B. Tech Electrical & Electronics Engineering

Engineers, from times immemorial, have played a crucial role in contributing to the betterment of humanity and in shaping the world by creating, developing, organizing and managing complex technologies. The growing influence of technology on all functions of society has created a good demand of Engineering graduates. The primary objective is to educate men and women for leadership in the industry and educational institutions, advance the knowledge base of the engineering professionals, and to influence the future direction of engineering practices.

Eligibility Criteria: 10+2(PCM) or equivalent in any stream

To earn a B.Tech in Electrical & Electronics Engineering a student has to earn a minimum of 180 credits. Min 100 credits to be earned from science subjects, minimum 40 credits to be earned from Electrical & Electronics Engineering subjects and remaining can be taken from any stream

Every student has to attain a minimum of D grade in all courses; a student may however, and repeat or change any course being offered. Notwithstanding, every student must acquire the desired number of credits. The detailed course structure under different categories is given in succeeding pages. Brief description of the course content follows thereafter.

Code	Subject	Credits
6A.101	Mathematics-I	4
6A.102	English Communication I	4
6A.103	Engineering Chemistry	4
6A.104	Engineering Mechanics	4
6A.105	Elements of Electrical Engineering	4
6A.106	Elements of Civil Engineering	4
6A.107	Mathematics-II	4
6A.108	English Communication II	4
6A.109	Engineering Physics	4
6A.110	Programming In C	4
6A.111	Elements Of Mechanical Engineering	4
6A.112	Engineering Graphics	4
6A.113	Environmental Studies	4
		4
6A.201	Mathematics-III	4
6A.202	English Communication III	4
6A.203	Analog & Digital Electronics	4
6A.204	Electrical Machine-I	4
6A.205	Circuit & Network	4
6A.206	Electrical Measurement & Instrumentation	4
6A.207	Electrical Engineering Material	4
6A.208	Stimulations & Design Tools	4
6A.209	Mathematics-IV	4
6A.210	English Communication IV	4
6A.211	Principles of Business Management	4
6A.212	Microprocessor And Interfacing	4
6A.213	Control System Engineering	4
6A.214	Electrical Machine-II	4
6A.215	Power System-I	4
		4
6A.301	Power Electronics Device & Circuit	4
6A.302	Electromagnetic Theory	4
6A.303	Signals & System	4
6A.304	Advanced Microprocessor & Microcontrollers	4
6A.305	Power System-II	4
6A.306	Electronics Instrumentation And Process Control	4
6A.307	Digital Signal Processing	4

6A.308	Elements of Electrical Design	4
6A.309	Switchgear And Protection	4
6A.310	Energy Conservation & Management	4
6A.311	Utilization of Electrical Energy	4
6A.312	Communication Engineering	4
6A.321	Soft Computing Techniques	4
6A.322	Advance Power System	4
6A.323	Scada System And Application	4
		4
6A.401	Power System Practice And Design	4
6A.402	Electrical Drives	4
6A.403	Industrial Automation And Control	4
6A.404	High Voltage Engineering	4
6A.405	Computer Aided Electrical Machine Design	4
6A.421	Advance Power Electronics	4
6A.422	Fuzzy Logic And Neural Network	4
6A.423	VLSI	4
4A.445	Project I	4
4A.446	Project II	4
4A.447	Project III	4

6A.101 Mathematics I

Credit: 4

Content: Successive differentiation, Expansion of functions, Partial differentiation, Jacobian, Application of partial differentiation Matrix Eigen values And Eigen Vector

6A.102 English Communication I

Credit: 4

This course is designed for the students of Engineering and Technology who need English for specific purposes in specific situations. It aims at imparting the communication skills that are needed in their academic and professional pursuits. This is achieved through an amalgamation of traditional lecture, oriented approach of teaching with the task based skill oriented methodology of learning.

Content: English Grammar Fundamentals, Reading & Comprehension, Framing Sentences and Vocabulary, Positive Outlook and Attitude, Spoken English Skills and Body Language

6A.103 Engineering Chemistry

Credit: 4

This subject helps in developing problem-solving skills related to the nature of matter, chemical reactions, stoichiometry, energy transformations, atomic and molecular structure, quantum theory, chemical bonding, and periodic properties.

Content: Thermodynamics, concept of Entropy, Phase-Rule – Terminology, Water & its treatment, Corrosion and its prevention – Galvanic & concentration cell, Lubrication and Lubricants - Friction, mechanism of lubrication, Introduction to polymeric composites, polymerization, various types of polymerization, Analytical Methods - Thermal methods.

6A.104 Engineering Mechanics

Credit: 4

Content: Basic Concepts Force System and Equilibrium, Definition of Force, Moment and Couple, Principle of Transmissibility, Varignon's theorem, Resultant of force system Condition of static equilibrium for coplanar force system, stability of equilibrium, concept of free body diagrams, Static dry friction, simple contact friction problems, ladders, wedges, screws and belt friction, moment of inertia first moment of inertia, second moment of inertia and product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia, Kinematics and Kinetics of Particles, work- Energy equation, Impulse – momentum, Impact – Direct central impact and oblique central impact, Kinematics and Kinetics of Rigid bodies, Plane motion,

6A.105 Elements of Electrical Engineering

Credit: 4

This subject will teach high reliability soldering, desoldering, circuitry repair, plated-thru-hole repairs, conformal coating removal, industry standards, electrostatic discharge (ESD) control, surface mount device (SMD) installation, removal and replacement using hand held systems or reflow workstations. Students will solder highly reliable connections; solder to industry standards; desolder connections; install surface mount

devices; remove surface mount devices; remove conformal coatings; repair and/or replace traces, pads, and eyelets.

Content: D.C. Circuits, Nodal and Loop methods of analysis, A.C. Circuits, Transient response of RL, RC and RLC Circuits with step input, Network Theorems, Star to Delta & Delta to Star transformation, Series and parallel A.C. circuits, Three Phase Circuits, Principle, construction & working of transformer, Introduction to. D.C. Machines, Induction motor, Synchronous machines, Measuring Instruments, Voltmeter, Ammeter, Watt meter, Energy meter.

6A.106 Elements of Civil Engineering
Credit: 4
Content: Buildings-Definition-Classification according to NBC-plinth area, Floor area, carpet area, floor space index, Buildings- Various Components and their functions, Surveying-classification, general principles of surveying – Basic terms and definitions of chain, compass and leveling surveying, Internal and external combustion systems, Solar thermal systems – Solar photovoltaic – Solar pond – wind, wave, tidal, geothermal and ocean thermal energy conversion systems, Elements of arc and gas welding, brazing and soldering.

6A.107 Mathematics II
Credit: 4
Review of the maxima & minima, point of inflexion, Asymptotes, Curve Tracing, Gamma Function & Beta Function Double and triple integral, Differential of Vector, Integration of Vector

6A.108 English Communication II
Credit: 4
English Grammar Fundamentals Ii, Reading & Comprehension II, Vocabulary Building, Confidence Building And Etiquettes, Self Management

6A.109 Engineering Physics
Credit: 4
It is designed to enable students to appreciate the role of physics in today's society and technology. Emphasis on the fundamental laws of nature on which all science is based, with some examples of interest to biologists.
Content: Interference, Division, Diffraction, dispersive and resolving powers. Polarization, Simple concepts of photo elasticity. Spontaneous and stimulated emissions, Laser action, Propagation of light in fibers, Simple concepts of Harmonic Oscillator, resonance; quality factor, E.M. wave theory ,dielectric coefficient permittivity, Special Theory of relativity, Nuclear physics.

6A.110Programming in C
Credit: 4
Content: This Subject provides an introduction to computer programming and to software development. The first portion of the course introduces students to computer programming, using the C/C++ language, and covers fundamental topics such as flow of

control, function definition, data structures, and object-oriented design and programming. The second portion of the course provides a more holistic view of software development and introduces students to a selection of tools, and additional languages that programmers should be proficient in to become effective software developers, with an emphasis on the Python programming language. Topics in this portion include using build tools, third-party libraries, scripting languages, and data storage.

Content: An Overview of Computer System, Operating System Basics, Introduction to the basic concepts of Networks and Data Communications, Programming Languages, C Programming language, Sittings, Standard library

6A.111 Elements of Mechanical Engineering
Credit: 4

Traditionally, engineering education tries to balance the fundamentals that engineers will need during their career and the skills that they need to start functioning as engineers upon graduation. The dynamic nature of the engineering enterprise makes it impossible and unwise to attempt to teach our students everything they need to know to function during their career. To restate the obvious, their education should include a strong set of fundamentals and the recognition of the need for and the ability to continually learn.

Content: Properties of Steam & Boilers, Steam Turbines and Condensers, Classification, principles, types, compounding of turbine, I.C. Engines and Gas Turbines, Water Turbines, Pumps and Hydraulic Devices, Simple Lifting Machines, Power Transmission Methods and Devices , Stresses and Strains, Bending Moment & Shear Force

6A.112 Engineering Graphics
Credit: 4

Content: This subject is an introduction to engineering design and the related graphical tools used to communicate design concepts. Engineering design require a combination of organization, analysis, and communication skills. Engineering graphics is the primary medium for communicating design concepts and is an important tool for analyzing engineering problems. This subject aims at developing the skills needed for documenting designs using drawings and for performing graphical analysis of two dimensional and three dimensional problems. Manual and computer aided methods of graphical analysis and communication are covered. Topics include the following: visual thinking, engineering design, free-hand sketching, projection theory, pictorial sketching, solid modeling, engineering drawing standards, tolerancing, plotting, and computer-aided design.

6A.113 Environmental Studies
Credit: 4

Introduction to Environment, Ecology and Ecosystem, Ecology & Ecosystems, Environmental Pollution, Population & Natural Resources,

6A.201 Mathematics III
Credit: 4

First order ODE: Methods for solving them, homogeneous equations, exactness, methods for finding integrating factors, Linear and Bernoulli's equation, Linear differential

equations of nth order with constant coefficients, Complementary functions and particular integrals, Simultaneous linear differential equations, Solution of second order differential equation by changing dependent and independent variables, Method of variation of parameters, Applications to engineering problems (without derivation), Series Solution and Special Functions, Laplace Transform, Periodic functions, Trigonometric series, Fourier series of period 2π, Euler's formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series

6A.202 English Communication III
Credit: 4
Advanced Grammar I, Interview Management I, English Literature Prose, Self Improvement, Business Communication

6A.203 Analog & Digital Electronics
Credit: 4
This subject overlaps with and extends the theory of operational amplifiers contained in the option Electronics. It provides students with an understanding of a range of electronic devices and circuits used in modern electronic systems.
Content: Boolean algebra, K-map, Combinational and sequential ckts, application of combinational and sequential circuits, Flip Flops, Gates, Counter, logic families, different scales of integration.

6A.204 Electrical Machine - I
Credit: 4
It gives engineering aspects of electric rotating machines, industrial practices of manufacture and design.
Content: Converter fed operation of DC motor, electronically commuted and permanent magnet motors, applications in electric traction, steel mill drives, etc.modelling of synchronous machines, saliency effects

6A.205 Circuit & Network
Credit: 4
The subject describes the topology and general circuit methods. Response of simple networks is explained. Various types of filters are designed.
Content: Topology and general circuit methods, Circuit graph, tree, co-tree, incidence matrix, cut-set matrix, Magnetically coupled circuits, Two-port networks, characteristic impedance, propagation coefficient, Network models, Symmetrical attenuators, Transients in R-L-C circuits, Laplace transforms, Transient analysis, Filters

6A.206 Electrical Measurement & Instrumentation
Credit: 4
This subject is to develop students' understanding of the concepts of measurement and test. In particular the subject is designed to develop the underpinning knowledge and skills required to perform complex measurement and test procedures.

Content: Concepts in measurement of electrical quantities data, error, accuracy, precision measuring the basic electrical quantities and the factors affecting their measurements basic principles of measurement of strain, vibration, pressure and flow in various electro-mechanical systems,

6A.207 Electrical Engineering Material
Credit: 4
The subject introduces the voltage, current and sinusoidal representation of these quantities to the students. The important parameters like power factor, bandwidth and quality factors are defined along with their importance in electrical engineering.
Content: Single-phase ac theory, Network Theory and associated theorems A.C. Circuit-behavior of resistance, Inductance and capacitance and their combinations, network theorems like Thevenin's and Norton's, three phase supply, delta/star, basic principle and applications of electrical instruments for measurement of voltage, current, power and energy, magnetic circuit concept, theory and working principle of single-phase transformer, energy conversion, rotating machines.

6A.208 Stimulations & Design Tools
Credit: 4
This gives an overview of various designing techniques.
Content: Design of different amplifiers (current, voltage, power), design of oscillators, Filters, design of switching regulators including step-up and step-down, design of filters.

6A.209 Mathematics IV
Credit: 4
Function of Complex variable, Complex Integration, Zeroes of transcendental and polynomial equation using Bisection method, Rate of Interpolation: Finite differences, difference tables, Newton's forward interpolation & it's problems, Newton's backward interpolation & it's problems, Newton's divided difference formula for unequal intervals & it's problems ,Lagrange's divided difference formula for unequal intervals & it's problems, Numerical integration: Trapezoidal method & it's problems method, Simpson's one third and three-eight rules & problem based on Simpson's one third and three-eight rules . Numerical Differntiation: Solution of ordinary differential equations by following methods: Euler's Method, Picard's Method and forth-order Runge- Kutta methods & it's problems

6A.210 English Communication IV
Credit: 4
Interview Management II, Presentation Skills, Writing Skills And Spoken English, Personal Development, English Literature Prose – Novel

6A.211 Principles of Business Management
Credit: 4
This subject introduces basic management concepts, theories, and their application, and offers an overview of managerial concerns arising in modern organizations.

Content: Management: Definitions, Significance of management, Management and administration, Principles of Management, Evolution of management/various schools of thought, Pre-Scientific Management Era, Classical Management Era, Neo-Classical Management Era, Modern Management Era, Recent developments in management, Fundamentals of Planning, Steps of Planning, Forecasting and planning, Elements of Planning, Decision Making, functions of management, forecasting- definition, types, scheduling, organizing, staffing, Directing, Controlling, Leadership.

6A.212 Microprocessor & Interfacing
Credit: 4
Block diagram of digital computer, Classification of computer languages, High level and low level languages, introduction to microprocessor, microprocessor systems with bus organization, microprocessor architecture & operations, memory, i/o device, memory and i/o operations, programming, parallel input/output and interfacing, interrupts, programmable peripheral interface

6A.213 Control System Engineering
Credit: 4
Introduction to Control Systems, Examples of Control Systems, Closed-loop Control versus Open-Loop Control, Mathematical Modeling of Dynamic Systems, Mathematical Modeling of Fluid Systems and Thermal systems, Transient and Steady-State Response Analyses, Root-Locus Analysis, Frequency-Response Analysis, Design and Compensation

6A.214 Electrical Machine - II
Credit: 4
It gives advanced engineering aspects of electric rotating machines, industrial practices of manufacture and design.
Steady-state and transient, brushless synchronous generators, ac motors, single phase induction motors and applications. Stepper motor and control applications in robotics.

6A.215 Power System - I
Credit: 4
Basic Concepts of Generation of Electric Power and Substations, Transmission and Distribution Systems General Distribution Systems, Overhead Transmission Lines & Overhead Line Insulators, Mechanical Design of Transmission Lines & Underground Cables, Tariffs & Load Curves Voltage Control and Power Factor Improvement Introduction to EHV/HVDC transmission

6A.301 Power Electronics Device & Circuit
Credit: 4
This subject is to have in depth understanding of working and performance of various power electronic devices and focus on applications of power electronics as a whole.
Content: Introduction to power electronics, Controlled Rectifiers, Dual converters. Regulated D.C. power supplies, Inverters, MC-Murray-Bedford half bridge inverters,

Choppers, Multi quadrant choppers, Applications, Converter and chopper control of dc motors

6A.302 Electromagnetic Theory
Credit: 4
Content: Max wells equations, displacement current, equation of continuity, boundary condition. Propagation of uniform plain waves in perfect dielectric and in glossy medium, reflection, refraction, phase and group velocities, transmission line: evaluation of line parameters, design concepts, cutoff frequency, attenuation, dispersion, power handling capacity, traveling waves, standing waves, Smith chart and matching techniques, pulse propagation, radiation concept : elementary dipole, half wave dipole, radiation patterns, gain, pattern multiplication. basic antennas.

6A.303 Signal & Systems
Credit: 4
The aim of this subject is to develop analytical framework for signals and systems by introducing their mathematical description and to analyze and solve problems that arise in a broad array of applications in control and communication engineering.
Content: Frequency spectrum, energy and power signals, Sampling of continuous-time signals and sampling rate, basic system properties that are used to model many physical processes as Linear Time-Invariant (LTI) system, Time domain and frequency domain techniques, continuous and discrete-time signals, Fourier series method of representing continuous-time periodic signals, Fourier Transform and its properties, Z-transform, Discrete Fourier Transform (DFT) and Discrete Time Fourier Transform-DTFT, Fast Fourier Transform (FFT) algorithm.

6A.304 Advance Microprocessor & Microcontrollers
Credit: 4
The objective of this course is to give the students the ability to design, build and test a microprocessor-based controller system. Students will learn how a microprocessor works, and programming in assembly language.
Content: Microprocessor-Based Systems, Types of Microprocessor, Applications of Microprocessors, Software Design for a Microprocessor-Based System, Software Coding and Testing for a Microprocessor Based System, Programmable Parallel Interface, Programmable Serial Interface, Non-Programmable Parallel Interface.

6A.305 Power System - II
Credit: 4
Overhead Transmission Lines & Overhead Line Insulators, Mechanical Design of Transmission Lines & Underground Cables, Tariffs & Load Curves Voltage Control and Power Factor Improvement Introduction to EHV/HVDC transmission

6A.306 Electronics Instrumentation and Process Control
Credit: 4

This subject is to develop students' understanding of the concepts of measurement and test. In particular the subject is designed to develop the underpinning knowledge and skills required to perform complex measurement and test procedures.

Content: Concepts in measurement of electrical quantities data, error, accuracy, precision measuring the basic electrical quantities and the factors affecting their measurements basic principles of measurement of strain, vibration, pressure and flow in various electro-mechanical systems.

6A.307 Digital Signal Processing

Credit: 4

The main objective of this subject is to understand DSP based embedded system design methodology and applications in the fields of biotechnology, telecommunications, computer science and electronic engineering.

Content: System architecture, analog to digital conversion, Analog filtering and its limitation, Sampling theorem and quantization, Performance metrics for A/D and D/, Fourier Transforms-FT, DFT and FFT and Z-transform, Digital filters like Windowed Sync, Moving average-FIR filter and Recursive–IIR filters, MATLAB with SIMULINK, programmable features using DSP chips as live projects for audio, development tools available for design and DSP implementation.

6A.308 Elements of Electrical Design

Credit: 4

Transformers, Three phase induction motors, Single Phase Induction motors, synchronous machines

6A.309 Switchgear & Protection

Credit: 4

Voltage, Circuit breakers, fuse, over current protection, differential relays, generator protection, distance protection, over voltage protection

6A.309 Energy Conservation & Management

Credit: 4

This subject covers ISO 14000 series environmental management systems, various sources of energy, energy systems, their analysis, planning and energy saving, energy audit, energy monitoring and targeting and energy performance indicators.

Content: Environment management, its need, introduction to ISO 14000 series, pollution of air and water, hazardous and non hazardous wastes, energy technologies like transportation and power generation, fossil fuels, nuclear energy, alternative energy sources like hydroelectric and geothermal, solar, photovoltaic, and photochemical, energy from sea, energy from wind, energy from biomass and solid wastes, energy system analysis and energy management principles, combined heat and power cycles, energy saving measures, energy audit concepts, energy audit in industries, energy monitoring and targeting, energy performance indicators heat recovery technologies.

6A.310 Utilization of Electrical Energy

Credit: 4

It gives an overview of conventional and non-conventional energy resources, relevant energy conversion systems, and special problems on autonomous systems on energy balance.

Content: Special electrical scheme used in wind, mini-hydro units, grid connected and standalone systems, hybrid systems, energy conservation methods in industries, energy saving in motors through energy efficient equipment and electronic controllers, energy audit.

6A.311 Communication Engineering

Credit: 4

This subject gives a review of Fourier series and transforms, Overview of performance of analog modulation schemes in the presence of noise.

Content: Hilbert transforms, bandpass signal and system representation, AM, DSBS, SS, VSB, signal representation, generation and demodulation. Concepts of mixing, coherent and non-coherent detection, phase recovery with PLL, effects of deviation from synchronization in DSBSC and SSB, frequency division multiplexing, PM, FM and their interrelationship, Signal representation. Narrow band and wide band FM, Carson's rule, generation and demodulation of FM, Stereophonic broadcasting. PAM, PDM, PPM. A broad overview of PCM, DM, ADM, Review of sampling, quantization, Analog to digital conversion.

6A.321 Soft Computing Techniques

Credit: 4

Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing

6A.322 Advance Power System

Credit: 4

This subject includes overview of power systems protection, numerical relays, integrated protection, control & monitoring, Intelligent Electronic Devices in system protection, Software Architecture and performance characteristics of numerical relays, Wide Area Protection

6A.323 Scada System and Application

Credit: 4

The potential applications of scada technology are diverse, because many industries require the comprehensive monitoring and control capabilities that SCADA offers. In most applications, SCADA is used to manage a physical process (manufacturing and water processing are common).

6A.401 Power System Design

Credit: 4

This subject is to have in depth understanding of working and performance of various power electronic devices and focus on applications of power electronics as a whole.

Content: Introduction to power electronics, Controlled Rectifiers, Dual converters. Regulated D.C. power supplies, Inverters, MC-Murray-Bedford half bridge inverters,

Choppers, Multi quadrant choppers, Applications, Converter and chopper control of dc motors

6A.402 Electrical Devices
Credit: 4
Electrical drives – advantages, elements of drive system, drive characteristics, dynamics of D.C. motor drives, steady-state stability, energy conservation. D.C. motor drives: single–phase & three-phase half & fully controlled rectifier fed drives, continuous and discontinuous conduction, armature current ripple & it's effect on motor performance, rectifier-source interaction, multi-quadrant operation. chopper controlled drives- duty-ratio control, current-limit control, steady state analysis, multi-quadrant operation & analysis. induction motor drives equivalent circuits, speed control of induction motors – terminal voltage control, fan & pump drives, frequency control – vsi & csi fed motors – operation with constant ratio of terminal voltage to frequency, constant air gap flux and field-weakening, stator rotor resistance control, slip energy recovery – static Scherbius drive and static kramer's drive. synchronous motor drives synchronous motors – wound field motors, permanent magnet motors, synchronous reluctance motors, operation with fixed frequency & variable frequency voltage source ¤t source fed synchronous motors, brushless & commutate less d.c. & a.c. motors with load commutation. closed-loop control of drives d.c. motor drives – armature voltage control, field weakening, multi-quadrant variable speed d.c.drives, drive employing dual-converters with simultaneous & non-simultaneous control, pll control a.c. motors – brushless & commutatorless d.c. & a.c. motor drives with vsi , csi & cycloconverter.

6A.403 Industrial Automation and Control
Credit: 4
This subject is intended to give students an insight into the principles of control engineering and how these principles can be used to model engineering systems and processes.
Content: Analytical techniques, Lap lace transforms, Process controllers, MISO Systems, Time Domain Analysis, Frequency Domain Analysis, Bode Plot, Analysis of different factors, Nyquist stability Criteria, Regulating subject terminology, dampers, power cylinders, louvers, valve positioners, and valves.

6A.404 High Voltage Engineering
Credit: 4
Various types of over voltages in power system and protection methods, Generation of over voltages in laboratories, Measurement of over voltages, nature of Breakdown mechanism in solid, liquid and gaseous dielectrics, Testing of power apparatus and insulation coordination.

6A.405 Computer Aided Electrical Machine Design
Credit: 4
Design of electrical and magnetic circuits of electrical machines- Mathematical equations for electric and magnetic circuits- formation of design of electric and magnetic circuits for electric machines- Design of Thermal Circuit of Electrical Machines- mathematical

equations for thermal circuits- design of thermal circuits for electric machines- Design of Rotating Electrical Machines- Optimum Design procedures for AC and DC Machines- Criteria for optimization – flow Charts and Computer Programs-

6A.421 Advance Power Electronics
Credit: 4
Overview of Switching Power Devices- Phase Controlled Rectifiers-DC-DC Converters-Inverters

6A.422 Fuzzy Logic and Neural Network
Credit: 4
This subject makes the students to understand about Neural computing in software engineering, Neural computing in cognitive science.
Content: Artificial neural networks, neuronal dynamics, neural network paradigms, models: mcculloch-pitts model, adaline and madaline models, back propagation algorithm, cerebellum model articulation controller (cmac), adaptive resonance theory (art) paradigm fuzzy logic-logic: propositional logic, membership function, fuzzy logic, fuzzy rule generation, time-dependent fuzzy logic, temporal fuzzy logic (tfl), fuzzy neural networks-fuzzy ann (fann), neuro-fuzzy control, fuzzy neural nets, applications-signal processing, image data processing, communications systems, intelligent control, optimization techniques.

6A.423 VLSI
Credit: 4
This subject aims to introduce the VLSI design methodology for ASIC design. The study of VLSI design and fabrication processes by simple concepts such as stick and symbolic diagrams is carried out rather than going into complex design rules.
Content: Bi-CMOS, NMOS and CMOS, Basic characteristics of MOS transistor, CMOS, scaling down of feature size, ASIC design options, VLSI design flow, Hardware description languages, Commercial issues surrounding VLSI circuit, Analogue and digital mixed-type VLSI system, SOC-system, digital IP cores in SOC, VLSI design processes using CAD tools and FPGA devices.

6A.445 Project I
Credit: 4

6A.446 Project II
Credit: 4

6A.447 Project III
Credit: 4