

## INSE 6421 Systems Integration and Testing (4 credits)

### 1. Course Description

- Systems Integration is a multidisciplinary subject involving a combination of computer science, systems engineering and management disciplines. This course investigates issues related to the integration and testing of complex systems. It provides the foundation needed to plan and implement successful systems integration projects. Students will learn how to apply the fundamentals of project planning, process analysis, and modeling as well as the use of quality standards, tools and methodologies in systems integration projects. Students will also be exposed to issues related to the formulation of system operational assessment and concept, systems architecture, abstract models, behavioral modeling and analysis methods-leading to the composition of components and systems. Specific focus is given to modeling languages, interface description, management and control, testability, integration and interoperability testing. Management issues pertaining to integrated product teams, vendors and suppliers, and subcontractors are also addressed. A Project.
- **Prerequisite:** INSE 6400 or permission from instructor

### 2. Learning Outcomes

By the end of this course, students should be able to:

1. Understand various aspect of systems integration problem
2. Model a system
3. Describe a system
4. Validate a system

### 3. Schedule

The order of Lectures may change during the session.

<b>Lecture 1</b>	<i>Introduction - Research Methods-1</i>
<b>Lecture 2</b>	<i>Research Methods-2</i>
<b>Lecture 3</b>	<i>Integration: Interdisciplinary activity ( Challenges of systems and components integration, human factor in integration)</i>
<b>Lecture 4</b>	<i>Introduction to modelling languages SysML</i>
<b>Lecture 5</b>	<i>Design and architectures of systems and their impact on integration</i>
<b>Lecture 6</b>	<i>Interface design: need for common understanding and role of ontologies</i> <b>Midterm #1, Monday February 18th 2019</b>
<b>Lecture 7</b>	<i>Composition models, predictive compositions and patterns</i>
<b>Lecture 8</b>	<i>Methods and tools for modeling and simulation</i> <i>Scenario driven integration and analytic methods</i>
<b>Lecture 9</b>	<i>Management and control of the integration, Risk assessment of the integration, and Cost evaluation of the integration and cost of rework</i>
<b>Lecture 10</b>	<i>Integration testing: design and specification</i>
<b>Lecture 11</b>	<i>Performance assessment of the integration</i> <b>Midterm #2, Monday March 25th 2019</b>

<b>Lecture 12</b>	Term Paper Presentations → <b>April 1<sup>th</sup> 2019</b>
<b>Lecture 13</b>	Term Paper Presentations → <b>April 8<sup>th</sup> 2019</b>

## 4. Course Materials

### References:

- “Engineering Systems Integration: Theory, Metrics, and Methods”, by Gary O. Langford, CRC Press, 2012, eBook ISBN 9781439852897
- “Advanced systems thinking, engineering and management” by Derek K. Hitchins, edited by Artech House, 2003 , ISBN 1-58053-619-0
- System Architecting, Gerrit Muller, Buskerud University College (online version on the course webpage)
- <http://www.sysml.org>
- <http://www.systemc.org>
- <http://www.incose.org>

## 5. Grading

1. Term paper: 50%
2. Midterm 25%
3. Midterm: 25%

### • Details:

1. Term paper must be done individually for PhD Students. The grade is composed of report grade and presentation grade.
2. Midterm Exams: will take place during the lecture time and location. Exams are Closed book.

### • Failing Grade:

Plagiarism, absenteeism, lack of preparation, and lack of effort will result in a failing grade.

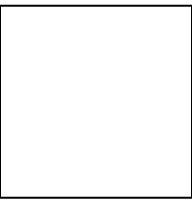
## 6. Academic Code of Conduct

### Academic Integrity

Any form of cheating, plagiarism, personation, falsification of a document as well as any other form of dishonest behaviour related to the obtention of academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties up to and including suspension and expulsion.**

As examples only, you are not permitted to:

- Copy from anywhere without indicating where it came from
- Let another student copy your work and then submit it as his/her own
- Hand in the same assignment in more than one class
- Have unauthorized material or devices in an exam. Note that you do not have to be caught using them – just having them is an offence
- Copy from someone’s else exam

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- Communicate with another student during an exam
  - Add or remove pages from an examination booklet or take the booklet out of an exam room
  - Acquire exam or assignment answers or questions
  - Write an exam for someone else or have someone write an exam for you
  - Submit false documents such as medical notes or student records
  - Falsify data or research results

You are subject to the Academic Code of Conduct. Take the time to learn more at <http://provost.concordia.ca/academicintegrity/>

## 7. Student's Responsibilities

- Students are expected to attend every class. Some material may only be covered in class and not made available on the course website. Students are expected to read the assigned material or work and to actively participate in class discussions.
- Students are expected to be respectful of other people's opinions and to express their own views in a calm and reasonable way. Disruptive behaviour will not be tolerated.
- Students are expected to be familiar with the Code of Rights and Responsibilities:  
<http://rights.concordia.ca>
- If you cannot attend class for any reason, unforeseen or not, you are to come and talk or write to me as soon as possible.

## 8. Student Services

- **Concordia Counselling and Development** offers career services, psychological services, student learning services, etc.  
<http://cdev.concordia.ca>
- **The Concordia Library Citation and Cycle Guides:**  
<http://library.concordia.ca/help/howto/citations.html>
- **Advocacy and Support Services:**  
<http://supportservices.concordia.ca>
- **Student Transition Centre:**  
<http://stc.concordia.ca>
- **New Student Program:**  
<http://newstudent.concordia.ca>
- **Office for Students with Disabilities:**  
<http://supportservices.concordia.ca/disabilities/>
- **The Academic Integrity Website:**  
<http://provost.concordia.ca/academicintegrity/>