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ME 305-001: Intro to System Dynamics

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| COURSE | ME 305 | | | | | | | | |
|---|---|------|---|--|--|--|--|--|--|
| NUMBER | | | | | | | | | |
| COURSE TITLE | Introduction to System Dynamics | | | | | | | | |
| COURSE | (3-0-3) (lecture hr/wk - lab hr/wk – course credits) | | | | | | | | |
| STRUCTURE | | | | | | | | | |
| COURSE | Z. Ji | | | | | | | | |
| COORDINATOR | | | | | | | | | |
| COURSE DESCRIPTION | Principles of dynamic system modeling and response with emphasis on mechanical, electrical, and fluid systems. Application of computer simulation techniques. | | | | | | | | |
| PREREQUISITE(S) | Mech 236 – Dynamics ME 231 – Kinematics | | | | | | | | |
| | | | | | | | | | |
| | Math 222 – Differential Equations | | | | | | | | |
| COREQUISITE(S) | None | | | | | | | | |
| REQUIRED, | Required | | | | | | | | |
| ELECTIVE OR | - | | | | | | | | |
| SELECTED | | | | | | | | | |
| ELECTIVE | | | | | | | | | |
| REQUIRED | 1. Katsuhiko Ogata, System Dynamics, 4th Ed., Pearson Prentice-Hall, | | | | | | | | |
| MATERIALS | 2004, ISBN: 0-13-142462-9 2. Software: MATLAB | | | | | | | | |
| | | | | | | | | | |
| Supplemental materials (not Required) | None | | | | | | | | |
| COMPUTER | MATLAB software | | | | | | | | |
| USAGE | | | | | | | | | |
| COURSE | Course Learning Outcomes | SOs* | Expected Performance | | | | | | |
| LEARNING | C C | | Criteria | | | | | | |
| OUTCOMES/ EXPECTED PERFORMANCE CRITERIA: | 1 develop models of mechanical, electrical/electromechanical and fluid systems. | 1 | Exam Question (80% of the students will earn a grade of 70% or better on this question) | | | | | | |
| | 2. analyze dynamic systems through the application of the Laplace transforms, block diagrams, and transfer functions. | 1 | Exam Question (80% of the students will earn a grade of 70% or better on this question) | | | | | | |
| | 3. determine transient and steady state response of dynamic systems. | 1 | Exam Question (80% of the students will earn a grade of 70% or better on this question) | | | | | | |
| | 4. calculate frequency response and use the results for vibration isolation | 1, 2 | Exam Question (80% of the students will earn a | | | | | | |

| | | | | | | - | grade of 70% or better on this question) | | | |
|--------------------------|---|--------------|-----------------------------------|-----|------|--|--|---|--|--|
| | · · | controllers | ulation relat and system n. | | 1, 2 | m Question (80% of students will earn a le of 70% or better on question) | | | | |
| | 6. use com (MATLAE systems ar | B) in analyz | zing dynam | ics | 1 | (80%) earn | Home work Problems (80% of the students will earn a grade of 80% or better on these problems) | | | |
| CLASS TOPICS | Complex Algebra, Linear Algebra, Laplace Transforms, Inverse Laplace Transforms. Linear Differential Equations. Modeling of Mechanical Systems. Block Diagrams, Transfer Functions. Electrical Systems, Electromechanical Systems. Transient Response Analysis. Impulse Response. Analysis in Frequency Domain, Frequency Response, Vibration Isolation. Feedback Control Systems and Automatic Controllers. System Response Analysis and Specification. | | | | | | | | | |
| STUDENT | 1 | 2 | 3 | 4 | | 5 | 6 | 7 | | |
| OUTCOMES (SCALE: 1-3) | 3 | 2 | | | | | | | | |
| (SCALE, 1-3) | 3 – Strongly supported 2 – Supported 1 – Minimally supported | | | | | | | | | |

* Student Outcomes