# KANNUR UNIVERSITY
## FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabi for B.Tech Degree Programme (III-IV Semesters) in ELECTRONICS AND COMMUNICATION ENGINEERING
With effect from 2007 Admissions

## THIRD SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Hours/Week</th>
<th>University Examination</th>
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<tr>
<td>2K6EC 301</td>
<td>Engineering Mathematics II</td>
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<td>2K6EC 302</td>
<td>Humanities</td>
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<td>2K6EC 303</td>
<td>Electrical Engineering</td>
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<td>2K6EC 304</td>
<td>Solid State Devices</td>
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<td>2K6EC 305</td>
<td>Network Theory</td>
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<td>Electronic Circuits I</td>
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## FOURTH SEMESTER

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<tr>
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<td>2K6EC 402</td>
<td>Computer Programming</td>
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<td>2K6EC 403</td>
<td>Communication Engineering I</td>
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<td>2K6EC 404</td>
<td>Signals &amp; Systems</td>
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<td>2K6EC 405</td>
<td>Electronic Circuits II</td>
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<td>Digital Electronics</td>
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Module I:

Module II:

Module III:
Vector Integral Calculus: Evaluation of line integral, surface integral and volume integrals – Line integrals independent of the path, conservative force fields, scalar potential- Green’s theorem- Gauss’ divergence theorem- Stoke’s theorem (proof of these not required).

Module IV:

References:

Sessional work assessment
Assignments 2x10 = 20
2 tests 2x15 = 30
Total marks = 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (20 hours)


Module II (14 hours)

Technical Communication
2. Barriers to effective communication – improper encoding, bypassing inter- cultural differences etc.
3. Organization in technical communication – spatial, chronological etc.
4. Style in technical communication - objectivity, accuracy, brevity, clarity etc.
5. Technical reports – types and format

Professional Ethics: 1. Ethics in Engineering, copyright – IPR- patents

Module III (10 hours)

Humanities, Science and Technology
1. Importance of humanities to technology, Education and Society
2. Relevance of a scientific temper
3. Relation between science, society and culture – the views of modern thinkers
4. The development of science and technology in society – science and technology in ancient Greece and India – the contribution of the Arabs to science and technology – recent advances in Indian science.

Reference books
2. Pennyor, Grammar Practice Activities, Cambridge University Press
5. Vesilind; Engineering, Ethics and the Environment, Cambridge University Press
6. Larson E; History of Inventions, Thompson Press India Ltd.
9. Encyclopedia Britannica, History of Science, History of Technology
10. Subrayappaa; History of Science in India, National Academy of Science, India

Sessional work assessment
Assignments 2x10 = 20
2 tests 2x15 = 30
Total marks = 50

University examination pattern
Q I - 10 short type questions of 2 marks, from Module 1
Q II - 10 questions of 5 marks, from module II and III for writing short notes with choice to answer any seven
Q III - 2 questions A and B of 15 marks from module I for writing essay with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module II for writing essay with choice to answer any one
Q V - 2 questions A and B of 15 marks from module III for writing essay with choice to answer any one
2K6 EC 303 : ELECTRICAL ENGINEERING

3 hours lecture and 1 hour tutorial per week

MODULE - I

MODULE –II
Parallel operations of single phase and three phase transformers- three phase transformer connections- star to star- star to delta- delta to delta-applications

MODULE –III
Alternators- E.M.F. equation-effects of harmonics on pitch factor and distribution factor- voltage regulation- mmf and emf method- parallel operation – synchronization
Synchronous motor- starting method- power developed by synchronous motor- applications- synchronous condenser

MODULE – IV
Three phase Induction motor- types – torque equations- torque slip and torque speed characteristics- power flow diagram – efficiency – equivalent circuit- induction generator
Special machines – single phase FHP motor starting methods- double field revolving theory-types and applications – stepper motor –classifications and applications – servomotors – classifications and applications –shaded pole motors -applications

Text book
1. Hughes E., Electrical Technology, ELBS

Reference books
1. Cotton H., Electrical Technology Pitman
2. Golding, Electrical measurements and measuring instruments, ELBS

Sessional work assessment
Assignments 2x10 = 20
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University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (13 hours)
Energy bands and charge carriers in semiconductors - Direct and indirect band gap semiconductors - Concept of effective mass - Intrinsic and extrinsic semiconductors - Fermi level - Electron and hole concentrations at equilibrium - Temperature dependence of carrier concentrations - Conductivity and mobility - Quasi Fermi level - Diffusion and drift of carriers - Einstein relation - Continuity equation

Module II (13 hours)
PN junctions - Contact potential - Space charge at a junction - Current flow at a junction - Carrier injection - Diode equation - Minority and majority carrier currents - Capacitance of pn junctions - Reverse bias breakdown - Zener and avalanche breakdown - Abrupt and graded junctions - Schottky barrier - Rectifying and ohmic contacts - Tunnel diode - Varactor diode - Zener diode

Module III (13 hours)
Charge transport in a bipolar junction transistor - Current and voltage amplification - Concept of load line - Analysis of transistor currents - Ebers-Moll model - Early effect - Concept of Early voltage - Avalanche breakdown in transistors - Transit time effects - Hetero junction GaAs BJTs

Module IV (13 hours)
Junction FET - Pinch off and saturation - Gate control - VI characteristics - MOS capacitor - Accumulation, depletion and strong inversion - threshold voltage - MOSFET - p channel and n channel MOSFETs - Depletion and Enhancement mode MOSFETs - Substrate bias effects - Floating gate MOSFETs - Short channel effects - hot carrier effect – MESFET- CMOS inverter-characteristics

Text books
2. Sze S.M., Physics of Semiconductor Devices, Wiley Eastern
3. Michael A.Shur, Physics of Semiconductor Devices, Prentice Hall of India

Reference books

Sessional work assessment
Assignments  2x10 = 20
2 tests  2x15 = 30
Total marks  = 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
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Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (10 hours)

Module II (13 hours)
S-Domain Analysis of Circuits - Review of Laplace transform - Convolution theorem and convolution integral - Transformation of a circuit into S-domain - Transformed equivalent of inductance, capacitance and mutual inductance - Impedance and admittance in the transform domain - Node analysis and mesh analysis of the transformed circuit - Nodal admittance Matrix - mutually coupled circuits - Input and transfer immittance functions - Transfer functions - Impulse response and Transfer function - Poles and Zeros - Pole Zero plots - Sinusoidal steady state from Laplace transform inversion - Frequency response by transform evaluation on j-axis - Frequency response from pole-zero plot by geometrical interpretation

Module III (16 hours)
Two port networks: Two port networks - Characterization in terms of impedance - Admittance - Hybrid and transmission parameters - Inter relationships among parameter sets - Reciprocity Theorem - Interconnection of two port networks - Series, parallel and cascade - Network functions - Pole zero plots and steady response from pole - zero plots
Symmetrical two port networks: T and π Equivalent of a two port network - Image impedance - Characteristic impedance and propagation constant of a symmetrical two port network - Properties of a symmetrical two port network
Symmetrical Two Port Reactive Filters: Filter fundamentals - Pass and stop bands - Behavior of iterative impedance - Constant - k low pass filter - Constant - k high pass filter - m-derived T and π sections and their applications for infinite attenuation and filter terminations - Band pass and band elimination filters

Module IV (13 hours)
Synthesis: Positive real functions - Driving point functions - Brune's positive real functions - Properties of positive real functions - Testing driving point functions - Application of maximum module theorems - Properties of Hurwitz polynomials - Even and odd functions - Strum's theorem - Driving point synthesis - RC elementary synthesis operations - LC network synthesis - Properties of RC network functions - Foster and Cauer forms of RC and RL networks

Text books
3. Van Valkenberg, Network Analysis, Prentice Hall of India

Reference books
1. Desoer C.A. & Kuh E.S., Basic Circuit Theory, McGraw Hill
2. Siskind, Electrical Circuits, McGraw Hill
3. Ryder J.D., Networks, Lines and Fields, Prentice Hall
5. Huelsman L.P., Basic Circuit Theory, Prentice Hall of India
### Sessional work assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Marks</th>
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<tr>
<td>Assignments</td>
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<td>Total marks</td>
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### University examination pattern

- **Q I**: 8 short type questions of 5 marks, 2 from each module
- **Q II**: 2 questions A and B of 15 marks from module I with choice to answer any one
- **Q III**: 2 questions A and B of 15 marks from module II with choice to answer any one
- **Q IV**: 2 questions A and B of 15 marks from module III with choice to answer any one
- **Q V**: 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (13 hours)
BJT circuit models - Hybrid $\pi$ model - Small signal low frequency and small signal high frequency models of BJT - Effect of temperature on BJT model parameters - $h$ parameter equivalent circuits of CC, CB and CE configurations - Current gain - voltage gain - input and output impedances BJT amplifiers: Biasing - Load line - Bias stabilization - Stability factor - Bias compensation - Analyses and design of CC, CE and CB configurations - RC coupled and transformer coupled multistage amplifiers - High frequency response

Module II (13 hours)
FET amplifiers: Biasing of JFET - Self bias and fixed bias - Biasing of MOSFETS - Feedback biasing and fixed biasing for enhancement and depletion mode MOSFETs - Analyses of common source - Common drain and common gate amplifier configurations

Module III (13 hours)
Feedback - Effect of feedback on amplifier performance - Voltage shunt - Voltage series - Current series and current shunt feedback configurations - Positive feedback and oscillators - Analysis of RC Phase Shift, Wein bridge, Colpitts, Hartley and crystal oscillators - Stabilization of oscillations

Module IV (13 hours)
Power amplifiers - Class A, B, AB, C, D & S power amplifiers - Harmonic distortion - Efficiency - Wide band amplifiers - Broad banding techniques - Low frequency and high frequency compensation - Cascade amplifier - Broadbanding using inductive loads

Text books

Reference books
3. Horenstein M.N., Microelectronic Circuits & Devices’, Prentice Hall of India

Sessional work assessment
Assignments $2 \times 10 = 20$
2 tests $2 \times 15 = 30$
Total marks $= 50$

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
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Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
1. Series resonant and parallel resonant circuits - voltage and current amplification
2. Diode & Zener diode characteristics - dc and dynamic resistance
3. Constant -k low pass and high pass filters
4. First and second order LPF/HPF/BPF with R and C for a given cut-off frequency
5. Clipping circuits with diodes
6. Clamping circuits & voltage multipliers
7. Half wave rectifier with C, LC & CRC filters
8. Full wave rectifiers with C, LC & CRC filters
9. Zener diode regulator with emitter follower output - regulation curves
10. UJT characteristics & the relaxation oscillator
11. CB configuration - determination of h parameters
12. CE configuration - determination of h parameters
13. MOSFET characteristics in CS and CD modes

**Sessional work assessment**

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<td>Lab Practicals and Record</td>
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<tr>
<td>Test</td>
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<td>Total marks</td>
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**Reference books**

1. Bhargava et.al., Basic Electronic Circuits and Linear Circuits, Tata McGraw Hill

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments. 20 marks for the viva-voce and 10 marks for the lab record.

Note: Duly certified lab record must be submitted at the time of examination.
1. Plot open circuit characteristics of DC shunt generator for rated speed - Predetermine O.C.C. for other speeds - Determine critical field resistance for different speeds
2. Load test on DC shunt generator - Plot external characteristics - Deduce internal characteristics
3. Load test on DC series motor - Plot the performance characteristics
4. OC and SC tests on single phase transformer - Determine equivalent circuit parameters - Predetermine efficiency and regulation at various loads and different power factors - verify for unity power factor with a load test
5. Load test on 3 phase cage induction motor - Plot performance curves
6. Resistance measurement using a) Wheatstone's bridge b) Kelvin's double bridge
7. Measurement of self inductance, mutual inductance and coupling coefficient of a) Transformer windings b) air cored coil
8. Power measurement
9. Three voltmeter method b) three ammeter method
10. Power measurement in 3 phase circuit - Two wattmeter method
11. Extension of ranges of ammeter and voltmeter using shunt and series resistances

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Text books
1. Hughes E., Electrical Technology, ELBS

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments. 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination
Module I: (13 hours)
Complex analytic functions and conformal mapping: Complex functions – limits, derivative, analytic function- Cauchy-Riemann equations- elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions- Conformal mapping – Linear fractional transformations- mapping by elementary functions

Module II: (13 hours)
Complex integration: Line integral, Cauchy’s integral theorem - Cauchy’s integral formula – Taylor’s series, Laurent series – residue theorem – evaluation of real integrals using integration around unit circle, around semicircle, integrating contours having poles on the real axis

Module III: (13 hours)
Jointly Distributed Random Variables: Joint distribution functions, independent random variables, covariance and variance of sums of random variables, joint probability distribution functions of random variables, conditional probability and conditional expectations. Curve fitting: Method of least squares, correlation and regression, line of regression.

Module IV: (13 hours)
Vibrating strings: One dimensional wave equation – D’ Alembert’s solution – solution by method of separation of variables One dimensional heat equation - solution of the equation by the method of separation of variable Solutions of Laplace’s equation over a rectangular region and a circular region by the method of separation of variable

Reference books

Sessional work assessment
Assignments 2x10 = 20
2 tests 2x15 = 30
Total marks = 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
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Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (15 hours)
Overview of C – Variables, Expressions and assignments, Lexical Elements, Fundamental Data Types, Operators Control Statements – if, switch-case, for , while, do, goto, break, switch Functions- Parameter passing , scope rules, recursion

Module II (12 hours)
Arrays – One dimensional and Multi Dimensional, Pointer-Linked List, Arrays of Pointers, Dynamic Memory Allocations, Strings – Operations and functions , Bitwise Operators and Enumeration Types , Structures and Unions, Files and File Operations

Module III (13 hours)
Overview of Java Language- Constants, Variables and Data Types, Operators and Expressions Control Structures – Decision Making, Branching and Looping, Object Oriented Programming – Concept of Classes, Objects and Methods, Benefits Java and OOP- Polymorphism and Overriding of methods, Inheritance

Module IV (12 hours)
Arrays and Strings, Interfaces, Multiple Inheritance, Packages – Putting Classes together – Managing Errors and Exceptions – Applet Programming and Graphics Programming (Basics only) – Managing Input/Output Files in Java

Text books

Reference books
2. Eckel, Bruce., Thinking in Java, 2nd Ed, Pearson Education

Sessional work assessment
Assignments 2x10 = 20
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University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
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Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (12 hours)
Random process: review of the theory of continuous random variables - joint distribution and density functions - conditional distribution functions - random process - ensemble average - stationarity - wide sense stationarity - time averages - ergodicity - correlation theory for WSS random process - power spectral density - Wiener - Khinchie Eiestein theorem - response of LTI systems to random process - guassian random process - filtered guassian random process - white guassian noise (May be removed from the syllabus, Telephony can be considered)

Module II (10 hours)
Noise: sources of noise - thermal noise - shot noise and flicker noise - filtered white noise - narrow band noise - quadrature representation - envelope and phase representation - signal to noise ratio - noise equivalent bandwidth - effective noise temperature - noise calculations for cascaded stages

Module III (15 hours)
Amplitude modulation: spectrum of amplitude modulated signal - power relations - AM generation and detection - DSB-SC generation and detection - SSB-SC generation and detection - VSB modulation - AM transmitter and receiver - TRF and superheterodyne receivers - noise analysis of AM receivers - SNR for envelope detection and coherent detection - SNR in DSB-SC and SSB-SC systems

Module IV (15 hours)
Frequency modulation: angle modulation - frequency modulation - narrow band FM - wide band FM - transmission bandwidth - generation of FM signals - direct and indirect methods - FM demodulators - noise in FM reception - threshold effect - pre-emphasis and de-emphasis

Text books
3. Dennis Roddy, John Coolen, “Electronic Communications”, PHI

Reference books
4. Tomasi, Electronic Communication: Fundamentals Through Advanced, Pearson Education
5. Couch, Digital and Analog Communication Systems, Pearson Education

Sessional work assessment
Assignments 2x10 = 20
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Q I - 8 short type questions of 5 marks, 2 from each module
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Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (12 hours)
Introduction to signals and systems - Classification of signals - Basic operations on signals - Elementary signals - Concept of system - Properties of systems - Stability, invertibility, time invariance - Linearity - Causality - Memory - Time domain description - Convolution - Impulse response - Representation of LTI systems - Differential equation and difference equation representations of LTI systems

Module II (15 hours)
Fourier representation of continuous time signals - Fourier transform - Existence of the Fourier integral - FT theorems - Energy spectral density and power spectral density - Frequency response of LTI systems - Correlation theory of deterministic signals - Condition for distortionless transmission through an LTI system - Transmission of a rectangular pulse through an ideal low pass filter - Hilbert transform - Sampling and reconstruction

Module III (13 hours)
Fourier representation of discrete time signals - Discrete Fourier series and Discrete Fourier transform - Laplace transform analysis of systems - Relation between the transfer function and differential equation - Causality and stability - Inverse system - Determining the frequency response from poles and zeros

Module IV (12 hours)
Z Transform - Definition - Properties of the region of convergence - Properties of the Z transform - Analysis of LTI systems - Relating the transfer function and difference equation - Stability and causality - Inverse systems - Determining the frequency response from poles and zeros

Text books

Reference books

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Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (13 hours)
RC circuit as integrator and differentiator - Compensated attenuators - Pulse transformer - Pulse response
Switching characteristics of a BJT - BJT switches with inductive and capacitive loads - Non saturating switches - Emitter follower with capacitive loading - Switching characteristics of a MOS inverter - Resistive load & active load configurations - CMOS inverter - Dynamic power dissipation

Module II (13 hours)
Monostable and astable multivibrators - Collector coupled monoshot - Emitter coupled monoshot - triggering the monoshot - Collector coupled and emitter coupled astable multivibrator - Astable - monostable and bistable operations using negative resistance devices - Multivibrators with 555 IC timer-Astable, monostable, bistable circuits with logic gates

Module III (13 hours)
Phase Locked Loops - Phase detector (XOR & phase frequency detectors) - Voltage Controlled Oscillator (Current starved & source coupled CMOS configurations) - Loop filter - Analysis of PLL - Typical applications of PLL - Voltage and current time base generators - Linearization - Miller & bootstrap configurations

Module IV (13 hours)
Digital to analog converters - R-2R ladder - Binary weighted - Current steering - Charge scaling - Cyclic & pipeline DACs - Accuracy - Resolution - Conversion speed - Offset error - Gain error - Integral and differential nonlinearity - Analog to digital converters – Track and hold operation - Track and hold errors - ADC conversion techniques - Flash converter - Two step flash - Pipeline – Integrating - Staircase converter - Successive approximation converter - Dual slope & oversampling ADCs

Text books

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Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
Module I (12 hours)
Basic digital circuits - Review of number systems and Boolean algebra - Simplification of functions using Karnaugh map and Quine McCluskey methods - Boolean function implementation - Code converters - Encoders and decoders - Multiplexers and demultiplexers - ROMs - Combinational logic design using decoders - Multiplexers and ROMs

Module II (12 hours)
Hazards in combination circuits – static and dynamic. Arithmetic circuits - Half and full adders and subtractors - Carry look ahead adders - BCD adder - Multiplier and divider circuits - Sequential circuits - Latches and flip flops (RS, JK, D, T and Master Slave) - Design and analysis of ripple counters - Shift registers - Johnson and ring counters

Module III (14 hours)
Design and analysis of sequential circuits - General model of sequential networks – Hazards in sequential networks - synchronous design method - clock skew - asynchronous inputs - synchroniser failure and metastability State diagrams – Synchronous counter design - Analysis of sequential networks - Derivation of state graphs and tables - Reduction of state table - Sequential network design

Module IV (14 hours)
Logic families - Fundamentals of RTL, IIL, DTL and ECL gates - TTL logic family - TTL transfer characteristics - TTL input and output characteristics - Tristate logic - Shottkey and other TTL gates - MOS gates - MOS inverter - CMOS inverter - Rise and fall time in MOS and CMOS gates - Speed power product - Interfacing BJT and CMOS gates.

Text books

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Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one
1. Feed back voltage regulator with short circuit protection
2. Biasing circuits- fixed bias-self bias- voltage divider.
3. Emitter follower with & without complementary transistors – Frequency and phase response for a capacitive load
4. Single stage RC coupled amplifier – Frequency response
5. Phase shift oscillator using BJT/FET
6. Hartley / Colpitts oscillator using BJT/FET
7. Power amplifier – Class A
8. Power amplifier – Class AB
9. Cascode amplifier – Frequency response
11. Active load MOS amplifier
12. Wide band single BJT/MOS voltage amplifier with inductance
13. Single BJT crystal oscillator

### Sessional work assessment

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<tr>
<td>Lab Practicals and Record</td>
<td>30</td>
</tr>
<tr>
<td>Test</td>
<td>20</td>
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<tr>
<td>Total marks</td>
<td>50</td>
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### Reference books


University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.

Note: Duly certified lab record must be submitted at the time of examination
2K6 EC 408(P) : DIGITAL ELECTRONICS LAB

3 hours practicals per week

List of experiments:
1. Familiarization with TTL ICs
2. Characteristics of TTL NAND gate
3. Arithmetic circuits
4. Flip-Flops
5. Counters and Sequence generators
6. Twisted counters
7. Registers
8. Encoders and Decoders
9. Multiplexers and Demultiplexers
10. ADC and DAC
11. CMOS logic circuits
12. Multivibrators using logic gates

Sessional work assessment
| Lab Practicals and Record | 30 |
| Test | 20 |
| Total marks | 50 |

Reference books

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.

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NBA/ACCR-904/2007 dated 12th Sept 2007, for its undergraduate program in Electronics and Communication Engineering. The department is fully equipped to support theoretical and practical syllabus of Rajiv Gandhi Proudyogiki Vishwhavidyalaya, Bhopal. The department has 15 laboratories and many kits, instruments and software such as VLSI Kits, DSP Kits, Antenna, Filter kits, Communication kits, ARM and 8086 Microprocessor kits, test benches, programmers and IC testers, LCR meters, CROâ€™s, function generators, PCB Etching machine, Microwind, FECO etc.

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