

SPECIAL TOPICS: PROCESS ENGINEERING, SPRING 2024, 3 Credit Hours SYLLABUS

Course Objectives

This course introduces the industrial, manufacturing and systems engineering student to *process modeling* with a view to developing student skills in generating formal descriptions of processes, identifying process architectures and landscapes, modeling processes using a formal process modeling language, and analyzing process models using qualitative and quantitative techniques. The main motivation is to equip the IMSE student with process modeling skills to be able to *reengineer processes by learning the art and science of overseeing how work is performed in organizations to ensure valuable outcomes and to take advantage of improvement and innovation opportunities*. To learn process modeling, the class will use the Business Process Modeling Notation (BPMN 2.0) language.

The main course topics for lectures and in-class activities are:

1. Identifying process elements and generating process descriptions
 2. Lifecycle of a process
 3. Process Identification and Process Selection Criteria
 4. Process Modeling using Business Process Modeling Notation (BPMN 2.0)
 - a. Branching and merging logic
 - b. Business objects
 - c. Resource modeling
 - d. Process decomposition
 - e. Process model reuse
 - f. Rework and repetition modeling
 - g. Process event and exception handling
 - h. Modeling process and business rules
 5. Process discovery challenges and methods
 6. Qualitative analysis of process models
 - a. Value added analysis
 - b. Waste analysis
 - c. Stakeholder analysis and issue documentation
 - d. Root cause analysis
 7. Quantitative analysis of process models
 - a. Flow analysis
 - b. Queue analysis
 - c. Introduction to simulation analysis
- (Time permitting)
8. Brief review of Process Redesign methods, process-aware information systems and process implementation steps

Course Meetings

Mondays from 6 to 8:50 PM, Civil Engineering Conference Room, Engineering Building A227.

Course Instructor

Dr. Arunkumar Pennathur, apennathur@utep.edu.

Office Hours

My office hours this semester are Tuesdays 3 to 430 PM and other times by appointment. Please send me an email for an appointment.

Email is a fast, convenient way to contact me. I read my email usually twice a day when I am in town and respond within a day if I am in town on weekdays. If I am traveling or if it is the weekend, please expect a slight delay in my response to your email.

Textbook

The following text is recommended. The lecture slides are based on this book:

Fundamentals of Business Process Management, Second Edition, by Marlon Dumas, Marcello La Rosa, Jan Mendling, and Hajo A. Reijers, published by Springer, 2018.

The book is available for rent and paperback/hardcopy purchase at a very nominal cost at:

https://www.amazon.com/Fundamentals-Business-Process-Management-Marlon/dp/3662565080/ref=sr_1_1?crid=1D1WY1RGOY0PS&keywords=business+process+dumas&qid=1705406588&sprefix=%2Caps%2C126&sr=8-1

If you want to learn BPMN language, there are many excellent books on this topic you can add to your personal library, including BPMN Method and Style books by Bruce Silver, and many other excellent and advanced references on the topic.

Software

There are quite a few software programs for creating process models and that support BPMN modeling standards. These include the Signavio modeler (with academic license) which I will predominantly use in this class, MS Visio, the process modeler of Camunda available via the free web version of the modeler (Cawemo – www.cawemo.com), BPMN and other modeler templates available on www.diagrams.net and others. For much of the modeling in this class, I plan to use Signavio. Signavio (owned by SAP; <https://www.signavio.com/customers/>) is used by many large industries; so is Camunda (<https://camunda.com/about/customers/>).

Diagrams.net is an open-source diagramming tool. But please note that every industry has its preferred software integrated with their IT systems for process implementation, but they all use the common BPMN language, so once you learn the language, it is easy to use any software supported by an organization you will work for. So, when you go to work full-time in industry, transitioning to what your industry uses will be easy. **I will create Signavio accounts for you individually and for your project teams (I have the academic license for this program).**

For your projects, I recommend you use one or more of the above to generate your process models, associated diagramming, and process documentation. MS Word SmartArt templates

are also useful for this class, and for diagramming and writing your homework assignments and other reports.

I will also supply class slides and some notes; the class slides will be condensed teaching versions, and available on Blackboard as PDF files.

Course Grading

In teams

Process Modeling Project	
Written proposal:	5%
Written final report:	30%
Final presentation:	25%

Individual work

Homework assignments:	10%
Mid-term exam:	15%
Final exam:	15%

I will use the following standard university letter grade scheme.

- A: 90-100%
- B: 80-89%
- C: 70-79%
- D: 60-69%
- F: Below 60%

Course Components

Course Project: You will identify and model an *as-is process* for a client of your choice this semester for your course using the tools from this course. I anticipate teams of 3 students working together in a project. This process can be with an internal client (inside UTEP, such as the Library, the Engineering Technology Center, our department front office, etc.,) or can be external (from your internships and any other industrial clients you may have relationships with).

Within about a month, a short, written project proposal is due. The project proposal should identify the client, and initial specifications of the process you will model and outline the scope of the process in brief. Please see Project Proposal Dropbox on Blackboard for further details on what the proposal should contain.

There will be a final report due and a final presentation for the class project during the final week of classes when your team will present the final as-is process models for your client. Please consult the project final report and final presentation Dropbox on Blackboard for what

these documents should contain. **The final project presentation is scheduled for Monday, April 29, 2024. Final project reports are due on that day as well.**

There is a team peer evaluation component for projects - all members in the team will evaluate each other, so all members in a team will not get the same grade. Please see the peer evaluation document for how you will rate your team members. The grade obtained by an individual for the final project report and the final presentation will be the product of the team grade and the peer evaluation of the individual.

Individual HW assignments (please see the Assignments list). Homework assignments are to be submitted via Canvas. Homework assignments are intended for your practice, and to enable you to stay abreast of what we cover in class, so you should attempt to submit these on time. In general, homework assignments will include 2 to 3 questions and will be a combination of short, objective type questions, and somewhat longer essay type questions/models. Please word process your homework assignments. **Late homework (late by a day or more) will earn penalties.**

Course Exams. The course has 2 exams which will be online and using the computer. The exams will consist of a combination of multiple choice/short answer and computer modeling (and file upload) questions. The exams will be open book, open notes and you can bring your textbook, any notes I have posted on Blackboard, anything you have tried in class when modeling, your HW assignments, your calculators and scratch pads for you to work problems if need be. You may also need the use of Signavio or other BPMN 2.0 software for creating process models.

Exam 1: Monday, March 25, 2024

Exam 2: Monday, May 6, 2024

Academic Dishonesty Policy

Any attempts of academic dishonesty in any aspect of the course will not be tolerated and will be dealt with according to applicable University of Iowa Policy. Please read the information on UI College of Engineering webpage to understand academic dishonesty and applicable U Iowa College of Engineering policy.

Accommodations for Students with disabilities

The University is committed to providing an educational experience that is accessible to all students. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through the Center for Accommodations and Support Services (CASS). CASS is responsible for making Letters of Accommodation (LOA) available to the student. The student must provide a LOA to the instructor as early in the semester as possible, The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Additional information can be found on the CASS website (<https://www.utep.edu/student-affairs/cass/>).