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| Course: | Industrial Process Control - 0908545 (3 Credit hours – Elective Course) |
| Instructor: | Dr. Adham Alsharkawi <i>Telephone: 5355000 Ext: 23030</i> <i>Email: sharkawi.adham@gmail.com</i> <i>Office Hours: Sun & Tue: 10:00-12:00; Mon & Wed: 09:30-11:00</i> |
| Course Website: | http://elearning.ju.edu.jo |
| Catalog Data: | This course unit aims to introduce students to the fundamental concepts of applied industrial process control, including cascade, feedforward control and decouplers. It also aims to introduce students to the formulation as well as the main implementation details regarding Model Predictive Control (MPC) as well as real-time optimisation. |
| Prerequisites by Course: | Control Systems (0908441) |
| Prerequisites By Topic: | Student should have the basic knowledge of programming and the use of Matlab. |
| Textbook: | Process Dynamics and Control, 2nd edition. Seborg, Edgar and Mellichamp, John Wiley & Sons. |
| References: | Process Dynamics, Modelling, and Control, 1st edition. Ogunnaike and Ray, Oxford University Press |
| Schedule & Duration: | 14 Weeks, 28 lectures (75 minutes each) plus exams. |
| Minimum Student Material: | Text book, class handouts, and an access to personal computer with MATLAB |
| Instructional Methods | <ol style="list-style-type: none">1. Lecture/problem solving sessions.2. Case studies using MATLAB.3. Classworks and homeworks. |
| Minimum College Facilities: | Classroom with whiteboard and projection display facilities, library, computational facilities with MATLAB and Simulink. |
| Course Objectives: | Students will understand the special characteristics of process dynamics and control. They will be able to use modern and advanced control system tools. |

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should:

1. Understand the tools and methods used in industrial process control
2. Design various process controllers, including single-loop PID, cascade, feedforward, de-couplers and model predictive control.
3. Explain what model predictive control is.
4. Tune a PID controller using various tuning rules.
5. Tune MPC controller by selecting values of weights in the corresponding cost function.
6. Use the relevant modelling and design tools for application in other areas.
7. Use computer-based simulation tools to analyse the response of dynamic systems.

| | Topic Description | Hrs |
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| 1. | Fundamental Process Control. | 12 |
| 2 | Enhanced Control. | 14 |
| 3. | Advanced Control. | 12 |

Ground Rules:

- **Attendance:**

Students are expected to attend EVERY CLASS SESSION and they are responsible for all material, announcements, schedule changes, etc., discussed in class. The university policy regarding the attendance will be strictly adhered to.

- **Make up Examinations**

There will be no make up exams for any exam that will be taken during the course. exceptions to this rule is restricted only to the following cases:

1. Death of only first order relatives (father, mother, sister, or brother).
2. Hospital entry (in-patient) during thr time of the examination.

Any other cases will be given the zero mark in the corresponding exam.

- **Special Notes**

1. Seating plan will be as given in the attendance sheet.
2. Students creativity is welcomed and will receive additional marks

Assessments: Exams, Quizzes, Projects, and Assignments.

Grading Policy:

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| Project | 10 % |
| Quizzes and Assignments | 10 % |
| Midterm Exam | 30 % |
| Final Exam | 50 % |
| Total | 100 % |

Last Updated: September, 2019