851. Modeling of Engineering Systems I

Fall. 3(3-0) M E 458 or E E 415. Interdepartmental with and administered by the Department of Mechanical Engineering.

Modeling of engineering components and dynamic systems; mechanical, electrical, fluid, thermal, and transducer effects. Linear state-space responses, impedance methods. Simulation of linear models. Design project.

852. Modeling of Engineering Systems II

Winter. 3(3-0) M E 851. Interdepartmental with and administered by the Department of Mechanical Engineering.

Continuation of M E 851. Modeling of nonlinear dynamic systems. Applications of phase-plane and linearization methods. Simulation of nonlinear systems. Design project.

863. Analysis of Stochastic Systems

Winter. 3(3-0) E E 415, E E 456. Interdepartmental with Electrical Engineering.

Analysis and modeling of stochastic signals and systems. Topics include stochastic models, description of processes, stationarity, ergodicity, correlation and power spectrum, linear stochastic systems, harmonic analysis, Markov processes, Poisson processes.

880. Signal Analysis

Winter. 3(3-0) Approval of department. Interdepartmental with and administered by Electrical Engineering.

Continuous and discrete signals—generation, representation and classification. Fourier transform, spectral analysis and filtering for continuous and discrete signals. Computer implementation of signal processing.

899. Master's Thesis Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

947. Topics in Communications

Fall of odd-numbered years. 3(3-0) May reenroll for a maximum of 6 credits. E E 848. Interdepartmental with and administered by Electrical Engineering.

Advanced treatment of a topic or group of topics of current research interest in the field of communications, information theory and signal processing.

961. Optimal Control Theory

Fall. 3(3-0) SYS 827, MTH 426.

Optimal control, performance measures, principle of optimality, dynamic programming, Hamilton-Jacobi-Bellman equation, variational approach, constrained extrema, Pontryagin principle, necessary conditions, solution techniques, singular cases.

962. Computational Techniques for Optimal Control

Winter of odd-numbered years. 3(3-0) SYS 961.

Computational methods of optimal controls, steepest descent, variation of extremals, quasilinearization, gradient projection, dynamic programming, convexity techniques, support functions for reachable sets, current literature.

963. Dynamic System Identification and Control

Spring of odd-numbered years. 3(3-0) SYS 863, SYS 829.

System identification; dynamic programming; stochastic and adaptive control. Topics under identification include review of statistics background, dynamic system models, identification methods, recursive algorithms, input design, and structure discrimination.

964. Large Scale Dynamic Systems

Winter of even-numbered years. 3(3-0) SYS 961.

Model simplification; stability of large scale systems; decentralized control; optimization by decomposition and coordination; multilevel hierarchical control; applications.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

ENGINEERING EGR

College of Engineering

1255. Orientation to Engineering Careers

Winter. 2(2-0) Credits earned in this course are included in computation of GPA and MAPS but are not included in the 180 credits required for graduation.

Engineering careers, history and philosophy of engineering profession, present and future challenges, industrial job functions, employment trends.

200. Technology, Society and Public Policy

Winter. 3(3-0) Twelve credits from natural science or engineering. Interdepartmental with the Department of Natural Science.

Description and analysis of certain current technologies and their consequences; exploration of avenues for assessing such consequences as an aid to formulation of public policy.

290. Selected Topics

Fall, Winter, Spring, Summer. 1 to 3 credits May reenroll for a maximum of 6 credits if different topics are taken.

Experimental course developments or special topics appropriate for freshmen and sophomores.

344. Engineering Cooperative Education

Fall, Winter, Spring, Summer. Zero credits. [3 credits-See page A-1, item 3.] May reenroll for a maximum of ten terms. Employment assignment approved by College of Engineering.

Pre-professional employment in industry and government related to student's major.

390. Value Engineering

Fall. 4(4-0) MMM 280 or approval of department.

The basis of value engineering is function, value, and a group of special techniques developed to aid in isolating and identifying problems created by our complex society and technology.

401. Engineering and Public Policy

Spring. 3(3-0) Seniors or approval of department. Interdepartmental with the Department of Natural Science.

Sociotechnical assessment of impact of technology on society, with analysis of the role of engineering and natural science in contributing to public policy formulation.

ENGLISH ENG

College of Arts and Letters

091. English for Foreign Students—Structures

Fall, Winter, Spring, Summer. Zero credits. [3(5-0) See page A-1 item 3.] English language proficiency examination.

Explanation and intensive practice of basic grammatical structures of English. Students are tested and then placed in small groups, from beginning to advanced, depending on their need.

092. English for Foreign Students—Speaking and Listening

Fall, Winter, Spring, Summer. Zero credits. [3(5-0) See page A-1 item 3.] English language proficiency examination.

Intensive speaking and listening practice of spoken English in small groups (determined by proficiency). For beginners, practice is largely drill. Advanced groups use drill, films, discussion, and practical conversations.

093. English for Foreign Students—Language Laboratory

Fall, Winter, Spring, Summer. Zero credits. [3(5-0) See page A-1 item 3.] English language proficiency examination.

Language laboratory practice in small groups (determined by proficiency). Beginnings review and supplement ENG 091, ENG 092. Advanced groups use carefully prepared lectures, speeches, and presentations to practice structures and vocabulary.

094. English for Foreign Students—Reading

Fall, Winter, Spring, Summer. Zero credits. [3(5-0) See page A-1 item 3.] English language proficiency examination.

Intensive and extensive reading in small groups (determined by proficiency). Beginners emphasize vocabulary development and practice in basic structures. Advanced classes include reading skills, wider reading, and specialized vocabulary.

095. English for Foreign Students—Writing

Fall, Winter, Spring, Summer. Zero credits. [3(5-0) See page A-1 item 3.] English language proficiency examination.

Frequent controlled and free writing in small groups to reduce errors and practice using structures and vocabulary to express ideas. Advanced classes include writing styles used in academic course work.

101. Responses Through Writing

Fall. 4(4-0) Arts and Letters Freshmen only. Students must enroll in and complete ENG 102 satisfactorily to make a substitution for the American Thought and Language requirement.

A writing workshop that concentrates on the students' personal writing voice and on their responses to the things, people, and institutions central to their experience.

102. Writing and Composing

Winter. 5(5-0) ENG 101; Arts and Letters Freshmen only.

A continuation of ENG 101 that develops the emphases of ENG 101 and encourages students to write in more public and objective forms—narrative, critical analysis, and issue-oriented essays.