Course Outline

UEE 201 – Theory of Electricity

B.Sc. Engineering Degree - Level 2

First Semester, 2005/2006

Credits:	5
Duration:	13 – 14 weeks
Lectures:	4 hours per week
Laboratory/Tutorials:	3 hours per week
Lecturer:	Prof. J. Rohan Lucas
Instructor in Charge:	Mr. N. C. Ekneligoda

Course Schedule 2005/06

Lecture Schedule:

1. Monday 0830 – 1030 hrs, Room 215A
2. Tuesday 1030 – 1230 hrs, Auditorium 2

Laboratory/Tutorial Schedule:

1. As per time-table and schedule displayed in Electrical Measurements Lab Notice Board

Web site

Department

http://www.elect.mrt.ac.lk

Notes

http://www.elect.mrt.ac.lk/pdf_notes.htm

Past Question Papers

http://www.elect.mrt.ac.lk/pdf_qpapers.htm

Learning Objectives

- To develop analysis tools
- To analyse circuits and waveforms
- To apply dc and ac principles to solve circuits
- To provide a foundation in electrical fundamentals through network theorems
- To complement methods of analysis with laboratory exercises

Outline Syllabus

1. **Introduction (4 hrs)**
2. **Alternating current theory (10 hrs)**
3. **Circuit Theory (12 hrs)**
4. **Three-Phase Analysis (8 hrs)**
5. **Non sinusoidal waveforms (10 hrs)**

Learning Outcomes

At the end of the module the you should be able to

- state the volt-ampere relationships for the basic circuit elements
- apply them to electric circuits
- state and apply the basic circuit laws to electric circuits for all forms of sources
- explain the operation of the basic devices providing electrical safety, including earthing
- represent sinusoidal quantities as phasors
- solve network problems using both phasors and complex numbers
- derive the loci diagrams for RL and RC circuits

Learning Outcomes (contd)

- derive conditions for resonance in electrical circuits
- derive an expression for the mutual inductance
- be able to express magnetically coupled circuits in terms of mutual inductances
- solve problems having mutually coupled components using complex numbers
- solve problems using the normal network theorems
- formulate network problems using matrices
- solve network problems using nodal and mesh analysis

Learning Outcomes (contd)

- explain the significance of phase sequence in three phase systems
- convert star connected systems to delta connected systems in three phase circuits
- solve problems in both balanced and unbalanced three phase networks
- convert phase components to symmetrical components and vice versa for three phase quantities
- appreciate the significance of harmonics in electrical systems

Learning Outcomes (contd)

- resolve non-sinusoidal periodic waveforms to their harmonic components
- analyse electrical circuits in the presence of harmonics
- transform time functions to the frequency and similar domains
- determine the Laplace transform of time functions
- solve transient problems in electric circuits using the Laplace transform

Continuous Assessment

- 30% of the overall mark will be based on continuous assessment
- continuous assessment will usually consist of 10 assessed laboratory classes, and tutorial classes marked by instructors
- no mid-semester assessments will be held

Eligibility to sit for end of semester examination

- normally a minimum of 80% attendance will be required in lectures, tutorials and laboratory work
- obtaining at least 40% of the marks allocated for continuous assessment

End of Semester Assessment

- 70% of the overall mark will be based on the end of semester assessment
- end of semester assessment will usually consist of 7 questions, not necessarily of equal weightage
- at least 20% of the marks must be obtained at the end of semester examination to qualify for a grade point

Recommended Texts

- Electric Circuits, E.A.Edminster, Schaum Outline Series, McGraw Hill
- Theory and Problems of Basic Electrical Engineering, D P Kothari, I J Kothari, Prentice Hall of India, New Delhi
- Electrical Engineering Fundamentals, Vincent Del Toro, Prentice Hall of India, New Delhi