Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course Specification

Institution: Umm Al-Qura University
Department: Computer Engineering Department

A. Course Identification and General Information

1. Course title and code: Circuit Theory 14031202-4
2. Credit hours: 04
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Computer Engineering
4. Name of faculty member responsible for the course Dr. Faisal Al-Osaimi
5. Level/year at which this course is offered Level 04
6. Pre-requisites for this course (if any) General Physics-I and Calculus-II
7. Co-requisites for this course (if any) N/A
8. Location if not on main campus Umm Al Qura University - Abdeya - Makkah Al Mukarramah

B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

- Define and explain basic circuits laws *
- Comprehension of circuit structure
- Analysis of different circuit theorems *
- Synthesis of transient response of first order networks *
- Application of resonant circuits
- Comprehension and synthesis of Two Port Networks

* Requires lab work

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

1. Involving students in presentation of advanced topics in Circuits to know current research in the field.
2. Lecture slides and tutorials, animations to further clarify the theoretical concepts
3. Use of Multisim, Pspice for simulating different circuits analysis problems.

C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
• Basic circuit variables	1	3
• Circuit elements	2-3	3
• Circuit laws	4	3
• Resistance equivalent circuits, resistors in series and parallel, voltage and current dividers, dependent sources	5-6	3

• Circuit analysis techniques	7-8	3
• Inductance, capacitance, mutual inductance	9	3
• Review of complex numbers	10	3
• First order RC and RL circuits, sinusoidal steady-state analysis and power, introduction to RLC	11	3
• Two-port networks	12-13	3

2. Course components (total contact hours per semester):

Lecture:	Tutorial:	Laboratory:	Practical/Field work/Internship:	Other:
45 contact Hrs	15	45 contact Hrs.	N/A	N/A

3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week)

An average student is expected to learn 08 hours per week other than class teaching.

4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

a. Knowledge

(i) Description of the knowledge to be acquired

- Knowledge of basic circuit concepts
- Synthesize of resistive networks, resistive networks, circuit structure
- Analyzing direct application of Ohm's and Kirchhoff's laws, storage elements, nodal and mesh analysis, linearity and superposition, network theorems and network reduction
- Application of two port network, transient response of first order networks, resonant circuits.

(ii) Teaching strategies to be used to develop that knowledge

Classroom lectures, power point slides and individual attention is used to develop knowledge of the course.

(iii) Methods of assessment of knowledge acquired

1. Exercises & Home works , Quizzes, Midterm, Project , Final Exam
2. Review outputs from the assignments in the computer lab and also from their assignments and projects.

b. Cognitive Skills

(i) Description of cognitive skills to be developed

1. Ability to solve numerical problems.
2. Ability of deduction and inference.
3. Ability to analyse different electric circuits

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(ii) Teaching strategies to be used to develop these cognitive skills

1. Assignments.
2. Labs

(iii) Methods of assessment of students cognitive skills

1. Mid and Final Exams
2. Labs Exams.

c. Interpersonal Skills and Responsibility

Students should be able to

1. Understand and communicate to others the importance and relevance of statistics in the modern world
2. Be an independent learner, able to acquire further knowledge with some guidance or support.
3. Participate in group discussions
4. Manage time and meet deadlines.

(ii) Teaching strategies to be used to develop these skills and abilities

1. Numerical Assignments
2. Labs
3. Students Presentations
4. Practical hardware problems to enable students to understand the components

(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility

1. Mid and Final Exams
2. Labs Exams.

d. Communication, Information Technology and Numerical Skills

(i) Description of the skills to be developed in this domain.

1. Case studies: the key method of discovering a student's dexterity in analyzing
2. Their recommendations, opinions and suggestions
3. Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills
4. Class discussions should indicate a student's prowess in responding

(ii) Teaching strategies to be used to develop these skills

1. Written Examinations
2. Assignments
3. Quizzes

(iii) Methods of assessment of students numerical and communication skills

1. Assignments, exams, reports, presentations and quizzes will test their analytic skills and

communication skills

2. Class discussions should indicate a student's prowess in responding

e. Psychomotor Skills (if applicable)

(i) Description of the psychomotor skills to be developed and the level of performance required

Circuit designing is used in the course for psychomotor skill.

(ii) Teaching strategies to be used to develop these skills

The students are encouraged to design and apply different circuits techniques to develop psychomotor skills.

(iii) Methods of assessment of students psychomotor skills

The psychomotor skills developed in this course are assessed by assignments, presentations and project.

5. Schedule of Assessment Tasks for Students During the Semester

Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1	Quizzes	4, 10	10
2	Mid Term	8, 12	20
3	Assignments	Throughout semester	5
4	Lab and Project	Throughout semester	25
5	Final Exam	16	40

D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

For individual student consultations and academic advice teaching staff is expected to be available 8 hours per week

E. Learning Resources

1. Required Text(s)

Nilsson & Riedel "Electric Circuits", 10th Edition, Pearson, 2015.

2. Essential References

Robert Boylestad, "Introductory Circuit Analysis", 12th Edition., Pearson, 2014.

3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

N/A

4. Electronic Materials, Web Sites etc

i. http://utwired.engr.utexas.edu/rgd1/
ii. http://www.irf.com/technical-info/guide/circuit.html
iii. http://www.circuit-magic.com/laws.htm
iv. http://www.zen22142.zen.co.uk/adt.htm
v. http://www.physics.uoguelph.ca/tutorials/ohm/

5. Other learning material such as computer-based programs/CD, professional standards/regulations

National Instruments Multisim 11.0 is required.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

1. A Lecture room having Multimedia projector for lectures and students presentation.
2. Well equipped lab with kits for practical implementations of electronic circuits
3. Internet

2. Computing resources

1. Computer lab available for practical networking and for simulations.
2. Students are encouraged to bring in their laptops and use them in solving problems in the class

room.

3. Other resources (specify e.g. If specific laboratory equipment is required, list requirements or attach list)

Sufficient number of National Instrument Elvis Boards with computers and components are required.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

Course Survey and students Feedback for each learning outcome of the course.

2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department

1. Faculty meetings to discuss best practices and issues related to the course
2. Comparison of the course content with similar courses offered in others colleges
3. Updating course curriculum according to latest research done in the field

3. Processes for Improvement of Teaching

1. Departmental Meetings
2. Faculty Trainings

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

N/A

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Departmental Meetings