

### Course details: 3rd Year Odd Semester

#### **ECE 3107 Electrical Machines II Credits : 3**

**DC Generators:** Types, no-load voltage characteristics, build up of a self excited shunt generator, load-voltage characteristic, effect of speed on no-load and load characteristics and voltage regulation, armature reaction.

**DC Motor:** Operating principle, counter emf, torque, speed, torque-speed characteristics, starting, braking, and speed control.

**Synchronous Generator:** Windings, excitation systems, equivalent circuit, vector diagrams at different loads, factors affecting voltage regulation, synchronous impedance, synchronous impedance methods of predicting voltage regulation and its limitations. Parallel operation: necessary conditions, synchronizing, circulating current and vector diagram.

**Synchronous Motor:** Operation, loading effect, effect of changing excitation, V-curves, and starting methods.

Special machines: Stepper motor, Hysteresis motor, Servo motor, Repulsion Motor, Magnetic levitation.

#### **ECE 3108 Electrical Machines II Sessional Credits : 0.75**

Sessional based on the theory of course ECE 3107.

#### **ECE 3109 Power System Credits : 3.00**

Inductance and Capacitance of overhead power lines, Line representation- equivalent circuit of short, medium and long line. Network representation: single line and reactance diagram of power system and per unit representation. Load flow studies : Gauss – Seidel and Newton-Raphson method. Control of voltage, real and reactive power, reactive power compensation. Fault analysis: Symmetrical fault calculation, symmetrical components, sequence impedance and sequence networks, different unsymmetrical fault calculation, stability analysis.

#### **ECE 3111 Microprocessors & Assembly Language Credits: 3**

**Microcomputer System:** Introduction to different types of microprocessors and its applications, organization of Intel 8086/8088 Microprocessor, the component of microcomputer system, I/O device, Interrupt Structures, I/O interfacing, DMA, Co-processors, RISC processors, Power PC processor, CISC processor, Direct video RAM accessing, Memory module.

**Introduction of Assembly Language:** Program structure and its components, few basic instruction, input/output instruction.

**Flag Register and Flow Control:** The flag register, flow control instructions, conditional and unconditional jumps, branching and looping structures.

**Logic and Arithmetic Operation:** Logic, Shift and Rotate Instruction, multiplication and division Instructions.

**Arrays and Data Structure:** Arrays and related addressing modes, DUP operator, register indirect modes, Based and Indexed addressing modes, basic stack operations, procedures declaration, communication between procedures, calling a procedure.

**String Manipulation:** The string instructions, director flag, moving a string, storing a string, Loading a string, scanning a string, comparing strings, substring operation.

### **ECE 3112 Microprocessors & Assembly Language Sessional Credits : 1.5**

Sessional based on the theory of course ECE 3111.

### **ECE 3117 Software Engineering & Information System Design Credits : 3.00**

#### **Software Engineering**

**Introduction:** Introduction to Software and its Nature, Software Engineering Methods, Different Types of Software Process Model.

**Software Requirement Analysis and design:** Software Requirements Analysis and their Applications, Software Prototyping.

**Design of Software:** Software Design and its Different Techniques, Software Configuration Managements. System Structuring, Control Models

**Software Testing:** Verification and Validation Planning, Software's Testing Strategies and Different Type of Testing Techniques,

**Software Quality Assurance:** Management and its Quality Assurance, Concepts of Software Reengineering.

#### **Information System Design**

**Application Development Policy and Strategies:** Planning of Information System, Policy in Information System Development, Strategies for Achieving Information System Goals.

**Application System Development Life Cycle:** Phases in Application System Development, Interrelationship among Each Phase. Feasibility Assessment: Problems and Needs in Information System Development.

**Feasibility Assessment:** Economic, Technical, Operational and Schedule Feasibility.

**Information Requirements Determination:** Strategies for Obtaining Information Requirements, Methods for Providing Assurance that Requirement are Correct and Complete.

**Structured Systems Analysis:** Steps in Structured Systems Analysis, Activity Diagrams and Related Documentation, Problem Analysis.

### **ECE 3118 Software Engineering & Information System Design Sessional Credits : 0.75**

Sessional based on the theory of course ECE 3117.

### **ECE 3119 Computer Architecture and Design Credit: 3.00**

**Introduction to computer Architecture:** Internal structure of processor/CPU – registers, PC, ALU, CU, etc. Bus architecture and processor interaction with memory and peripherals, Memory hierarchy in terms of cache memory, main memory, secondary storage, Memory organization into bytes and words; big-endian and little-endian organization, Computer Peripherals, Introduction to Von Neumann SISD organization, RISC and CISC machines.

**Review:** Representation of strings, Binary and hex integer representations and conversions, Signed and unsigned formats; 2's complement, Computer integer arithmetic, Fixed-point arithmetic, IEEE floating point representation and arithmetic.

**Process and Control:** Fetch-Execute cycle, Encoding and decoding of MIPS machine instructions, The MIPS CPU instruction set syntax and semantics, Addressing modes, MIPS assembly language programming, Register usage conventions, Use of stack and stack-frame for supporting function calling with parameters, Operating system calls and I/O operations. CPU and It's Instruction Sets Design.

**Application HDL and FPGA for microcomputer design:** Introduction to FPGA and HDL/VHDL for digital design implementation.

### **ECE 3100 Electronic Shop Practice Credits : 1.50**

Introduction to formal procedures of preventive maintenance. Circuit tracing, trouble shooting, fault repairing, soldering and de-soldering of electronic circuits. Design of PCB layout, etching. Radio receivers: Principles of operations, circuit tracing, fault finding by signal injection alignment. TV camera, B/W TV, color TV. CD and VCD player.