

S Y L L A B U S

BACHELOR OF TECHNOLOGY

ELECTRICAL ENGINEERING

(Semester Scheme)

Four Year Degree Course

B.Tech., Second Year Examination, 2010 / 2011

B.Tech., Third Year Examination, 2011 / 2012

B.Tech., Fourth Year Examination, 2012 / 2013



JODHPUR NATIONAL UNIVERSITY
JODHPUR

Jodhpur National University, Jodhpur

Faculty Of Engineering & Technology

Teaching & Examination scheme

B.Tech. Electrical Engineering (Four Year Course)

II B.Tech III Semester

Subject Code	Subject	Lectures	Tutorials	Practicals	Exam. H.	Theory		Practicals & Sessionals		Total
						Internal	External	Internal	External	
A.	Written Papers									
EE301	Electrical Machines - I	3	1		3	20	80			100
EE302	Electrical Measurement & Instrumentation	3	1		3	20	80			100
EE303	Electronics Devices & Circuits-I	3	1		3	20	80			100
EE304	Computer Programming-I	3			3	20	80			100
EE305	Circuit Analysis-I	3	1		3	20	80			100
EE306	Mathematics	3	1		3	20	80			100
GE 307 A*	Special Mathematics - I **	3	1		3	20**	80**			100**
Total (A)		21	6		21	120	480			600
B. Practical & Sessionals										
EE311	Electrical Machine-I Lab			2				60	40	100
EE312	Electrical Measurement & Instruments Lab			2				60	40	100
EE313	Electronic Devices & Circuits-I Lab			2				60	40	100
EE314	Computer Programming-I Lab			2				60	40	100
Total (B)				8				240	160	400
Grand Total (A+B)										1000

**** Sessional Exam: marks shall not be counted for awarding division.**

Jodhpur National University, Jodhpur

Faculty Of Engineering & Technology

Teaching & Examination scheme

B.Tech. Electrical Engineering (Four Year Course)

II B.Tech IV Sem.

Subject Code	Subject	Lectures	Tutorials	Practicals	Exam. H.	Theory		Practicals & Sessionals		Total
						Internal	External	Internal	External	
A.	Written Papers									
EE401	Electrical Machines-II	3	1		3	20	80			100
EE402	Electronics Devices & Circuit-II	3	1		3	20	80			100
EE403	Computer Programming-II	3			3	20	80			100
EE404	Digital Electronics	3	1		3	20	80			100
EE405	Circuit Analysis - II	3	1		3	20	80			100
EE406	Advanced Mathematics	3	1		3	20	80			100
GE407 A*	Special Mathematics - II**	3	1		3	20**	80**			100**
Total (A)		21	6		21	120	480			600
B. Practical & Sessionals										
EE411	Electrical Machine-II Lab			2				60	40	100
EE412	Electronics Devices & Circuit - II Lab			2				60	40	100
EE413	Computer Programming-II Lab			2				60	40	100
EE414	Digital Electronics Lab			2				60	40	100
Total (B)				8				240	160	400
Grand Total (A+B)										1000

** Sessional Exam: marks shall not be counted for awarding division.

Jodhpur National University

(Faculty of Engineering & Technology)

School of Electrical Engineering

III B.Tech. V Semester Teaching & Examination scheme

Subject Code	Subject	Lectures	Tutorials	Practicals	Exam. H.	Theory		Practicals & Sessionals		Total
						Internal	External	Internal	External	
A. Written Papers										
EE501	Power Transmission & Distribution	3	1		3	20	80			100
EE502	Power Electronics-I	3	1		3	20	80			100
EE503	Microprocessor & Computer Architecture	3			3	20	80			100
EE504	Control System Engineering	3	1		3	20	80			100
EE505	Electromagnetic Field Theory	3	1		3	20	80			100
EE506	Communication Engineering	3			3	20	80			100
Total (A)		18	4		18	120	480			600
B. Practicals and Sessionals										
EE511	Power Transmission & Distribution Lab			2				60	40	100
EE512	Power Electronics-I Lab			2				60	40	100
EE513	Microprocessor Lab			2				60	40	100
EE514	Entrepreneurship Development			2				60	40	100
Total (B)				8				240	160	400
Grand Total (A+B)				30						1000

Jodhpur National University

(Faculty of Engineering & Technology)

School of Electrical Engineering

III B.Tech.VI Semester Teaching & Examination scheme

Subject Code	Subject	Lectures	Tutorials	Practicals	Exam. H.	Theory		Practicals & Sessionals		Total
						Internal	External	Internal	External	
A. Written Papers										
EE601	Advanced Microprocessor	3	1		3	20	80			100
EE602	High Voltage Engineering	3	1		3	20	80			100
EE603	Power Electronics-II	3	1		3	20	80			100
EE604	Power System Instrumentation	3	1		3	20	80			100
EE605	Generation of Electrical Power	3	1		3	20	80			100
EE606	Non-conventional Energy Sources	3			3	20	80			100
Total (A)		18	5		18	120	480			600
B. Practical and Sessionals										
EE611	Advanced Microprocessor Lab			2				60	40	100
EE612	High Voltage Lab			2				60	40	100
EE613	Power Electronics-II Lab			2				60	40	100
EE614	MAT & Ps-Pice Lab			2				60	40	100
Total (B)				8				240	160	400
Grand Total (A+B)				3						1000

Jodhpur National University

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School of Electrical Engineering

IV B.Tech. VII Semester Teaching & Examination scheme

Subject Code	Subject	Lectures	Tutorials	Practicals	Exam. H.	Theory		Practicals & Sessionals		Total
						Internal	External	Internal	External	
A. Written Papers										
EE701	Switch Gear & Protection	3	1		3	20	80			100
EE702	Utilisation of Electrical Power	3	1		3	20	80			100
EE703	Power System Engineering	3	1		3	20	80			100
EE704	Power System Analysis	3	1		3	20	80			100
EE705	Artificial Intelligence Techniques	3			3	20	80			100
EE706	Elective*	3	1		3	20	80			100
EE706.1	Power System Transients									
EE706.2	E-Commerce & Internet									
EE706.3	Optimisation Techniques									
Total (A)		18	5		18	120	480			600
B. Practical and Sessionals										
EE711	Computer Based Power System Design lab			2				75	50	125
EE712	Industrial Economics & Management Lab			2				75	50	125
EE713	Project Training Semiar & Education Tour			2				60	40	100
EE714	Project Stage 1			2				30	20	50
Total (B)				8				240	160	400
Grand Total (A+B)				31						1000

Jodhpur National University

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School of Electrical Engineering

IV B.Tech. VIII Semester Teaching & Examination scheme

Subject Code	Subject	Lectures	Tutorials	Practicals	Exam. H.					
						Theory		Practicals & Sessionals		Total
A. Written Papers						Internal	External	Internal	External	
EE801	EHV AC DC Transmission	3	1	—	3	20	80	-	-	100
EE802	Electrical Machine Design	3	1	—	3	20	80	-	-	100
EE803	Electrical Drives & Controls	3	1	—	3	20	80	-	-	100
EE804	Elective*	3		—	3	20	80	-	-	100
EE804.1	Principles of Nuclear Engineering							-	-	
EE804.2	Network Operating System							-	-	
EE804.3	Static Protective Relays							-	-	
Total (A)		12	3		12	80	320			400
B. Practicals and Sessionals										
EE811	Advanced Power Electronics lab			3				60	40	100
EE812	Computer Based Electrical Machine Design Lab			3				60	40	100
EE813	Electric Drives & Control Lab			3				60	40	100
EE814	Project Stage 2			3				120	80	200
EE815	Seminar			2				60	40	100
Total (B)				14				360	240	600
Grand Total (A+B)				29						1000

Jodhpur National University

II B. TECH. III Semester

EE301 ELECTRICAL MACHINES -I

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	INTRODUCTION	Basic principle of electromechanical energy conversion, salient aspects of conversion, energy balance equation, Energy & Co energy, Faraday's law of electromagnetic induction, Fleming's right & left hand rules, right hand palm rule, Bio-savart's law.
II	DC GENERATORS	Construction, Types of DC generators, emf equation, lap & wave windings, equalizing connections, Armature reaction, commutation, methods of improving commutations, demagnetizing and cross magnetizing mmf, interpoles, characteristics, parallel operation. Rosenberg generator.
III	DC MOTORS	Principle of operation, comparison between motor and generator action, significance of back emf, types, production of torque, armature reaction & interpoles, characteristics of shunt, series & compound motor, DC motor starters. Speed Control of DC Motor: Armature and field control method, Ward Leonard method. Braking, losses and efficiency, direct & indirect test, Swinburne's test, Hopkinson test, field & retardation test, single-phase series motor
IV	SINGLE PHASE TRANSFORMER	Construction, types, emf equation. No load and load conditions. Equivalent circuits, Vector diagrams, OC and SC tests, Sumpner's back-to-back test, efficiency. voltage regulation, effect of frequency, parallel operation, autotransformers, switching currents in transformers, separation of losses.
V	POLYPHASE TRANSFORMERS	Single unit or bank of single-phase units, polyphase connections, Open delta and V connections, Phase conversion: 3 to 6 phase and 3 to 2 phase conversions, Effect of 3-phase winding connections on harmonics, 3-phase winding transformers, tertiary winding.

EE302 ELECTRICAL MEASUREMENTS & INSTRUMENTATION

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	MEASURING INSTRUMENTS	Moving coil, moving iron, electrodynamic and induction instruments-construction, operation, torque equation and errors. Applications of instruments for measurement of current, voltage, single-phase power and single-phase energy., Testing and calibration of single-phase energy meter by phantom loading., 3- phase induction type energy meter
II	POLYPHASE METERING	Blondel's Theorem for n-phase, p-wire system. Measurement of power and reactive kVA in 3-phase balanced and unbalanced systems: One-wattmeter, two-wattmeter and three-wattmeter methods. Construction and operation of current and potential transformers. Ratio and phase angle errors and their minimization. Effect of variation of power factor, secondary burden and frequency on errors.
III	POTENTIOMETERS	Construction, operation and standardization of DC potentiometers– slide wire and Crompton potentiometers. Use of potentiometer for measurement of resistance and voltmeter and ammeter calibrations. Volt ratio boxes. Construction, operation and standardization of AC potentiometer – in-phase and quadrature potentiometers. Applications of AC potentiometers.
IV	MEASUREMENT OF RESISTANCES	Classification of resistance. Ammeter and voltmeter method, substitution method, Wheatstone bridge method. Potentiometer method and Kelvin's double bridge method. Price's Guard-wire method. Direct deflection method & loss of charge method. Fall of potential method.
V	AC BRIDGES	Generalized treatment of four-arm AC bridges. Sources and detectors. Maxwell's bridge, Hay's bridge and Anderson bridge Heaviside's bridge for mutual inductance measurement. De Sauty Bridge & Schering Bridge Wein's bridge for capacitance and frequency measurements. Sources of error in bridge measurements and precautions. Screening of bridge components. Wagner earth device.

EE303 ELECTRONIC DEVICES & CIRCUITS -I

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	PN JUNCTION DIODES	<p>Open-circuited p-n junction and space charge region. The biased p-n junction, volt-ampere characteristics, cut-in voltage. Minority carrier density distribution in (a) a forward biased junction and (ii) a reverse biased junction, diode capacitance, junction diode switching times and characteristics</p> <p>Other diodes: Avalanche breakdown and zener breakdown, working principles of zener diodes, photo-diodes, light emitting diodes, solar cell and varactor diodes.</p>
II	ANALYSIS OF DIODE CIRCUITS	<p>Diode as a circuit element, load line, small signal and large signal diode model, analysis of half wave and full wave single- phase rectifiers, peak inverse voltage, various types of filters, their analysis and applications, voltage multipliers, clipping and clamping circuits.</p>
III	TRANSISTOR FUNDAMENTALS	<p>Transistor configurations and input and output characteristics, operating regions: active region, saturation region and cutoff region, Hybrid model, h-parameter equivalent circuits, Conversion formulae for the parameters of the three transistor Configurations, DC and AC analysis of CE, CC and CB amplifiers, Emitter follower, Phototransistor.</p> <p>Transistor Biasing and Thermal Stabilization: Ebers-Moll model, Transistor biasing, Bias stability, Stability factor, Transistor Biasing Circuits, Stabilization against variations in I_{CO}, V_{BE} and β, Bias Compensation, Thermal Runaway, Thermal Stability, Transistor switching times.</p>
IV	FIELD EFFECT TRANSISTORS	<p>Construction, working, V-I characteristics and transfer characteristics and comparison of JFET and MOSFET (Enhancement type and depletion type), Pinch-off voltage, Equivalent circuits and biasing of JFET's & MOSFETs. FET as a voltage amplifier and voltage variable resistor. FET as a switch, FET small signal amplifier models, CMOS.</p>
V	SMALL SIGNAL TRANSISTOR AMPLIFIERS	<p>Analysis of BJT Cascading Transistor Amplifiers, Direct-Coupled and R-C Coupled Transistor Amplifier, Frequency response, gains at low and high frequency, Miller's theorem and its dual, Darlington pair and Bootstrapped Darlington circuit, Emitter followers.</p>

EE304 COMPUTER PROGRAMMING-I

Teaching Hrs.
L-3, T-0, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage	:
I	PROGRAMMING IN C	Review of basics of C, structure & pointer type, variables, singly and doubly linked lists, I/O and text file handling, command line arguments.	
II	OOP FUNDAMENTALS	Concept of class and object, attributes, public, private and protected members, derived classes, single & multiple inheritance.	
III	PROGRAMMING IN C++	Enhancements in C++ over C in data types, operators and functions. Inline functions, constructors and destructors. Friend function, function and operator overloading.	
IV	OOPS CONCEPT PROGRAMMING IN C++	Working with class and derived classes. Single and, multiple and multilevel inheritances and their combinations, virtual functions, pointers to objects.	
V	FILE HANDLING IN C++	Working with text files, templates, file handling in C++, Input output flags and formatting operations.	

EE305 CIRCUIT ANALYSIS-I

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	INTRODUCTION	Introduction to circuit elements and their characteristics. Current and voltage reference. Response of single element, double element and triple element circuits. Resonance, selectivity & Q-factor in ac circuits.
	NETWORK ANALYSIS	Network voltages. Mesh & node systems of network equations and their comparison. Graph of network, tree, incidence matrix, fundamental circuit functions, cut sets, f-circuits analysis and f-cut set analysis, node and node pair analysis. Duality. Method of obtaining dual network.
II	NETWORK THEOREMS	Thevenis's, Norton's, Superposition, Reciprocity, Compensation, Millman's, Tellegen's, Maximum power transfer and Miller's theorems.
III	POLYPHASE CIRCUITS	General Circuit Relations: Three Phase Star, Three Phase Delta, Star and Delta Combination, Four Wire Star Connections, Balanced Three Phase Voltages And Unbalanced Impedances. Power and Reactive Volt-Amperes in a 3-Phase System. Power Relations in AC Circuits: Instantaneous Power in AC Circuits, Power Factor, Apparent Power, Reactive Power, Power Triangle, Complex Power.
IV	NON-SINUSOIDAL WAVES	Complex Periodic Waves And Their Analysis By Fourier Series. Different Kinds of Symmetry, Determination of Co-Efficient. Average and Effective Values of a Non-Sinusoidal Wave, Power in a Circuit of Non-Sinusoidal Waves of Current and Voltage, Form Factor, Equivalent Sinusoidal Wave and Equivalent Power Factor. Response of Linear Network to Non-Sinusoidal Periodic Waves.
V	TIME DOMAIN AND FREQUENCY DOMAIN ANALYSIS	Response of networks to step, ramp, impulse, pulse and sinusoidal inputs. Time domain and frequency domain analysis of circuits. Shifting theorem, initial and final value theorems. Special signal waveforms with Laplace transform & applications to circuit operations.

EE306 MATHEMATICS

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	LAPLACE TRANSFORM	Laplace transform with its simple properties, applications to the solution of ordinary and partial differential equations having constant coefficients with special reference to wave and diffusion equations, digital transforms.
II	FOURIER TRANSFORM	Discrete Fourier transform, Fast Fourier transform, Complex form of Fourier transform and its inverse applications, Fourier transform for the solution of partial differential equations having constant coefficients with special reference to heat equation and wave equation
III	FOURIER SERIES	Expansion of simple functions in Fourier series, half range series, change of interval, harmonic analysis. Calculus of Variation: Functional, strong and weak variations, simple variation problems, Euler's equation.
IV	COMPLEX VARIABLES	Analytic functions, Cauchy-Riemann equations, elementary conformal mapping with simple applications, line integral in complex domain, Cauchy's theorem, Cauchy's integral formula.
V	COMPLEX VARIABLES	Taylor's series, Laurent's series, poles residues. Evaluations of simple definite real integrals using the theorem of residues, simple contour integration.

GE 307* Special Mathematics** I

(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 1T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Trigonometry	Trigonometric functions, simple identities, range and values of trigonometric functions, inverse functions, De Moivre's theorem, Euler's theorem. Lectures Req : 6
II	Basic Algebra	Binomial theorem for positive and negative index, logarithmic and simple properties, exponential, Logarithmic and trigonometric series. Lectures Req : 6
III	Differential Calculus:	Function, single variable and multivariable function, polynomial, trigonometric, logarithmic and exponential fun's, derivative of a function, elementary formulae. Lectures Req : 6
IV	Differential Calculus:	Derivative of sum and difference of two functions, derivative of product and quotient of two functions, logarithmic differentiation, partial differentiation. Lectures Req : 6
V	Integral Calculus:	Integration of a function standard integrals and properties, integration by substitution, Integration by parts, definite integral and properties. Lectures Req : 6

Total Lectures Req : 30

**** It will be sessional paper: marks shall not be counted for awarding division.**

EE311 ELECTRICAL MACHINE-I LAB

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. No.	List of Experiments:
1	Speed control of D.C. Shunt motor by a) Field control method and plot the curve for speed v/s field current. b) Armature control method and plot the curve for speed v/s armature voltage.
2	Speed control of a D.C. motor by ward Leonard method and to plot the curve for speed v/s applied armature voltage.
3	To determine the efficiency of D.C. Shunt motor by loss summation (swinburn's)
4	To determine the efficiency of two identical D.C. machine by Hopkinson's regenerative test.
5	To perform O.C. and S.C. test on a 1-phase transformer and find their efficiency & parameters of its equivalent circuit.
6	To perform parallel operation of two 1-phase transformer and their load sharing.
7	To perform back-to-back test on two identical 1-phase transformers and find their efficiency & parameters of the equivalent circuit.
8	To determine the efficiency and voltage regulation of a single-phase transformer by direct loading.

EE312 ELECTRICAL MEASUREMENT & INSTRUMENTATION LAB

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. No.	List of Experiments:
1	Measure power and power factor in 3-phase load by (i) Two-wattmeter method and (ii) Onewattmeter Method
2	Calibrate an ammeter using DC slide wire potentiometer
3	Calibrate a voltmeter using Crompton potentiometer
4	Measure low resistance by Crompton potentiometer
5	Measure Low resistance by Kelvin's double bridge
6	Measure earth resistance using fall of potential method
7	Calibrate a single-phase energy meter by phantom loading at different power factors
8	Measure self-inductance using Anderson's bridge
9	Measure capacitance using De Sauty Bridge.

EE313 ELECTRONICS DEVICES AND CIRCUITS LAB -I

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. No. List of Experiments:

- 1 Study the following devices: (i) Analog & digital multimeter (ii) Function/ Signal generators (iii) Regulated d. c. power supplies (constant voltage and constant current operations)
- 2 Study of analog CRO, measurement of time period, amplitude, frequency & phase angle using Lissajous figures
3. Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse Saturation current and static & dynamic resistances.
4. Plot V-I characteristic of zener diode and study zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
5. Plot frequency response curve for audio amplifier and to determine gain bandwidth product.
6. Plot drain current - drain voltage and drain current – gate bias characteristics of field effect transistor and measure I_{dss} & V_p
7. Plot gain- frequency characteristic of two stages RC coupled amplifier & calculate its bandwidth and compare it with theoretical value.
8. Plot input and output characteristics of BJT in CB, CC and CE configurations.
9. Study half wave rectifier and effects of filters on wave. Also calculate ripple factor
- 10 Study bridge rectifier and measure the effect of filter network on D.C. voltage output & ripple factor

EE314 COMPUTER PROGRAMMING LAB-I

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. List of Experiments:

No.

- I. Write a program to find the greatest between four numbers.
- II. Write a program to prepare mark sheet of students using structures.
- III. Write a C program to read several different names and addresses, rearrange the names in alphabetical order and print name in alphabetical order using structures.
- IV. Write a program to implement concatenation of two strings using pointers.
- V. write a program to create a singly link list of ten students names and implement add node, delete node and isemptylist operations.

PROGRAMMING IN C++

1. Write a program to search a pattern in a string.
2. Write a program to print the following output using FOR loop.
1
22
333
4444
55555
1
2
3 3
4 4 4
5 5 5 5
3. Write a program to add, subtract and multiply integer matrices.
4. Write a program to calculate the power function (m^n) using the function overloading technique; implement it for power of integer and double.
5. Implement file creating and operate it in different modes: seek, tell, read, write and close operations.
6. Using multiple inheritance, prepare student's mark sheet. Three classes containing marks for every student in three subjects. The inherited class

Jodhpur National University
II B. TECH. IV Semester

EE401 ELECTRICAL MACHINE-II

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	INTRODUCTION TO ROTATING AC MACHINE	General equation of induced emf, effect of chording on induced emf., Skewing. Production of rotating field, 2-phase & 3-phase supply Harmonics, methods for eliminating harmonics. Concentric and distributed windings
II	INDUCTION MOTOR	Construction of squirrel cage & slip ring induction motor, basic principles, flux and mmf waves, induction motor as a transformer. Equivalent circuits torque, no load & block rotor tests, Circle diagram. Performance calculation Torque-slip curves. Effect of rotor resistance. Cogging, Crawling. Double cage squirrel cage induction motor, induction generator, induction regulator
III	STARTING & SPEED CONTROL OF INDUCTION MOTORS	Various methods of starting & speed control of squirrel cage & slip ring motor, cascade connection, braking. Single- Phase Induction Motor: Revolving field theory, starting methods, equivalent circuits
IV	SYNCHRONOUS GENERATOR	Construction, types, excitation systems, principles. Equation of induced emf, flux and emf waves, theory of cylindrical rotor and salient pole machines, two-reactance theory, phasor diagrams, power developed, voltage regulation, OC & SC tests, zero power factor characteristics, potier triangle and ASA method of finding voltage regulation, synchronization, parallel operation, hunting and its prevention.
V	SYNCHRONOUS MOTORS	types, construction, principle, phasor diagrams, speed torque characteristics, power factor control, V-curves, starting methods, performance calculations, applications, synchronous condenser, synchronous induction motor.

EE402 ELECTRONIC DEVICES & CIRCUITS –II

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

		CONTENTS OF SYLLABUS
Units	Topics	Details of Coverage
I	FEEDBACK AMPLIFIERS	Classification, feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifier, feedback topologies, input and output resistance, Analysis of voltage series, current series, voltage shunt and current shunt feedback amplifiers, stability criterion.
II	OSCILLATORS	Concept of feedback, Oscillator Circuit, Classification of oscillators and Criterion for oscillation. RC-phase shift oscillator, Hartley oscillator, Colpitts oscillator, Clapp oscillator, Tuned collector oscillator, Wein bridge and crystal oscillator. Multivibrators: Astable, monostable and bistable multivibrators, Schmitt trigger.
III	OP-AMP AND ITS APPLICATIONS	Characteristics of Ideal Op -Amp, Offset voltage and currents, Common mode rejection ratio, slew rate, Open-Loop and Closed-Loop Op-Amp Configuration (Inverting and Non-inverting), Basic op-amp applications, Differential DC amplifier and stable ac coupled amplifier. Logarithmic & anti-logarithmic amplifiers, Analog computation, comparators, sample and hold circuits
IV	POWER AMPLIFIERS	Classification of power amplifiers, collector efficiency, class-A large signal amplifier, transformer coupled power amplifier, second harmonic distortion, higher order harmonic generation, Push-pull amplifiers: Class-A, Class-B & Class AB operations, cross-over distortion, difference between voltage and power amplifiers.
V	INTEGRATED CIRCUITS	Precision AC/DC converters- Precision Rectifiers, peak detectors, A to D and D to A converters. IC 555 timer: Pin configuration, block diagram, working of Timer, 555 Timer as an Astable and a Monostable Multivibrator. Regulated power supplies, Series and shunt voltage regulators

EE403 COMPUTER PROGRAMMING-II

Teaching Hrs.
L-3, T-0, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	UNIX	Introduction to following basic commands (excluding shell programming): who, touch, cat, cp, rm, mv, ls, unmask, pwd, mkdir, rmdir, bc, expr, factor, logname, id, uname, try, date, banner, dspace, du, ulimit, passwd, cal, wc, sort, cut, grep, dd, head, pg, lp, tail, compress, man, tee.
II	VI Editor	Text entry and command modes, cursor movement commands, string replacement commands and set commands.
III	JAVA	Variation from C++ to JAVA. Introduction to JAVA bytecode, virtual machine, application, application & applets of Java, integer, floating point, characters, Boolean, literals, and array declarations.
IV	OPERATORS AND CONTROL STATEMENTS	Arithmetic operators, bitwise operators, relational operators, Boolean logic operators, the assignment operators, operators, operator precedence. Switch and loop statements.
V	PACKAGE AND INTERFACES	Packages, access protection, importing & defining packages. Defining and implementing interfaces. I/O APPLET: I/O basics, reading console I/O, input and print stream classes, applet fundamental and string handling, mouse and keyboard interfaces, awt tools and controls.

EE404 DIGITAL ELECTRONICS

Teaching Hrs.
L-3, T-0, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	NUMBER SYSTEM AND CODES	Radix and radix conversions, sign , magnitude & Complement notation. Weighted and non-weighted codes, BCD codes, self-complementing codes, cyclic codes, error detecting and correcting codes, ASCII & EBCDIC codes. (alphanumeric codes).Fixed point and floating point arithmetic .BCD arithmetic
II	BOOLEAN ALGEBRA AND DIGITAL LOGIC GATES	Features of Boolean algebra, postulates of boolean algebra, theorems of boolean algebra. Fundamental logic gates, derived logic gates, logic diagrams and boolean expressions. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Minimization Techniques: Miniterm, Maxterm, Karnaugh's maps, simplification of logic functions with K-map, conversions of truth tables in SOP & POS form, incompletely specified functions,variable mapping, Quinn-Mcklusky Technique
III	SWITCHING CIRCUITS AND LOGIC FAMILIES	Diode, BJT, FET as switch. Different types of logic families: RTL, TTL, open collector TTL, three state output logic, TTL subfamilies, MOS, CMOS,ECL, IIL.
IV	COMBINATION SYSTEMS	Combinational logic circuit design, Half and full adder & subtractors. Binary serial and parallel adders, BCD adder. Binary multiplier, comparator, decoders, encoders, multiplexer, demultiplexers, code converters.
V	SEQUENTIAL SYSTEMS	Latches, Flip-Flops: R-S, D, J-K, T, Master slave. Flip-Flop conversions. Counters -Ripple Counters, Modulus Counter, Ring Counter, Synchronous Counter, UP and DOWN Counters, Timing Sequences. Registers –Buffer Register, Shift Registers,.

EE405 CIRCUIT ANALYSIS-II

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	IMPEDANCE AND ADMITTANCE FUNCTIONS NETWORK FUNCTIONS:	<p>The concept of complex frequency, transform impedance and admittance, series and parallel combinations.</p> <p>Terminals and terminal pairs, driving point impedance transfer functions, poles and zeros. Restrictions on pole and zero location in s-plane. Time domain behavior from pole and zero plot. Procedure for finding network functions for general two terminal pair networks.</p>
II	NETWORK SYNTHESIS	<p>Hurwitz polynomial, positive real functions, reactive networks. Separation property for reactive networks. The four-reactance function forms, specification for reactance function. Foster form of reactance networks. Cauer form of reactance networks. Synthesis of R-L and R-C networks in Foster and Cauer forms.</p>
III	TWO PORT GENERAL NETWORKS	<p>Two port parameters (impedance, admittance, hybrid, ABCD parameters) and their inter relations. Equivalence of two ports. Transformer equivalent, inter connection of two port networks. The ladder network, image impedance, image transfer function, application to L-C network, attenuation and phase shift in symmetrical T and paintworks.</p>
IV	TWO PORT REACTIVE NETWORKS (FILTERS)	<p>Constant K filters. The m-derived filter. Image impedance of m-derived half (or L) sections, composite filters. Band pass and band elimination filters. The problem of termination, lattice filters, Barlett's bisection theorem. Introduction to active filters.</p>
V	COUPLED CIRCUITS	<p>Conductively coupled circuits. Mutual impedance, magnetic coupling, mutual inductance, co-efficient of magnetic coupling, circuit directions and sign of mutual inductance, mutual inductance between portions of the same circuit, mutual inductance between parallel branches, transferred impedance. Transformer equivalent inductively and conductively coupled circuits; Resonance in Single tuned and Double tuned circuits, effect of coefficient of coupling.</p>

EE406 ADVANCED MATHEMATICS

Teaching Hrs.
L-3, T-1, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage
I	NUMERICAL ANALYSIS	Finite differences - Forward backward and central difference. Newton's forward and backward differences interpolation formulae. Sterling's formulae, Lagrange's interpolation formula. Solution of non-linear equations in one variable by Newton Raphson and Simultaneous algebraic equation by Gauss and Regula Falsi method. Solution of simultaneous equations by Gauss elimination and Gauss Seidel methods. Fitting of curves (straight line and parabola of second degree) by method of least squares.
II	NUMERICAL ANALYSIS	Numerical differentiation, numerical integration trapezoidal rule, Simpson's one-third and one eighth rule. Numerical Integration of ordinary differential equations of first order, Picard's method, Euler's & modified Euler's methods. Milne's method and Runge Kutta fourth order method. Simple linear difference equations with constant coefficients.
III	SPECIAL FUNCTIONS	Bessel's function of first and second kind, simple recurrence relations, orthogonal property of Bessel functions, Transformation, Generating functions, Legendre's function of first kind, simple recurrence relations, orthogonal property, Generating functions.
IV	STATISTICS & PROBABILITY	Elementary theory of probability, Baye's theorem with simple applications, Expected value. Theoretical probability distributions – Binomial, Poisson and Normal distributions
V	STATISTICS & PROBABILITY	Lines of regression, co-relation and rank correlation .TRANSFORMS: Z-transforms, its inverse, simple properties and application to difference equations.

GE 407 A* Special Mathematics- II**
(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 1T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Differential equation of first Order	Definition, order and degree of differential equation, Method of separation of variable, Homogeneous differential equation.
II	Differential equation of first Order	Exact differential equation of first order, Reducible to exact form, Linear form, Reducible to linear form.
III	Differential equation of second Order	Linear differential equation with constant coefficients, complementary function, particular integral
IV	Elementary Complex variable	Complex Numbers, Real and imaginary parts of complex, complex conjugate, modulus and argument of complex number. Euler's theorem and De'moivre's theorem (only statement) polar form of complex number.
V	Matrices and Determinants	Determinants and Matrices of order two and three properties of determinants, Evaluation of Determinants, Addition, Subtraction, Multiplication, Transpose, Adjoint and inverse of Matrix.

**** It will be sessional paper**

EE411 ELECTRICAL MACHINE II- LAB

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. No.	List of Experiments:
1	To perform OC & SC test on a 3 phase transformer & find its efficiency and parameters for its equivalent circuit.
2	To perform parallel operation of two 3-phase transformer and determine their load sharing.
3	To study the performance of 3-phase transformer for its various connections, i.e. star/star delta delta/star and delta/delta and find the magnitude of 3rd harmonic current.
4	To make scott connection and measure the phase difference of secondary voltage by (i)voltmeter method (ii) CRO method.
5	Separation of transformer core losses and to determine the hysteresis and eddy current loss at rated voltage and frequency.
6	To plot the O. C. C & S.C.C of an alternator and to determine its regulation by synchronous impedance method.
7	To synchronise an alternator across the infinite bus RSEB & summarise the effects of variation of excitation on load sharing.
8	To plot the V-curve for a synchronous motor for different values of loads.

EE412 ELECTRONICS DEVICES & CIRCUIT - II LAB

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. List of Experiments:

No.

- 1 Plot gain-frequency characteristics of BJT amplifier with and without negative feedback in the emitter circuit and determine bandwidths, gain bandwidth products and gains at 1kHz with and without negative feedback.
- 2 Study of series and shunt voltage regulators and measure line and regulation and ripple factor.
- 3 Plot and study the characteristics of small signal amplifier using FET.
- 4 Study of push pull amplifier. To study variation of output power & distortion with load.
- 5 Study Wein's bridge oscillator and observe the effect of variation in R & C on oscillator frequency.
- 6 Study transistor phase shift oscillator and observe the effect of variation in R & C on oscillator frequency and compare with theoretical value.
- 7 Study the following oscillators and observe the effect of variation of C on oscillator frequency:
 - a) Hartley
 - b) Colpitts
- 8
 - a) Study op-amp in inverting and non-inverting modes.
 - a) Use op-amp as scalar, summer and voltage follower.
- 9 Use of op-amp as differentiator and integrator.

EE413 COMPUTER PROGRAMMING-11 LAB

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. No. List of Experiments:

- 1** Exercising Vi advanced commands.
- 2** Experiments (four experiments)using Unix advanced commands and their combinations.

Writer programs in Java on:

- 3** Package creation and importing.
- 4** Implementing interfaces.
- 5** String computation.
- 6** Stream classes.
- 7** Applets.

EE414 DIGITAL ELELCTRONICS LAB

Teaching Hrs.
L-0, T-0, P-2

Exam Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (60) & University (40)}

CONTENTS OF SYLLABUS

S. No.	List of Experiments:
1	Study of following combinational circuits: Multiplexer, Demultiplexer and Encoder, Decoder. Verify truth tables of various logic functions.
2	Study of various combinational circuits based on: AND/NAND Logic blocks and OR/NOR Logic blocks.
3	To verify the universal NOR Gate
4	To verify the universal NAND Gate.
5	To verify the combinational logic circuit- half adder, full adder, half subtractor, full subtractor.
6	To perform the conversion of binary to gray code.
7	To perform the conversion of gray to binary code.
8	To study the different types of flip-flops.
9	Implementation of full adder using two half adder.

GE 407* Special Mathematics II**

(Common for all branches CSE/ECE/IT/ME/CSE/CIVIL for Diploma Holders)

Teaching Hrs.
3L + 1T

Exam Hrs. 3 Hrs.
Total-100

Unit	Topics	
I	Differential equation of first Order	Definition, order and degree of differential equation, Method of separation of variable, Homogeneous differential equation. Lectures Req : 6
II	Differential equation of first Order	Exact differential equation of first order, Reducible to exact form, Linear form, Reducible to linear form. Lectures Req : 6
III	Differential equation of second Order	Linear differential equation with constant coefficients, complementary function, particular integral Lectures Req : 6
IV	Elementary Complex variable	Complex Numbers, Real and imaginary parts of complex, complex conjugate, modulus and argument of complex number. Euler's theorem and De'moivre's theorem (only statement) polar form of complex number. Lectures Req : 6
V	Matrices and Determinants	Determinants and Matrices of order two and three properties of determinants, Evaluation of Determinants, Addition, Subtraction, Multiplication, Transpose, Adjoint and inverse of Matrix. Lectures Req : 6

Total Lectures Req : 30

**** It will be sessional paper: marks shall not be counted for awarding division.**