Course Description
B.Sc. Program
Electrical Engineering Department

0903201 Computer Applications (1 Cr. Hr.)
Prereq. (190110 2)

0903203 Electrical Engineering (3 Cr. Hrs.)
Prereq. (0302102)

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 \( \Delta \) connected loads. Measurement of power and power factor. Transistor amplifiers. Op-amps.

0903211 Electrical Circuits (1) (3 Cr. Hrs.)
Prereq. (0302102)
0903212  Electrical Circuits (2)  (3 Cr. Hrs.)
Prereq. (0903211)

0903219  Electrical Circuits Lab.  (1 Cr. Hr.)
Prereq./Coreq. (0903212)

0903221  Signal Analysis & Systems  (3 Cr. Hrs.)
Prereq. (0903201 & 0903211)

0903251  Electromagnetics (1)  (3 Cr. Hrs.)
Prereq. (0302102)
0903253  Electromagnetics (comp. Eng.)  (3 Cr. Hrs.)  
Prereq. (0302102)  

0903261  Electronics (1)  (3 Cr. Hrs.)  
Prereq. (0903211)  

0903301  Engineering Numerical Methods  (3 Cr. Hrs.)  
Prereq. (0301202)  
0903321  Probability and Random Variables  (3 Cr. Hrs.)  
Prereq. (0903221)  

0907235  Assembly Language & Microprocessors  (3 Cr. Hrs.)  
Prereq. (0907231)  

0903341  Instrumentations and Measurements  (3 Cr. Hrs.)  
Prereq. (0903212& 0903261 )  
0903351  Electromagnetics (2)  (3 Cr. Hrs.)
Prereq. (0903251)

0903361  Electronics (2)  (3 Cr. Hrs.)
Prereq. (0903261)

0903368  Electronics Lab.
Prereq./Coreq. (0903361)

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, brushless DC motors.

0903374 Electrical Machines Lab. (Mechanical & Mechatronics Eng.) (1 Cr. Hr.)
Prereq. (0903373)

0903421 Communications (1) (3 Cr. Hrs.)
Prereq./ Coreq. (0903321)

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

**0903424 Digital Signal Processing**  
*(3 Cr. Hrs.)*

**Prereq. (0903321)**  

**0903425 Communication Systems**  
*(3 Cr. Hrs.)*

**Prereq. (0903421)**  

**0903426 Communication Networks**  
*(3 Cr. Hrs.)*

**Prereq. (0903421)**  
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>0903429</td>
<td>Communications Lab.</td>
<td>1</td>
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<td><strong>Prereq./Coreq. (0903422)</strong></td>
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<td></td>
<td>Baseband binary transmission and matched filter receiver measurements. Generation and reception of incoherent binary ASK, PSK, and FSK signals. Waveform shaping. Eye diagram.</td>
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<td>0903441</td>
<td>Control System</td>
<td>3</td>
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<td><strong>Prereq. (0301302)</strong></td>
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<td>0903448</td>
<td>Measurements &amp; Control Lab.</td>
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<td><strong>Prereq. /concurrent (0903341 &amp; 0903441)</strong></td>
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0903461  Power Electronics  (3 Cr. Hrs.)
Prereq. (0903361)

0903462  Digital Electronics  (3 Cr. Hrs.)
Prereq. (0903361)

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)

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**

**0903483 Power System Protection (3 Cr. Hrs.)**
**Prereq: 0903482**

**0903489 Electrical Power Lab. (1 Cr. Hr.)**
**Prereq./Coreq. (0903482)**
0903521 Communication Circuits
Prereq. (0903422)

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

0903523 Telephone Communication Systems (3 Cr. Hrs.)
Prereq. (0903422)
0903524 Optical Communications & Laser (3 Cr. Hrs.)
Prereq. (0903421)

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. (0903421)
Selected topics in modern digitals and analog control systems and the advantages of these systems and their different application.

0903551 Antennas and Wave Propagation (3 Cr. Hrs.)
Prereq. (0903351)
0903561  Medical Electronics  (3 Cr. Hrs.)
Prereq. (0903361)

0903581  Power System Reliability  (3 Cr. Hrs.)
Prereq. (0903482)

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.