Course Description
B.Sc. Program
Electrical Engineering Department

0903201 Computer Applications (1 Cr. Hr.)
Prereq. (190110 2)
Computer packages for mathematical and symbolic manipulations (Matlab, Mathematica). Windows environment. Graphics packages. INTERNET and its use in literature survey and information acquisition. Library search via computer. Engineering packages for computation. Data processing and statistical packages. Standard computer libraries.

0903203 Electrical Engineering (3 Cr. Hrs.)
Prereq. (0302102)
Ohm's and Kirchhoff's Laws. Series and parallel connections, Voltage and current division. Nodal and mesh analysis. Superposition. Thevinin's and Norton's theorems. Inductance and capacitance. Source free RL and RC circuits. Response of RL and RC and RLC circuits to unit step function. Characteristics of a sinusoid. The phasor concept. Phasor relationships for R, L, and C elements. Impedance and admittance. Effective values of current and voltage. Instantaneous, average and apparent power and power factor. Three-phase Y and Δ- connections.. Introduction to semiconductors. The PN junction. Applications of PN junctions (rectifiers). Transistors: operation, model, V-I characteristics. Operational amplifiers and gates. Safety considerations. Protective earthing .

0903204 Electrical Engineering Lab. (1 Cr. Hr.)
Prereq. (0903203)
Electric measuring equipment. DC circuits. Basic Laws and network theorems, impedance concept and phase shift in RL and RC circuits. 3-phase Y and Δ connected loads. Measurement of power and power factor. Transistor amplifiers. Op-amps.

0903211 Electrical Circuits (1) (3 Cr. Hrs.)
Prereq. (0302102)
Units, definitions, and simple circuits. Circuit analysis techniques. Inductance and capacitance. Source-free RL and RC circuits. The application of unit-step forcing functions. The RLC circuits. The sinusoidal forcing function. The phasor concept. The phasor relationships for R, L, and C. Impedance/admittance. The sinusoidal steady state response. Circuit analysis using MATLAB and SPICE.

0903212 Electrical Circuits (2) (3 Cr. Hrs.)

Prereq. (0903211)

Average power and rms values. Polyphase circuits. Three phase Y and Δ connections. Complex frequency. The damped sinusoidal forcing function. Frequency response. Parallel and series resonance. Magnetically coupled circuits. General two port networks. Impedance, admittance, hybrid and transmission parameters. Principles of basic filtering. Basic passive and active filters.

0903219 Electrical Circuits Lab. (1 Cr. Hr.)

Prereq./Coreq. (0903212)

DC circuits. KVL. Network theorems. Transient analysis in RL, RC, and RLC circuits. Impedance concept.Power and P.F.Series and parallel resonance. Quality factor. Three phase circuits. Power measurement. Parameters of two-port networks. Coupled circuits. Filters.

0903221 Signal Analysis & Systems (3 Cr. Hrs.)

Prereq. (0903201 & 0903211)

Signal and system model and classification. Continuous time signals. Signals and vectors. Generalized Fourier series representation.. Amplitude and phase spectra of signals. Energy and power content of signals. Bandwidth of signals. The Fourier Transform and applications. Sampling of signals. Convolution of signals. Power and Energy spectral densities. Correlation functions. Time-domain analysis of continuous time systems. The system impulse response. Communication channels. Filters: LPF, HPF and BPF. Discrete time signals. The discrete Fourier transform (DFT) and the Fast Fourier transform (FFT). Spectral analysis of DFT systems.Unit sample response and response to arbitrary input sequences. Introduction to the Z-transform. Computer project.

0903251 Electromagnetics (1) (3 Cr. Hrs.)

Prereq. (0302102)

Introduction. vectors and vector operations. Coordinate systems. Coulomb's law and electric field. Potential and gradient. Electric flux density. Gauss law and divergence theorem. Electric fields in material space. Capacitors. Boundary conditions, Poisson's and Laplace's equations. Method of images. Biot-Savart's law. Ampere's law. The curl and the Stock's theorem. Magnetic force, torque and moment. Magnetic vector potential. Practical applications. Magnetic properties of materials. The B-H curve. Boundary conditions. Inductors. Magnetic circuits. Interaction between fields and charged particles. Faraday's law. Displacement current. Maxwell's equations. Continuity equation and the relaxation relationship. Time-harmonic fields and the hysteresis concept.

0903253 Electromagnetics (comp. Eng.) (3 Cr. Hrs.)
Prereq. (0302102)
Introduction. vectors and coordinate systems. Charges. Electric field, potential and electric flux density. Gauss law. Electric characteristics of materials. Capacitors. Boundary conditions. Currents. Magnetic fields. Ampere's law. Magnetic properties of materials and the B-H curve. Boundary conditions. Inductors. Magnetic circuits. Time varying fields and Maxwell's equations. Waves in lossless and conducting media. Transmission lines (TL). Transient and steady state analysis of TL. Matching in TL. Introduction to optical fibers. Electromagnetic effects in high speed digital systems. Practical applications.

0903261 Electronics (1) (3 Cr. Hrs.)
Prereq. (0903211)
Introduction to Semiconductors. Conduction in metals. Intrinsic and extrinsic semiconductors. Electrical properties of semiconductors. Diffusion process in semiconductors. The PN Junction Diode. Open-circuited junction. Forward, reverse biased junction. VI static characteristics. Temperature effects. Small and large-signal models. Junction capacitance and switching times. Diode types and applications. Rectification. Rectifier filters. Clipper and clamper circuits. Voltage multipliers. Zener, varactor and Schottky diodes. LED and Photodiode applications. Bipolar Junction Transistors: Ebers-Moll mode. CB and CE characteristics. DC biasing and analysis. BJT as a switch, diode and amplifier. Small-signal models. Transistor ratings. Field-effect Transistor: VI characteristics of JFET and MOSFET. FET as a switch and amplifier. Small-signal models. The MESFET. Transistor ratings.

0903301 Engineering Numerical Methods (3 Cr. Hrs.)
Prereq. (0301202)
Mathematical preliminaries, numerical errors and, loss of significance and error propagation. Numerical solution of nonlinear algebraic equations, Review of linear algebra (Solution of systems of linear equations). Numerical solutions of systems of linear and non-linear algebraic equations. Interpolation and approximation and curve fitting. Numerical differentiation and integration. Numerical solution of differential equations. Eigenvalue problems. Introduction to numerical solution of partial differential equation. Engineering applications.

0903321 Probability and Random Variables (3 Cr. Hrs.)
Prereq. (0903221)
Introduction to probability and Random Variables. Discrete random variable. Continuous random variable. The probability density function. The probability distribution function. Statistics of random variable. Random process, Ergodicity and stationary. Auto correlation function. Power spectral density. Estimating the autocorrelation function and power spectral density from raw data. Input output relations of linear systems.

0907235 Assembly Language & Microprocessors (3 Cr. Hrs.)
Prereq. (0907231)
Introduction to microprocessors and microcomputers. Evolution, architecture, and software model. Introduction to Real-mode and protected-mode memory addressing. Addressing modes. The PC and its DEBUG program. Move, stack, load-effective address, and string instructions. Arithmetic instructions. Addition, subtraction and comparison. Multiplication and division. Logic instructions. Shifts and rotates. Counters and time delays. String comparisons. Jump instructions. Code conversion. Stacks and subroutines. Program and machine control instructions. Software interrupts. Program development. The microprocessor and its bus architecture. Introduction to memory and I/O interface. Discussion, one hour weekly.

0903341 Instrumentations and Measurements (3 Cr. Hrs.)
Prereq. (0903212& 0903261)
General electric and magnetic units. Experimental data and error. Analogue and digital instrumentation of current, voltage and power. R, L, C components measuring instruments. RF power and voltage measurement. Oscilloscopes. Signal generation and analysis. Wave and spectrum analyzers. Transducers. Digital data acquisition and test systems. Capacitive interference. Grounding. Projects on use of 7216 and 7217 chips in digital multimeters.

0903351 Electromagnetics (2) (3 Cr. Hrs.)

Prereq. (0903251)

Introduction. Maxwell's equation. Wave equation. Plane wave (PW) in general medium. Wavelength, wave number, direction of wave propagation, phase velocity, group velocity, phase and attenuation constants and wave impedance. PW propagation in lossless, lossy and good conducting media. Skin effect and the surface impedance in lossy and good conducting media. Generalized form of the PW. Poynting vector. Normal and oblique incidence of the UPW. Wave polarization. Consideration of some practical problems. Transmission lines (TL). Transient analysis of lossless TL. Analysis of TL for harmonic source using vector and crank diagram. Short TL (stubs). TL charts. Matching using single stub, double stubs and quarter wavelength TL. Impedance measurement. Waveguides. Rectangular and circular waveguides. Slots in waveguide. The concept of resonant cavity. Introduction to antennas including the different parameters of an antenna. Short and half a wavelength dipoles characteristics.

0903361 Electronics (2) (3 Cr. Hrs.)

Prereq. (0903261)

Amplification. Biasing of transistor (BJT and FET). Single-stage amplifier. Cascaded BJT and FET amplifiers. Composite transistor stages. Operational amplifiers and Applications: Differential amplifier. Operational amplifier architectures. Gain with active load. DC level shifting. Output stage. Offset voltages and currents. Frequency response of amplifiers. The high-frequency response of all amplifier configurations. The low-frequency response of all amplifier configurations. the frequency response of cascaded stages. Feedback Amplifiers. Properties of negative-feedback amplifiers. Properties of feedback amplifier topologies. Analysis of feedback amplifiers.

0903368 Electronics Lab. (1 Cr. Hr.)

Prereq./Coreq. (0903361)

Rectification. Regulation and clipping. BJT characteristics. Bjt biasing and large-signal amplification. BJT as an amplifier. FET as an amplifier. Cascaded amplifiers. Frequency response of amplifiers. Feedback amplifier. Differential amplifier. Op-Amp Applications. Projects.

0903371 Electrical Machines (1) (3 Cr. Hrs.)

Prereq. (0903212 & 0903251)

Magnetic circuits; single-phase transformers: principles, analysis and performance characteristics; three-phase transformers: construction, connections and groups; single-phase and three-phase transformer testing; electromechanical energy conversion; basic principles of DC mechanics; principles and classification of DC generators; DC motors: analysis, performance characteristics, starting and speed control; DC machines testing; rotating field; synchronous generators: classification, analysis, performance characteristics, synchronization process and parallel operation.

0903373 Electrical Machines (Mechanical & Mechatronics Eng.) (3Cr.Hrs.)

Prereq. (0903203 or 0903212)

Magnetic circuits; single-phase and three-phase transformers: Principles, analysis, performance characteristics and testing; electromechanical energy conversion; principles and classification of DC generators; DC motors: analysis, performance characteristics, starting, testing and speed control; synchronous motors: analysis, performance characteristics, applications, starting, and testing; three-phase induction motors: analysis, performance characteristics, testing, starting and speed control; single-phase induction motors; special types of motors:stepper motors, universal motors, reluctance motors, burshless DC motors.

0903374 Electrical Machines Lab.(Mechanical & Mechatronics Eng.) (1 Cr. Hr.)

Prereq. (0903373)

Transformer magnetic circuits. Testing of single and 3-phase transformers. DC generators. Speed control of DC motors. Testing and operational characteristics of alternators. Testing and operational characteristics of synchronous motors. Testing and operational characteristics of induction motors

0903421 Communications (1) (3 Cr. Hrs.)

Prereq./ Coreq. (0903321)

Continuous-wave modulation (CW). Amplitude Modulation (AM). Angle modulation. Frequency and phase modulation (FM, PM). Bandwidth estimation in CW-modulation. AM and FM receivers. Noise in CW Modulation. Noise Sources. Interference and noise representation. Signal to noise ratio (SNR). Pulse modulation. Time division multiplexing (TDM). Pulse code Modulation (PCM). Delta modulation, DPCM. Baseband transmission : Pulse shaping and line coding. Nyquist's criterion for distortion less transmission. Digital transmission techniques: Binary ASK, FSK and PSK. Performance of digital modulation schemes in the presence of noise.

0903422 Communications (2) (3 Cr. Hrs.)

Prereq. (0903421)

Introduction. Digital modulation formats. Optimum receiver design. Matched filter derivation and design of digital modulation formats. Signal space representation. Performance evaluation for digital modulation formats in AWGN channel. Probability of symbol and bit error for the different modulation formats. Fading channel models. Evaluation of the probability of symbol and bit error in fading channel. Read Spectrum Communication: Channel Coding. Hamming Codes. Convolutional Codes. Linear block codes. Error correcting capability of linear block codes.

0903424 Digital Signal Processing (3 Cr. Hrs.)

Prereq. (0903321)

Introduction to DSP. Discrete time signals and systems. Z-transform. Modeling and implementation forms of DT systems. Time and Frequency domain analysis of digital processors. Design and analysis of finite impulse response filters (FIR). Analog filter approximations. Design and analysis of infinite impulse response (IIR) filters. Digital filter networks. Digital equalizers. The DFT and FFT algorithms. DSP algorithms and applications.

0903425 Communication Systems (3 Cr. Hrs.)

Prereq. (0903421)

Review of Voice and Data Communications. Line transmission and voice companders. Waveform shaping and data generation. Multiple Access Techniques. TDMA, FDMA, CDMA and Hybrid systems. Propagation Models and Antennas. Broadcasting systems Analog and Digital TV Systems, AM and FM broadcasting. Microwave and Optical Fiber Links. Satellite Communications. Satellite transponders, link budget calculation. GPS Systems: satellite configuration, timing signals, modulation and location calculations.

0903426 Communication Networks (3 Cr. Hrs.)

Prereq. (0903421)

Introduction to communication networks and the OSI model. Circuit switching and packet switching. Physical layer and transmission media. Asynchronous and synchronous transmission. Local loop access technologies. Data Link Layer Principles. IEEE 802.x Medium Access Control (MAC) protocols: LANs, MANs, WANs and PANs. The concept of internetworking and the Internet Protocol (IP), IP Specifications and supporting protocols (ARP, DHCP, ICMP, etc), Routing and switching in IP networks. Repeaters, Switches, Hubs, Bridges, Routers and Gateways. UDP and TCO transport layers. Internet applications.

0903429 Communications Lab. (1 Cr. Hr.)

Prereq./Coreq. (0903422)

Baseband binary transmission and matched filter receiver measurements. Generation and reception of incoherent binary ASK, PSK, and FSK signals. Waveform shaping. Eye diagram.

0903441 Control System (3 Cr. Hrs.)

Prereq. (0301302)

Open-loop and closed-loop (feedback) control systems. Examples of feedback control systems. Review of complex variables and Laplace transform. Poles and element transfer function and block diagram. Modeling of physical systems: electrical, mechanical hydraulic and pneumatic systems. Linearization of nonlinear systems. System representations: system block diagrams and signal flow graphs. Overall transfer function, block diagrams reduction techniques and Mason's gain formula. Introduction to state-space representation. Sensitivity of open loop and closed loop control systems. Time response analysis and performance indices of first and second order systems. Dominant poles of high order systems. Routh-Hurwitz stability criterion. Steady state error coefficients. Design and effects of basic control actions and their combinations: proportional, integral and derivative. Effects of velocity feedback. Stability analysis using root locus. Bode diagrams and Nyquist stability criterion. Gain and phase margins, and obtaining transfer function using Bode diagrams. Introduction to analysis and design using state-space equations.

0903448 Measurements & Control Lab. (1 Cr. Hr.)

Prereq. /concurrent (0903341 & 0903441)

Experiments on oscilloscope. Measurement of earth resistance. Instrumentation. Data acquisition. Signal generators. Interference and insulation. Open and closed loop systems. Servomechanism principles. The effect of gain, integral and derivative control, and velocity feedback on system performance. Frequency response measurements. Analog computer simulation. CAD of control systems. Control of liquid level and thermal systems.

0903461 Power Electronics (3 Cr. Hrs.)
Prereq. (0903361)
Basic elements of PE systems. Applications of PE. Classification of PE controllers. Power semiconductor devices (PSD). Classification of PSD. V-I characteristics of the major PSD. Switching characteristics of PSD. Basic drive circuits of PSD. Line commutated converters. Single-phase H.W. rectifiers. Single-phase F.W. rectifiers configuration. 3-phase H.W and F.W rectifiers. Single-phase and 3ph semiconverters. Inversion mode of operation. Performance characteristics of line commutated rectifiers. Introduction to AC switching controllers. Introduction to DC-to-DC converters. Introduction to DC-to-AC converters.

0903462 Digital Electronics (3 Cr. Hrs.)
Prereq. (0903361)
Building blocks and design methodologies for constructing synchronous digital systems. Bipolar TTL vs. MOS implementation technologies. Standard logic (SSI, MSI, LSI, VLSI). Programmable logic (PLD, PGA). Finite state machine design. Digital computer building blocks. Semiconductor ROM and RAM. Timing circuits. Monostable and stable multivibrators. Analog-to-digital (A/D) and digital-to-analog (D/A) converters. Using computer-aided design software (PSpice, Verilog HDL, Xilinx, etc).

0903471 Electrical Machines (2) (3 Cr. Hrs.)
Prereq. (0903371)
Synchronous motors: analysis, performance characteristics, application in power factor correction, and starting methods; testing of synchronous machines; three-phase induction motors: classification, analysis, performance characteristics, starting methods, testing, and speed control; single-phase induction motors; special types of motors: stepper motors, universal motors, reluctance motors, and brushless DC motors.

0903478 Electrical Machines Lab. (1 Cr. Hr.)
Prereq./ concurrent (0903471)
Transformer magnetic circuits. Testing of single and 3-phase transformers. DC generators. Speed control of DC motors. Testing and operational characteristics of alternators. Testing and operational characteristics of synchronous motors. Testing and operational characteristics of induction motors

0903481 Power System Analysis (I) (3 Cr. Hrs.)

Prereq: 0903371

Introduction to sources of Electrical energy and power system components. Basic concepts. Per unit quantities. Per unit calculations applied to power systems. The one line diagram. Representation of transmission lines: current, voltages and power relations at both ends, reactive compensation. Symmetrical 3-phase fault calculations. Symmetrical components. Unsymmetrical faults calculations. Load flow: problem definition, Gauss siedal, Newton-Raphson (N-R), decoupled N-R, and fast decoupled N-R methods.

0903482 Power System Analysis (2) (3 Cr. Hrs.)

Prereq: 0903481

Power system protection: layout of substations, requirements and elements of protection systems, relays. Directional and non-directional over current and earth fault feeder protection. Differential protection as applied to feeders. Principles of distance protection. Economic operation of power systems: the transmission loss equation, an interpretation of transformation "C", classical economic dispatch, automatic generation control, unit commitment. Power system stability: rotor dynamics and the swing equation, the power angle equation, synchronizing power coefficient, equal-area criterion of stability, introduction to multi-machine stability studies.

0903483 Power System Protection (3 Cr. Hrs.)

Prereq: 0903482

Review of basic principles. Electromechanical/solid state/computer relays. Current and voltage transformers: steady state and transient performance. Transformer protection. Generator protection. Motor protection. Busbar protection. Fuses: mechanism of interruption of overcurrent & short circuit currents. Maintenance & testing of relays.

0903489 Electrical Power Lab. (1 Cr. Hr.)

Prereq./Coreq. (0903482)

Voltage distribution over a string of suspension insulators. I-t fuse characteristic. Measurement of symmetrical components in unbalanced systems. Power flow relations at the ends of transmission lines. Earthing of power system neutral. Network analyzer. Comparison of the characteristics of static and electromechanical relays. Characteristics of time lag O/C relays. Differential relays. Directional relays. Load flow.

0903521 Communication Circuits (3 Cr. Hrs.)

Prereq. (0903422)

Introduction and overview. Impedance matching and transformations. Oscillators types and circuits. Loop gain analysis. Negative resistance analysis. Voltage controlled Oscillators (VCO). Phase locked loops and applications. FM detection. Frequency synthesis. Mixers: Active mixers, Switching type mixers and 4-diode double balanced mixer. Conversion loss. Nonlinear effects. Mixers applications in Modulation and Demodulation. Tuner and resonant circuits. RF Filters. RF and IF tuned amplifiers. Power amplifiers. AGC circuits. Design of Low Noise Amplifiers. Case studies. Projects on the design, construct, match, and test an RF oscillator and amplifier.

0903522 Cellular Communications (3 Cr. Hrs.)
Prereq. (0903422)

Introduction to telephony and traffic theory. Calculating the probability of blocking for parallel and series links. Cellular communication design and frequency assignment. Traffic management and call setup, hand-offs and calculating C/I ratio. Propagation models: Knife edge model and effect of multiple edges. Performance enhancement by proper cell site design and sectorization. Modulation for Cellular Systems. Probability of error rate performance in fading multi-path channels. Source and channel coding for cellular systems. Voice coders and GSM compression formats. Error correcting and convolutional codes. Interleaving and deinterleaving. Encryption and decryption. Case studies.

0903523 Telephone Communication Systems (3 Cr. Hrs.)
Prereq. (0903422)

Introduction. Telephone circuits. Round trip attenuation and delay time effects. Echo canceling. Signaling systems. Private Automatic Branch Exchanges (PABX). Transmission planning. PCM, A-law, Mu-law companding. PCM hierarchy. TDM transmission systems and their hierarchy. Traffic Theory: Erlang B and C formulas, traffic and resources calculations. Digital exchanges. Switching techniques. Network synchronization, control and hierarchy. Synchronization. System controllers and CPU. Common channel control and distributed control. Data Networks and ISDN and packet switching. Open systems interconnection and ISDN networks. Data and control interface to other systems. Signaling systems.

0903524 Optical Communications & Laser (3 Cr. Hrs.)
Prereq. (0903421)
Introduction. Step and graded index, multi-and single-mode optical fibers. Attenuation and dispersion. Guided wave propagation. Fields and modes in optical fibers. Principles of laser generation. Semiconductor lasers. Light amplifiers and their applications. Optical modulation techniques: Direct modulation; external modulation. Multiplexing methods. Optical detectors and receivers: PIN, and APD. System performance. Optical integrated circuits. Practical considerations in optical systems. Optical communication systems: Optical modem, digital optical networks. Introduction to nonlinear optics and soliton systems. Numerical simulation techniques in optical systems.

0903529 Selected Topics in Communications and Electronics (3 Cr.Hrs.)
Prereq. (0903421)
Modern subjects in communication or/and electronics presented to students the new systems in the world of digital or/and communications or electronics working in the radio frequencies and microwaves; including the advantages of these systems. Radiators and antennas are also included.

0903549 Selected Topics in Control (3 Cr. Hrs.)
Prereq. (0903441)
Selected topics in modern digitals and analog control systems and the advantages of these systems and their different application

0903551 Antennas and Wave Propagation Hrs.)
Prereq. (0903351)
Introduction and Overview. Antenna Types. Antenna Parameters. Free Space Path loss. Mathematical formulation. Wire antennas: Short dipole, long and half-wavelength dipoles, standing and traveling wave antennas, wire antennas above the surface of the earth. Loop antennas. Antenna arrays analysis. Aperture antennas. Wave equation. Plane, cylindrical, and spherical waves. Wave components and wave polarization. Reflection, refraction and transmission of wave. Huygence's principal. Physics of the atmosphere. Wave propagation in the troposphere. Space wave. Surface wave. Physics of the ionosphere. Wave propagation in the ionosphere. Sky wave. Effect of the earth magnetic field. Case studies.

0903561 Medical Electronics (3 Cr. Hrs.)
Prereq. (0903361)
Introduction to medical instrumentation. Sensors and electrodes: resistive, inductive, and capacitive sensors. Piezoelectric sensors. Thermistors. Optical measurements. Introduction to biopotential signals. Biopotential amplifiers and signal processors. Cardiovascular system instrumentation: direct and indirect blood pressure measurement. Heart-sound measurement. Blood flowmeters. Plethysmography. Respiratory system instrumentation. Introduction to medical imaging systems: radiography. Computed tomography. Ultrasonic scanning. Therapeutic and prosthetic Devices: Cardiac pacemakers. Defibrillators and cardioverters. Ventilators. Infant incubators. Drug delivery devices. Electrosurgical unit. Electrical Safety.

0903581 Power System Reliability (3 Cr. Hrs.)
Prereq. (0903482)
Introduction to the main electrical power subsystems: Generation,Transmission and distribution. Basic probability theory and distribution.Network modeling and evaluation of systems. Reliability analysis of: Generation: Generating capacity, techniques, indices, interconnected systems, operating reserve; Transmission: Network configuration and indices; Composite systems; Distribution: Radial, parallel and meshed networks.

0903582 Electrical Drives (3 Cr. Hrs.)
Prereq. (0903461)
Classification of Mechanical loads; motors: classification and selection for drive systems; methods of speed control of DC motors; methods of speed control of AC motors; the need for speed control of electric motors; DC choppers and speed control of DC motors; controlled rectifiers and speed control of DC motors, Inverters and speed control of AC motors; soft starting of electric motors.

0903589 Selected Topics in Power & Machines (3 Cr. Hrs.)
Prereq. (0903482)
Modern topics in electrical power systems or electrical machines to keep the student up-to-date in the areas of power generation (their policies and economics), energy sources, distribution systems and special machines.

0903599 Project (3 Cr. Hrs.)

Prereq. (Completing successfully 124 Cr. Hrs. from the students plan)

In part one, a problem will be assigned to the student in one of the different electrical engineering tracks. He will be asked to rely on himself to find a solution for the problem (which could be practical or theoretical). It is expected from the student to develop the abilities of research and independent work and to train himself to observe a time table to perform his project and to be capable to explain and express his findings in a professional manner.

In the second part, student is required to finish the work he started in project 1. Student is required, whenever it is possible, to use the appropriate and available software to solve his problem, simulate his solution, to build a prototype and perform all needed measurements. The student will be required to write down his final year project as a complete report (dissertation) according to the department instructions.