

SAURASHTRA UNIVERSITY

B.E SEMESTER V

TEACHING AND EXAMINATION SCHEM

YEAR OF IMPLEMENTATION :2005-2006

Code	subject	Teaching scheme		Examination Scheme				
		Lect. Hrs	Pract. Hrs	Theory marks	Paper Hrs	Oral\ Pract.	T.W	Total marks
501	Electronics Measurement	4	2	100	3	50	25	175
502	Digital Control System	4	2	100	3	50	25	175
503	Electrical Machine-II	4	2	100	3	50	25	175
504	Electronics Communication	4	2	100	3	50	25	175
505	Engineering Electromagnetics	4	-	100	3	-	-	100
506	Electronics Workshop	-	2	-	-	50	25	75
	Total	20	10	500		250	125	875

One Industrial Visit Be held during the semester

SAURASHTRA UNIVERSITY, RAJKOT
B.E .SEM. V (ELECTRICAL&ELECTRONICS ENGG.)

(501) SUBJECT: ELECTRONICS MEASUREMENT

Theory scheme		Examination scheme				
Theory Hrs.	Pract. Hrs.	Theory Marks	Paper Hrs.	Pract\oral marks	Term work marks	Total marks
04	02	100	03	50	25	175

1). Indicator and display devices:

Digital display system and indicator, classification of display, display device, printers, dot matrix printers.

2). ANALOG MEASUREMENT INSTRUMENTS:

RF ammeter, effect of frequency on calibration, measurement of very large current by Thermocouple, transistor voltmeter, chopper type DC amplifier voltmeter, solid state voltmeter, AC voltmeter using Rectifier, multimeter AC voltmeter average responding voltmeter, peak responding voltmeter, true RMS meter, consideration in choosing an analog voltmeter, multimeter, multimeter operating instruction, transistor tester, megger.

3). Digital measuring instrument:

Digital meter introduction, resolution and sensitivity, ramp technique, dual slope integrating type DVM, Integrating type DVM, most commonly used principles of ADC, Successive approximation, continuous balance DVM, 3-1/2 digital, general specification of DVM, digital multimeter, digital frequency meter, introduction and concept of microcontroller controlled digital meter.

4). OSCILLOSCOPE:

CRT feature, block diagram of simple CRO, dual beam CRO, dual trace oscilloscope, sampling oscilloscope, analog and digital storage oscilloscope, probes for CRO, attenuators, oscilloscope operating precaution, fiber optic CRO recording oscilloscope.

5). SIGNAL GENERATORS:

Introduction, fixed frequency of AF oscillator, variable AF oscillator, standard signal Generator, modern laboratory signal generator, AF sine and square wave generator, function generator, square and pulse generator, random noise generator, sweep generator, TV sweep generator, marker generator, sweep marker generator, wobblscope, video pattern generator, colour bar generator, vector scope, beat frequency oscillator, standard specification of a signal generator.

6).WAVE ANALYZERS AND HARMONICS DISTORTION :

Basic wave analyzer, frequency selective wave analyzer, harmonic analyzer, spectrum Analyzer, digital Fourier analyzer, practical FET spectrum analysis using waveform Processing software.

7).RECORDERS:

Type of recording devices, strip chart recorder, null type recorder, linear servo motor Recorder, circular chart recorder, X-Y recorder, digital data recording, recorder Selection for particular application, recorder specification.

8).DATA ACQUISITION AND TRANSMISSIOM:

Requirement for data acquisition system, objective of DAS, A/D converter, signal Channel DAS, principle of multi channel DAS, DATA transmission system, advantage and disadvantage of digital transmission over analog transmissions.

REFERENCE BOOKS:

- 1).DAVID BELL-electronic instrumentation & measurement.
- 2).H.S KALSI- electronic instrumentation.
- 3).A.K SAWHANY- electrical & electronics instrumentation.
- 4).COOPER- modern electronics instrumentation and measurement Techniques.

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(502) SUBJECT: DIGITAL CONTROL SYSTEM

Theory scheme		Examination scheme				
Theory Hrs.	Pact. Hrs.	Theory Marks	Paper Hrs.	Pact/oral marks	Term work marks	Total marks
04	02	100	03	50	25	175

1).PROCESS CONTROL LOOP AND ITS CHARATRISTIC:

Controlled variable, controlling parameters, process equation load, transient, process Lag, self regulation, control lag, variable range, dead time, cycling.

2). CONTROL ALGORITHMS:

Characteristic of different dis continuous controller mode two position mode, multi Position mode, floating control mode,
Introduction of different continuous controller mode, proportional, integral, Derivative, propotional+integral, propotional+derivative,
Propotional+integrale+derivative.

3).PROGRAMMABLE LOGIC CONTROLLER (PLC):

Architecture by block diagram, I/O modules& programming criteria-discrete state
Process control, analog controller, digital controller, and intelligent controller, serial
Communication port.
Memory and storage, programming language- ladder diagram and its application.

4). DISTRIBUTED CONTROL SYSTEM:

Evaluation of DCS, system architecture-hierarchical of DCS at function levels,
Database organization, system implementation concepts
System elements- fields, station, intermediate station, central computer system,
Monitoring and communication facilities
Data communication link- transfer of process, data , LAN transmission
Soft ware- real time operating knowledge database.

Reference book:

- 1).LAPTIC- PROCESS CONTROLS.
- 2).CURTIS JOHNSON- process control instrumentation technology.

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(503) SUBJECT: ELECTRICAL MACHINES-II

Theory scheme		Examination scheme				
Theory Hrs.	Pact. Hrs.	Theory Marks	Paper Hrs.	Pact/oral marks	Term work marks	Total marks
04	02	100	03	50	25	175

1). DC MACHINE : Armature winding: introduction , single & two layer windings, closed & open windings, coils & coil sides, numbering scheme, coil span, types of dc windings, windings pitches, simplex lap winding, simplex wave winding, dummy coils , parallel

Operation of dc generator, series generator in parallel, shunt generator in parallel, connection of losses & efficiency of dc machine , swinburnes test, regenerative or hopkinsons test, retardation test , testing of dc series motors.

2). 3-PHASE TRANSFORMERS:

Introduction , construction, the vector groups of transformer connection nomenclature, General remarks on 3-phase connection, tertiary winding, Scott connection, parallel operation, transients in transformer

3). POLY PHASE INDUCTION MOTOR:

Testing of induction motor as per IS-325, circle diagram , performance calculation, methods of starting, double squirrel cage motors, equivalent circuit of double squirrel cage motor , speed control of induction motors, advantage , disadvantage, and application of induction motors.

4). SPECIAL MACHINES:

Synchronous induction motor, induction generator, induction regulation, the variable speed commutator type 3-phase induction motor, linear induction motor, AC commutator motors.

5). 1-phase induction motor:

Introduction , working principle, double revolving field theory, starting, split phase motors, capacitor start motor, capacitor start run motor, equivalent circuit , testing of single phase induction motor , shaded pole motor, repulsion motor, universal motor, reluctance motor, stepper motor, application .

6). Alternator:

Voltage regulation , MMF methods, zero power factor or potter method , two reactance concepts for salient pole machine, construction of two reactance diagram from test data. Synchronizing of alternator and division of load , synchronizing power & torque .

7).synchronous motor:

Construction , principle of operation , effect of load on a synchronous motor , effect of varying excitation on alternator current and power factor , vector diagram , power developed , condition for maximum power developed , V-curves , constant power lines, main characteristic of synchronous motor , synchronous condensers, hunting methods of starting of synchronous motor under load, advantage and disadvantage of synchronous motor, application .

REFERANCE BOOK:

1. The performance & design of alternating current machine by M.G SAY
2. Electrical technology vol .II. by B.L.thereja.
3. Electrical machinery by Dr. P.S Bhimbhra
4. Theory & performance of electrical machine by J.B.Gupta
5. ELETRICAL MACHINES by Ashfac Husain.

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(504) SUBJECT: ELECTRONIC COMMUNICATION

Theory scheme		Examination scheme				
Theory Hrs.	Pact. Hrs.	Theory Marks	Paper Hrs.	Pact\oral marks	Term work marks	Total marks
04	02	100	03	50	25	175

1).COMMUNICATION FUNDAMENTAL:

INTRODUCTION to waveform spectra , introduction to audio signal , frequency rang for speech and music , sound pressure level , intensity , loudness level , pitch frequency, sound distortion

2).NOISE:

Thermal noise , short noise , partition noise , low frequency or flicker noise, burst noise, avalanche noise , bipolar transistor noise , field effect transistor noise , equivalent input noise generator ,and comparison of BJTs and FETs , signal to noise ratio , S/N ration of a tandem connection , noise temperature, measurement of noise , temperature and noise factor .

3).RECEIVER:

Super heterodyne receiver, tuning range, tracking, sensitivity and gain , image rejection , spurious response, adjacent channel selectivity automation gain control(AGC) , double conversion.

4).Amplitude modulation:

Amplitude modulation, amplitude modulation index , modulation index for sinusoidal AM, frequency spectrum for sinusoidal AM , average power for sinusoidal AM , Effective voltage and current for sinusoidal AM, double sideband suppressed carrier modulation , amplitude modulation circuit , amplitude demodulator circuit , amplitude modulated transmitters.

5).SINGAL SIDEBAND MODULATION :

Single sideband principle, balanced modulators, SSB generation, SSB reception, modified SSB system, signal to noise ratio for SSB, companded signal sideband. Frequency modulation, sinusoidal FM,frequency spectrum for sinusoidal FM , average power in sinusoidal FM , measurement of modulation index for sinusoidal FM ,phase modulation , equivalence between PM and FM sinusoidal phase modulation , FM transmitter , automatic frequency control , amplitude limiters , pre- emphasis and de-emphasis , FM broadcast receiver .

6).PULSE MODULATION:

Pulse amplitude modulation (PAM), quantization error, pulse code modulation, pulse frequency modulation, pulse time modulation, pulse position modulation.

7).Multiplexing:

Time division multiplexing, frequency division multiplexing, T1 TDM –PCM hierarchy.

8).SATELLITE COMMUNICATION:

Keplers first law , keplers second law , keplers third law, orbits , geostationary orbit , power system , attitude control , frequency plans and polarization , transponders, multiple- access method .

9).DIGITAL COMMUNICATION S:

Synchronization, asynchronous transmission, data transmission techniques such as ASK, FSK, PSK, QPSK, EYE diagram.

10).MODEM:

Principle of modem, function, operation of some specific modems, short haul modems, digital modems.

11).SERIAL COMMUNICATION STANDARD:

RS-232, voltage analogy, data bits, RS-232 error condition, RS-232 pin designation, handshaking, RS-232 inter connection work, multi drop communication, RS-422, RS - 423, RS-485 communication.

REFERANCE BOKK:

1. Denish reddy & john coolen – electronics communication.
2. Taub &schilling –principle of communication system.
3. William schweber- data communication.
4. Kennedy- electronics & communication.

SAURASHTRA UNIVERSITY, RAJKOT
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(505) SUBJECT: ENGINEERING ELECTROMEAGNETICS

Theory scheme		Examination scheme				
Theory Hrs.	Pract. Hrs.	Theory Marks	Paper Hrs.	Pract\oral marks	Term work marks	Total marks
04	-	100	03	-	-	100

1).VECTOR ANALYSIS:

Introduction , scalars and vectors, product of vectors , co- ordinate systems, scalars and vectors fields , del operator , gradient of a scalar point function , divergence of a vectors point function , curl operators .

2).COULOMB'S LAW & ELECTRIC FIELDS INTENSITY:

Intensity, electric fields intensity for several point charge, electric field intensity for various charge distribution , line charge distribution , surface charge distribution .

3).ELETRIC FLUX DENSITY &GAUSS'S LAW:

Introduction, electric flux , electric flux density , gauss's law , application of gauss's law , point charge , infinite line charge , The case of coaxial cable , divergence theorem , Maxwell's first equation .

4).ENERGEY AND POTENTIAL:

Introduction , electric potential , potential gradient , electric dipole, energy density , potential energy in continuous charge distribution .

5).CONDUCTORS, DIELETRIC S, CAPACITANCE :

Introduction , continuity of current , steady state current , conductors properties , dielectric materials and properties capacitance , parallel plate capacitors , spherical capacitors , capacitors for coaxial cable .

6).POISON AND LAPLACE'S EQUATION:

Introduction, Poisson and laplace's equation s, problem solution of laplace's equation .

7).STEADYMAGNETIC FIELD:

Introduction , biot –savart's law, magnetic fields intensity , ampere's circuital law , application of ampere's circuital law , magnetic flux and flux density , coaxial cable , solenoid, toroid , magnetic induction , faraday's law and self inductance mutual inductance , scalar and vector magnetic potential , magnetic forces, lorents force equation , force on differential current, force between parallel conductors .

8).TIME VARYING FIELDS:

Introduction, faraday's law, summary of faraday's law, Lenz's law, concepts of displacement current.

9).MAXXWELL'S EQUATION:

Maxwell's static fields equation , time varying equation , free space equation , harmonically varying fields equation , boundary condition , boundary condition between conductors and free space , boundary condition between perfect dielectric , magnetic boundary condition .

10).UNIFORM PLANE WAVES:

Introduction , uniform plane waves in time domain in free space sinusoidal time varying uniform plane wave in free space , wave equation for conductors.

Reference Book:

1. engineering electromagnetic By William hayt jr.
2. A textbokk of electromagnetic field theory By S.P Seth.

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(506) SUBJECT: ELECTRONI WORKSHOP

Theory scheme		Examination scheme				
Theory Hrs.	Pract. Hrs.	Theory Marks	Paper Hrs.	Pract\oral marks	Term work marks	Total marks
-	02	-	02	50	25	75

The student will refer to the books /journal like electronic circuit design , Hand book s of Electronic project , project's book, Electronics for you, Elector India, etc. and select a project which may cover a topic from any of the subjects they study / have studied. The project must be of working type based on electronic application. They have also to prepare a write-up covering theory, circuit diagram/s, pin diagram of IC's etc. aiongwith the results, if any.