Course Syllabus

Department : Electrical Engineering   EN211100 Electric Circuits

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Corequisite : SC401126 Calculus for Engineering I

Textbooks :

R.C. Dorf & J.A. Svoboda : *"Introduction to Electric Circuits"*, John Wiley & Sons, Inc.
J.W. Nilsson : *"Electric Circuits"*, Addison – Wesley Pub., Co.

Objective : Students who take this course are able to

1.   Analyze DC electric circuits both in steady states and transients.
2.   Analyze electric circuits excited with AC sinusoidal signals.
3.   Compute AC power and analyze 3 phase circuits.

Examination :

1. Midterm Test   40 %
2. Final Test   40 %
3. Attention and Assignment   10 %
4. Test   20 %

Language of Lecture : English

Language of Examination : English

Instructors :

Sec 01 Asst. Prof. Dr. Boonying Charoen

Sec 02 Asst. Niyom Pinitkarn

Sec 03 Asst. Prof. Dr. Boonying Charoen and Asst. Niyom Pinitkarn

Course Description :

Circuit elements, node and mesh analysis, circuit theorems, resistance, inductance, capacitance, first and second order circuits, phasor diagram, AC power circuits, three- phase systems

บทที่	เนื้อหา	จำนวนชั่วโมง
1	**Introduction** • Basic concepts of electric circuits • Definition of circuit variables • Basic electrical measuring instrument	**2**
2	**Circuit Elements** • Linear circuit elements • Type of circuit elements • Resistors • Independent and dependent sources • Voltmeter and ammeter • Other circuit elements in DC circuits	**2**
3	**Resistive Circuits** • Kirchhoff's laws • Simple resistive circuits • Series and parallel resistive circuits	**3**
4	**Methods of Resistive circuits Analysis** • Node analysis • Mesh analysis • Selection of circuit analysis methods • Computer programs for circuit analysis	**3**
5	**Circuit Theorem** • Source transformation • Superposition theorem • Thevenin's and Norton's equivalent circuits • Maximum power transfer theorem	**3**
6	**Energy Storage Elements** • Energy storage elements • Capacitors • Energy stored in capacitors • Series and parallel capacitors • Inductors • Energy stored in inductors • Series and parallel inductors • Initial condition of switched circuits	**3**
7	**Complete Responses of 1st order circuits** • 1st order circuits • Constant input responses • Sequential switches • Stability of 1st order circuits • Unit step sources • Time dependent input responses	**6**

บทที่	เนื้อหา	จำนวนชั่วโมง
8	**Complete Responses of 2nd order circuits** • 2nd order differential equations and solutions • Natural responses of parallel RLC circuits • Forced responses • Complete responses	6
9	**Sinusoidal Steady State analysis** • Sinusoidal sources • Steady state response of RL circuit • Complex exponential forcing function • Phasor concept • Phasor and circuit elements • Impedance and Admittance • Circuit analysis with phasor • Phasor diagram	6
10	**AC Steady State Power** • Electrical power • Instantaneous and average power • Power superposition and maximum power transfer • Complex power • Power factor	6
11	**Three Phase Circuits** • Three phase voltage sources • Y – Y connection • Y – Δ connection • Balanced three phase circuit • Three phase power • Three phase power measurement with two wattmeters	4
Total		45