Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

COURSE SPECIFICATION

Course Specification

Institution: Umm Al-Qura University

Department: Computer Engineering Department, College of Computer Information Systems

A. Course Identification and General Information

1. Course title and code: Control Systems Engineering – 14034405-3
2. Credit hours: 03
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. Khaled Al-Motairi
5. Level/year at which this course is offered   Level 9 or 10 (Elective)
6. Pre-requisites for this course (if any)   Signal and Systems, Numerical Methods
7. Co-requisites for this course (if any)   N/A
8. Location if not on main campus   Umm Al-Qura University – Abadia Campus

B Objectives

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

Linear control systems, system descriptions and mathematical analysis. Feedback systems. Stability. Laplace transform, frequency spectrum, Nyquist criteria, Bode plots, and root locus methods. System and Controller design and compensation.

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)

N/A

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
Introduction to Control System and Modeling		
System Descriptions and Manipulation		
Feedback System Characteristics		
Root Locus Analysis		
Stability		
Controller Design		
The Frequency-Response Method		
Bode Plot Analysis		

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

Lecture: 48 contact Hrs	Tutorial: N/A	Laboratory: N/A	Practical/Field work/Internship: N/A	Other: N/A

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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 6 hours per week other than class teaching.

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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.

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a. Knowledge

(i) Description of the knowledge to be acquired

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

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(iii) Methods of assessment of knowledge acquired

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b. Cognitive Skills

(i) Description of cognitive skills to be developed

The course will develop the ability to designing and creative thinking in the students.

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

Different teaching strategies are used to develop cognitive skills including practical examples during the lectures and practiced those examples in project. Assignments include some open ended tasks to apply the knowledge gained in the subject.

(iii) Methods of assessment of students cognitive skills

The cognitive skills are assessed by using assignments and project. Quizzes are also designed to assess these skills.

c. Interpersonal Skills and Responsibility

(i) Description of the interpersonal skills and capacity to carry responsibility to be developed

In this course project is assigned to students which is a group activity and play important role to improve students' interpersonal skills and personal and social responsibility.

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

Group assignments and project are given to develop these skills.

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

Assessment of students' interpersonal skills is performed by taking exam, report and presentation.

d. Communication, Information Technology and Numerical Skills

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

To develop skills in this domain technical programming and training is given to the students.

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

Students' are advised to write assignments and project reports as per standard format to develop Writhing skills and presentations are arranged to give them chance to develop communication skills.

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

To assess the students numerical and communication skills tests and conducted and presentations are arranged. Some of the marks are allocated for standard presentation.

e. Psychomotor Skills (if applicable)
(i) Description of the psychomotor skills to be developed and the level of performance required The course provides concepts of designing control systems as psychomotor skill.
(ii) Teaching strategies to be used to develop these skills The student use different techniques to design control systems 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		20
2	Mid Term		20
3	Assignments		20
4	Final Exam		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 04 hours per week

E. Learning Resources

1. Required Text(s)

Franklin , Powell, and Emami-Naeini, Feedback Control of Dynamic Systems, 6th edition Prentice Hall, 2011
2. Essential References Lecture notes prepared by the instructor.
3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) • N.E. Leonard and W.S. Levine, Using Matlab To Analyze And Design Control Systems, Addison-Wesley, 1995 • K. Ogata. Modern Control Engineering. 4th Ed., New Jersey: Prentice Hall, 2007
4. Electronic Materials, Web Sites etc
5. Other learning material such as computer-based programs/CD, professional standards/regulations MATLAB with Simulink 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.) Lecture room is required with multimedia projector.
2. Computing resources Sufficient numbers of computers and MATLAB with Simulink is required.
3. Other resources (specify e.g. If specific laboratory equipment is required, list requirements or attach list) N/A

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching To improve effectiveness of teaching student feedback is obtained in the form of assignments, tests, quizzes, attendance etc.

2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department The evaluation of teaching is performed by the department using student survey.
3. Processes for Improvement of Teaching The process for improvement of teaching is based on result of student survey and result of student outcomes. Individual attention is provided to weak students.
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. The course effectiveness is reviewed for planning and improvement on annual basis.