Workflow Design of Manufacturing and Service Systems

Course Information

Instructor: Spiridon (Spyros) Reveliotis (spyros.reveliotis@isye.gatech.edu)
Course Prefix and Number: ISYE 4112
Term: Summer 2026 (ISyE Summer Study Abroad Program in Europe)

Course Description

- This course will introduce the students to the operations that take place in modern production and distribution facilities, providing
    1. a set of concepts and themes that underlie the basic characterization of these operations,
    2. the main concerns and objectives that drive their design and their management,
    3. the corresponding terminology, and
    4. some analytical modeling and tools that systematize and support the aforementioned tasks.
- The main emphasis of the course is on the modeling, analysis and design of the *"workflows"* that take place in the considered environments and the supporting *resource allocation functions*.
- Many of the presented models and techniques are also applicable to the workflow management of additional operational environments, like those taking place in health-care systems.

Basic Course Outline

1. Introduction: Course Policies, Objectives, and Outline
2. Operations Management in Modern Corporations
3. Modeling, Analysis and Design of High-Volume Manufacturing Systems
4. Production Planning and Control in High-Volume Manufacturing Systems
5. Modeling, Analysis and Design of Warehousing Systems (Time Permitting)

Course Learning Outcomes

By enrolling in this course, students will:

1. Understand and appreciate the necessity and the significance of using formal modeling and analysis for the systematic study of the sequential workflows that support the operations of the target application environments.
2. Use effectively the fundamental concepts, terminology, results and methods of the employed theory in the context of the considered applications.
3. Appreciate the role and the significance of a pertinent modeling abstraction as an effective tool for structuring design, analysis and control problems in various application domains, while controlling the conceptual / representational, analytical and computational complexity of these tasks.
4. Understand the effective / proper use of the presented models (as defined by their structure and their embedded assumptions), their potency, but also their limitations.
5. Experience the potential of the current LLM platforms in the course domain.

Course Prerequisites

- ISyE 3232: Stochastic Manufacturing and Service Systems
- ISyE 3133: Engineering Optimization

Required Course Materials

- The slides discussed in class and any additional material circulated by the instructor.
- The electronic textbook *Workflow Design in Manufacturing and Service Systems,* by D. Bodner, D. Williams and C. Zhou, can be used as supporting material to the course developments (will be provided at the beginning of the course).

Grading Policy

- Midterm Exam: 50% (Take-Home)
- Final Exam: 50% (Take-Home)
- Solution of some homework problems from on past campus offerings of the covered material will be interleaved with the course lectures, and some additional such problems together with their solutions might be provided for practicing purposes.

AI Policy

You are welcome to use the current LLM platforms in the preparation of your solutions for the assigned homework and the exams, but the ultimate responsibility for the final outcome of such a usage is yours.

Attendance Policy

Class attendance is encouraged but optional. However, you are responsible to remain abreast with respect to the in-class and the overall course developments.

Academic and Research Honesty/Integrity Statement

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review the Student Code of Conduct and the Academic Honor Code, especially Appendix A: Graduate Addendum to the Academic Honor Code.

Allegations of misconduct are handled in accordance with the procedures outlined by the Policy for Responding to Allegations of Scientific or Other Scholarly Misconduct.

Core IMPACTS

Not applicable.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.