701[DKK]		
FRI	CE	HU-701		WRE [MKM]		PROJECT-I[EC782]		
	EE		EE-702A(SMI)		Hu701	IT-781Industrial Training Evaluation AKS/SKM/ DMS/PPS/AG)		
	ME		M & M [ME702][NRM]	Operation Research[ME704A] [NM]		PROJECT		
	CSE	CS 782		CS792 [Gr.-B] [SS] /CS795 [Gr.-A] [CG]		EE782(UD/BL)		
	ECE	Principle of Management (HS-HU701)	Artificial Intelligence EC-705A [SDM]		FPGA & RECONFIGURABLE COMPUTING EC-703 B[SWM]	CAD/CAM LAB [ME 791] (A) [AM,SRC] / M & M LAB [ME 792] (B)[SUM,NRM]		
	IT	IT703-ComputerGraphics (PPS)			IT705E-AdvanceData Communication and Coding ()IT705C-Cryptography and Network Security(DMS)	CS705 [CG]		
SAT	CE	PROJECT				FPGA and Reconfig. Computing Lab EC-793 B (Gr.A) [SWM,MTB] / MICRO WAVE Lab EC-792(Gr.B) [JYL,SKK]		
	EE	Digital Signal Processing EC(EE)-701B(MRR	EE702A(SMI)			IT792-Soft Computing LAB(SR)(GR-B)		
	ME		HU-701		EE-703(A)(TKM)	IT-782 Project Part-I (AKS/SKM/DMS/PPS/AG)		
	CSE	CS704B [SR]						
	ECE				CS 782			
	IT	IT-781 Industrial Training Evaluation (AKS/SKM/DMS/PPS/ AG)		PROJECT-I[EC782]				

(Dr. A. Roy)
Principal
Jalpaiguri Govt. Engineering College
Jalpaiguri

Government of West Bengal
Office of the Principal
Jalpaiguri Government Engineering College
Jalpaiguri-735102, West Bengal, India

Phone no.:03561-255131,
Fax no.03561-256143, website:www.jgec.ac.in
Email: principal@jgec.ac.in
Mobile no: +91-9434381078

Ref. No.512-P/2020 **Notification** **Date: 17.10.2020**

Though the physical mode of teaching could not be conducted from 1st September,2020 onwards due to various reasons, it is appreciated drive by the faculty members across the Departments to conduct online classes so that JGEC can comply the AICTE directives (**F.No.AICTE/AB/Academic calendar/2020-21 Dated 13.08.2020**). You are requested to continue the online classes until the physical mode of classes held as per the class routine prepared by the Central Routine committee. Again, a Departmental time table for online classes may be prepared based on the input from Central Routine Committee.

Principal

Enclosure: Class routine
Copy to:

1. All Heads/section Incharge
2. COE
3. Office file

JALPAIGURI GOVT. ENGG. COLLEGE

CLASS ROUTINE OF 2ND SEMESTER FOR THE SESSION 2020-21 WITH EFFECT FROM 03rd MAY, 2021

DAYS	DEPT.	PERIODS						
		I	II	III	IV	V	VI	VII
		9.00-10.00	10:00 – 11.00	11.00-12.00	12.00-1.00	2:15 – 3.15	3.15-4.15	4.15-5.15
MON	CE	BS-CH201 [MNA]		ES-CS201[MG]		BS-CH201[SH]	BS-M202 [DC/SR]	
	EE	BS-PH201[NC]	HM-HU201 [AB]	HM-HU-291[AB]		WORKSHOP [Gr. A]		
	ME	ES-ME291(NH)	BS-M202 [DC/SR]		BS-CH201[SH]	ES-CS201[CG]	HM-HU-291[AB]	
	CSE		ES-ME291 (RR/SR)		ES-ME291(A)(RR)/ ES-CS291 (B)[SKR]			
	ECE	BS-PH201[AS]	BS-PH291(A)[AS]					
	IT	BS-CH201[SH]	BS-M201 [DC/SR]		ES-ME291(A)[SR]/ ES-CS291(B)[SS]			
TUE	CE	BS-M202 [DC/SR]			ES-ME291(B)[RR]/ES-CS291(A)[MG]			
	EE	BS-PH201[NC]	HM-HU201 [AB]	ES-CS201[PG]	ES-CS291(A)[PG]			
	ME	BS-CH201 [MNA]					BS-M202 [DC/SR]	
	CSE	ES-CS201[SKR]		BS-M201 [DC/SR]		ES-ME291(B)[SR]		
	ECE	BS-PH291(Gr.B)[AS]/ ES-CS291(A)[AH]				ES-CS201[SVD]		
	IT	ES-ME291(SR)		ES-CS201[SS]	BS-CH201[SH]	BS-CH291(A/B)[SH & MNA]		
WED	CE	BS-CH201[SH]				BS-CH291(A/B) [SH & MNA]		
	EE	BS-PH291(A)[AR]			BS-PH201[AS]	BS-M202 [DC/SR]		
	ME		ES-CS201(CG)		ES-ME291(A)[NH]/ ES-CS291(B) [CG]			
	CSE	HM-HU-291[AB]		BS-CH201 [MNA]		HM-HU-201[AB]		
	ECE			BS-PH201[AS]	ES-CS201 [SVD]	WORKSHOP [Gr. A]		
	IT		BS-M201 [DC/SR]		ES-ME291(B)[SR]/ ES-CS291(A)[SS]			
THU	CE	HM-HU291(AB)		ES-CS201(MG)		HM-HU201(AB)		
	EE	BS-M202 [DC/SR]		BS-PH201[AR]	ES-CS291(B)[PG]			
	ME			HM-HU-201[AB]		Sec B-ES-ME291(NH)		
	CSE	BS-CH201[SH]	BS-CH291(A/B) [SH & MNA]					
	ECE	ES-CS291 (B)[AH]			BS-PH201[AR]	BS-M202 [DC/SR]		
	IT			ES-CS201[SS]		BS-CH201 [MNA]		
FRI	CE			ES-ME291(RR)	Sec B-ES-ME291(RR)			
	EE		WORKSHOP(B)			ES-CS201[PG]		
	ME	ES-CS291(A)[CG]				BS-CH291(A/B)[SH & MNA]		
	CSE		ES-CS201[SKR]	BS-M201 [DC/SR]		ES-CS291(A)[SKR]		
	ECE	HM-HU-201[AB]	HM-HU291(AB)		BS-201[NC]	BS-M202 [DC/SR]		
	IT		HM-HU-291[AB]			HM-HU-201[AB]		
SAT	CE	ES-CS291(B)[MG]				(DR. A. ROY) PRINCIPAL JALPAIGURI GOVT. ENGINEERING COLLEGE JALPAIGURI		
	EE		BS-PH291(B)[NC]					
	ME		BS-CH201[SH]					
	CSE				BS-CH201[SH]			
	ECE	HM-HU-201[AB]	WORKSHOP [Gr. B]					
	IT							

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE

CLASS ROUTINE OF 4TH SEMESTER FOR THE SESSION 2020-2021 WITH EFFECT FROM 03rd MAY, 2021

DAYS	DEPT	PERIODS						
		I	II	III	IV	V	VI	VII
		9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	2:15-3:15	3:15-4:15	4:15-5:15
MON	CE	CE(PC)401 [AB]		CE(PC)403 [PR]		CE(ES)491[B] (AB,SG) / CE(ES)492[A] (KK,SK)		
	EE	PC-EE402 [ECE][MTB]		PC-EE401 [GKP]	MC-EE 401[MNA]	PC-EE493(A)[TKM,MSen,SrG]/PC-EE491(B)[SS,SDM,MS]		
	ME	MC-CH401[SH]	MC401 ES[CH]	PC-ME402 FM&FM [AM]		MP LAB(A)[W/S]		
	CSE		PCC-CS401 (SP)			PCC-CS492(B)[SB]		
	ECE	BS-M401(Num. method)[JSM]		EC-401(Analog Comm.) [SDM]		BS-M(CS)491(A)[JSM,SWM]/EC493(B)[RRG,AVC,TNP]		
	IT	HSMC- 401[TS]		MC-401		PCC-CS492(A)[AG]/TUTORIAL(B)		
TUES	CE	CE(MC)401 [SG]		CE(PC)404 [BC]	CE(PC)402 [SK]	CE(PC)493[B] (PR,BCM)/ CE(ES)491[A] (SG,AB)		
	EE		PC-EE402[MTB]	PC-EE403 [TKM]		PC-EE493(B)[TKM,MSen,SrG]/PC-EE492(A)[MTB,AKP,JLD]		
	ME	PC-ME404 MI[NRM]		PC-ME403 SM [SB]		PC-ME491[B][SUM,NRM]		
	CSE		PCC-CS402[SB]	PCC-CS494(A)[AH]				
	ECE	ES-CS401 [SWM]		EC403(Microproc.&Microcontrl)[JSM]		EC491(GR.A)-(Analog Comm. Lab)[SDM,MCS]		
	IT	PCC-CS403 (DKK)		PCC -CS401 (AKS)		PCC-CS494 (A)(AKS)/TUTORIAL(B)		
WED	CE	CE(HS)401 [PR]		CE(PC)404 [BC]		CE(ES)492[B] (SK,KK)/ CE(PC)494[A] (BC,BCM)		
	EE		ES-ME401 [NH]	PC-EE401 [GKP]	MC-CH401 [SH]	PC-EE491(A)[SS, SDM, MS]		
	ME	ES-ME401 ME[SRC]		PC-ME401 AT[AK]		M/C Drawing-I[A][SUM,NRM]/MP LAB[B][W/S]		
	CSE		PCC-CS404[AH]	PCC-CS403(DKK)		PCC-CS492(A)[SB]/ PCC-CS494(B)[AH]		
	ECE		HS-HU481(AB)		EC402 [AKM]	EC492 (B) [AKM,AKP,SYB,MLD]/ EC493(A)[RRG,AVC,TNP]		BS-B401
	IT	PCC-CS404[AKS]		PCC-CS-401[DKK]		PCC-CS492(B)[AG]/ TUTORIAL(A)		
THURS	CE	CE(ES)401 [SG]		CE(ES)402 [KK]		CE(PC)493[A] (BCM,PR)		
	EE	ES-ME401 [NH]		HM-EE401(TS)	PC-EE403 [TKM]	ES-ME491(B) [AK,NH]		
	ME	PC-ME404 MI[NRM]		PC-ME403 SM [SB]				
	CSE	PCC-CS402[SB]		PCC-CS 401 (SP)		BSC-401[New Faculty]	MC-401 [MNA]	MC-401[SH]
	ECE	EC402(Analog Elec. Circt.) [AKM]		EC401 [SDM]	EC403[JSM]	EC492(A)[AKM,AKP,SYB,MLD]/ EC491 (B)[SDM,MCS]		
	IT		PCC-CS402(AG)	HSMC- 401[TS]		PCC-CS494(B)[AKS]/ TUTORIAL(A)		
FRI	CE		CE(PC)401 [AB]	CE(PC)402 [SK]		CE(ES)493[A] (SD,PR)/ CE(PC)494[B] (BCM,BC)		
	EE	HM-EE401(TS)		MC-EE401		ES-ME491(A) [NH,AK] / PC-EE492(B) [MTB,AKP,JLD]		
	ME	MC401 ES[CH]	ES-ME401 ME[SRC]	PC-ME402 FM&FM [AM]		M/C Drawing-I[B][SRC, AM]/PC-ME491[A][NRM,SUM]		
	CSE	PCC-CS403(DKK)		PCC-CS404[AH]		BSC-401[New Faculty]		
	ECE	BS-B401(Biology for Engg.)		ES-CS401 [SWM]	BS-M401[JSM]	BS-M(CS)491 (GR.B)-(Num. method Lab)[JSM,SWM]		
	IT		PCC-CS401(AKS)		PCC-CS404[AKS]			
SAT	CE		CE(PC)403 [PR]	CE(ES)493[B] (PR,SD)				
	EE		PC-EE401 [GKP]		MC-EE401*			
	ME	PC-ME401 AT[NH]		MC-CH401 [MNA]				
	CSE							
	ECE			HU481 (AB)				
	IT	PCC-CS402[AG]		MC401				

(DR. A. ROY)
PRINCIPAL
JALPAIGURI GOVT. ENGINEERING COLLEGE
JALPAIGURI

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE

CLASS ROUTINE OF 6TH SEMESTER FOR THE SESSION 2020-21 WITH EFFECT FROM 03rd MAY, 2021

DAYS	DEPT	PERIODS						
		I	II	III	IV	V	VI	VII
		9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	2:15-3:15	3:15-4:15	4:15-5:15
MON	CE	CE(OE)601A [AB]/CE(OE)601B[TS]		CE(PE)602 [SK,KK,UKM]		CE(PC)695 [A] (SD, PR)/ CE(PC)694 [B] (BC,UKM)		
	EE			PC-EE602[SD]	HM-601	PC-EE691(A)[SMI,SDM,BL]/ PC-EE692(B)[SD,MSe,SuG]		
	ME	PC-ME601[AR]		PC-ME602[GCC]	PE-ME602A1 [NM] PEME602A6[NRM]	PC-ME691[A][GCC,SB] /PC-ME691[B][CE]		
	CSE	PCC-CS 601 (SVD)		PEC-IT601D [SR]	PCC-CS692 [B] (DM) / PCC-CS691 [A][SVD]			
	ECE			EC 601(Control Sys. &Instr) [MRR]	PE-EC603A[AVC]/ PE-EC603B[PRB]/ PE-EC603C[MTB]/ PE-EC603D[TNP]	EC691(A)[DBS,SMK]/EC681(B) [AKM,SDM,MRR,SYB,PRB,JLD,SMK,AKP]		
	IT		PCC-CS602[SKM]	PEC-IT601 (AKS)		PROJ-IT601 (A)[SD/SKM/AKS/PPS/AS /AG/DKK]		
TUES	CE	CE(PE)601 [AB,BCM]		CE(PC)603 [SG]		CE(PC)694 [A] (BC,UKM)		
	EE	PC-EE601[SMI]		PE-EE602(b)[SM]		PC-EE691(B)[SMI,SDM,BL]/PC-EE692(A)[SD,MSe,SuG]		
	ME	HM-HU601[SMU]	PE-ME601A10[AM]		PC-ME601[AR]	PW-ME681(PROJECT II)		
	CSE		OEC-IT601A (SP)		PCC-CS 602 (DM)	PROJ-CS681 [ALL TEACHER]		
	ECE	EC601(Control Sys. &Instr) [MRR]		OE-EC604A [RRG] / OE-EC604B[SDM]		MC-681(NF)		
	IT		PCC-CS601[SD]	PEC-IT602[SB]		PROJ-IT601(B) [SD/SKM/AKS/PPS/AS/AG/DKK]		
WED	CE	CE(PC)602 [SD]		CE(PE)601 [AB,BCM]		CE(PC)695 [B] (SD, PR)		
	EE	HM-601		PC-EE602[SD]		PC-EE681[SM]		
	ME		PE-ME602A1[NM] / PE-E602A6[NRM]	PC-ME602[GCC]		PC-ME691[B][SB,GCC] / PC-ME691[A][CE]		
	CSE	PROJ-CS681 [ALL TEACHER]		PEC-IT602B (SB)		PROJ-CS681 [ALL TEACHER]		
	ECE		EC 602 [DBS]	PE-EC603A[AVC]/ PE-EC603B[PRB]/ PE-EC603C[MTB]/ PE-EC603D[TNP]		EC692(Control Sys &Inst Lab)(Gr.A)[MRR,PRB]		
	IT	PCC-CS602 (SKM)		PEC-IT601 (AKS)		PROJ-IT601(A) [SD/SKM/AKS/PPS/AS/AG/DKK]		
THURS	CE	CE(PC)604 [BC]*		CE(PC)601 [GB]		CE(PC)693 [A] (SG,SK)		
	EE		PC-EE601(SMI)	OE-601[UD]		PC-EE681[SM]		
	ME		HM-HU601[SMU]	PC-ME601[AR]	PE-ME601A10[AM]			
	CSE		OEC-IT601A (SP)	PEC-IT601D [SR]		PROJ-CS681 [ALL TEACHER]		
	ECE	Tutorial Class		EC 602(Comp. Net) [DBS]		EC692(B)[MRR,PRB] /EC681(A)[JSM,MTB,SWM,RRG,PRB,AVC,TNP,DBS]		
	IT	OEC IT601 (PPS)		PCC-CS601 (SD)		PROJ-IT601(B) (SD/SKM/AKS/PPS/AS /AG/DKK)		
FRI	CE	CE(PC)603 [SG]*		CE(PC)604 [BC]		CE(PC)693 [B] (SG,SK)		
	EE	PE-EE602(b)[SM]		PE-EE601(c)[SS]				
	ME		HM-HU601[SMU]	PC-ME602[GCC]	PE-ME602A1 [NM] / PE-ME602A6[NRM]	PW-ME681(PROJECT II)		
	CSE	PEC-IT602B (SB)	PCC-CS602 (DM)		PCC-CS691 [B][SVD]/ PCC-CS692 [A] (DM)			
	ECE	OE-EC604A [RRG] / OE-EC604B[SDM]		HU601 (SG)		EC691(Comp. NetLab)[Gr.B](DBS,SMK)		
	IT	PEC-IT602(SB)		Project-1		PROJ-IT601(A) (SD/SKM/AKS/PPS/AS /AG/DKK)		
SAT	CE	CE(PC)601 [GB]	CE(PC)602 [SD]	CE(PE)602 [SK,KK,UKM]		(DR. A. ROY) PRINCIPAL JALPAIGURI GOVT. ENGINEERING COLLEGE JALPAIGURI		
	EE	HU601(SG)		OE-601[UD]	PE-EE601(c)[SS]			
	ME							
	CSE	PCC-CS 601 (SVD)	PROJ-CS681 [ALL TEACHER]					
	ECE	Tutorial Class						
	IT		OEC IT601(PPS)	PROJ-IT601(B) (SD/SKM/AKS/PPS/AS /AG/DKK)				

JALPAIGURI GOVERNMENT ENGINEERING COLLEGE

CLASS ROUTINE OF 8TH SEMESTER FOR THE SESSION 2020-21 WITH EFFECT FROM 03rd May, 2021

DAY	DEPT.	PERIODS						
		I	II	III	IV	V	VI	VII
		9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	2:15-3:15	3:15-4:15	4:15-5:15
MON	CE	CE 804 (SG)		CE 801 (GB)		CE 892 [PROJECT]/ CE 893 [SEMINAR]		
	EE		EE-882(SD, SS)			PROJECT		
	ME	HU 801[SG]				INDUSTRIAL LAB (A)[NM,SUM]		
	CSE	HU 801[SG]	PROJECT-II (CS 882)			PROJECT-II (CS 882)		
	ECE	EC-801A (Nano Tech.)[MRR]/ EC801C(RemSnsing)[AKM]/ EC801D(Radar &Nav)[JDL]		EC802A(Dig ImgProc)[SWM]/ EC802B(Mob Comp)[SYB]		EC881(Seminar)-GR.1-[MTB,SDM,MRR,AKP,AVC,DBS]		
	IT	HU-801- Financial Management (SG)		IT- 802A -Cyber Law & Security Policy (DMS)		IT- 891 - E-Commerce Laboratory (Group - A) (PPS)		
TUES	CE			CE 803 (BCM,AB,SD)		CE 894 [A] (KK,SD)		
	EE	EE-801[BL]		EC(EE)-801B(Comm.Eng)[SMK]		PROJECT		
	ME	ELECTIVE VI-803 C[AK]		EL-V-802A[SM]		PROJECT		
	CSE	PROJECT-II (CS 882)		CS 801A (CG)		PROJECT-II (CS 882)		
	ECE		EC882(Project-II)			EC881(Seminar)-GR.2-[JSM,AKM,SWM,RRG,TNP]		
	IT	IT -801- E-Commerce (PPS)		IT 882[SD,SKM,AKS,PPS,DMS,AG]		IT 882 Project -II (SD/SKM/AKS/PPS/DMS/AG)		
WED	CE	CE 804 (SG)		CE 802 (UKM)		CE 892 [PROJECT]/ CE 893 [SEMINAR]		
	EE	EC(EE)-801B(Comm.Eng)[SMK]		EE-802(c)[SMI]		PROJECT		
	ME					PROJRCT		
	CSE	PROJECT-II (CS 882)		CS 802A (SR)		CS 892A(A) (SR)		
	ECE	HU801(SG)	EC882(Project-II)			EC881(Seminar)-GR.3-[SWM,RRG,JDL,SYB,SMK]		
	IT		IT- 801 - E-Commerce (PPS)	IT- 882- Project (SD/SKM/AKS/PPS/AS /AG/DKK)		IT 882 Project -II (SD/SKM/AKS/PPS/DMS/AG)		
THURS	CE			CE 803 (BCM,AB,SD)		CE 894 [B] (KK,AB)		
	EE			PROJECT		PROJECT		
	ME	IEM-801[SUM]		EL-V-802A[SM]		INDUSTRIAL LAB (B)[SUM,NM]		
	CSE	HU-801[SG]		CS 801A (CG)		CS 892A(B) (SR)		
	ECE	EC802A(Dig ImgProc)[SWM]/EC802B(Mob Comp)[SYB]		EC-801A (Nano Tech.)[MRR]/ EC801C(Rem Sensing) [AKM]/ EC801D(Radar & Nav)[JDL]		EC882(Project-II)		
	IT	IT- 882- Project -II (SD/SKM/AKS/PPS/MD/AG)						
FRI	CE	CE 802 (UKM)		CE 801 (GB)		CE 892 [PROJECT]/ CE 893 [SEMINAR]		
	EE		PROJECT			EE-882(SD, SS)		
	ME	ELECTIVE VI-803 C[AK]		IEM-801[SUM]		PROJECT		
	CSE	PROJECT-II (CS 882)		CS 802A (SR)		PROJECT-II (CS 882)		
	ECE	IT- 802A- Cyber Law & Security Policy (DMS)		HU-801- Financial Management (SG)		IT -891 E-Commerce Laboratory (Group -B)(PPS) (LAB),AKM,SDM,MRR,RRG,PRB]		
	IT	IT 801[PPS]		IT 802 A [DMS]		PROJECT-II [IT-882][SD/SKM/AKS/PPS/DMS/AG]		
SAT	CE	CE 892 [PROJECT]/ CE 893 [SEMINAR]				(DR. A. ROY) PRINCIPAL JALPAIGURI GOVT. ENGINEERING COLLEGE JALPAIGURI		
	EE	EE-801 [BL]			EE-802(c)(SMI)			
	ME							
	CSE	PROJECT-II (CS 882)						
	ECE	HU801(SG)	EC882(Project-II)					
	IT	IT 882 Project (SD/SKM/AKS/PPS/AS /AG/DKK)						