

Fall 2019

# IE 492-451: Engineering Management

Ankush Karnik

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# NEW JERSEY INSTITUTE OF TECHNOLOGY

## Department of Mechanical and Industrial Engineering

### Course Summary:

<b>COURSE:</b>	<b>IE 492 – 451, IE 492 – 455, &amp; IE 492 – HM1 ENGINEERING MANAGEMENT</b>
<b>SEMESTER:</b>	FALL 2019 – ONLINE ONLY
<b>INSTRUCTOR:</b>	Ankush Karnik BS. IE, MS. EM, MBA, SAFe POPM, CSSGB, PMP, CSM, EIT Tel: (732) 266 5439 Email: <a href="mailto:apk1932@njit.edu">apk1932@njit.edu</a>
<b>TEXTBOOKS/LITERATURE:</b>	<ul style="list-style-type: none"> <li>▪ Gido, J. and Clements, J., Successful Project Management, 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> Edition, South-Western Publishing, 2009, 2012, 2015</li> <li>▪ Sepulveda, J., Souder, W. and Gottfried, B., Schaum’s Outline of Theory and Problems of Engineering Economics, McGraw-Hill, Inc., 1984</li> </ul> <p>Note: You will also need to review additional sources – online or from library in case the book falls short to thoroughly explain a specific concept, or if you want to learn more about a specific topic.</p>
<b>COURSE DESCRIPTION:</b>	<p>This course covers the fundamental concepts of Engineering Economics and Project Management. It is designed to introduce engineering majors to application of basic finance, time value or money, and project management principles to general engineering problems. Application of these principles helps facilitate decision making in practice and provide a foundation for engineers for working with senior management, and eventually transitioning into management roles.</p> <p>There are two parts to this course. The Engineering Economics section of the course will encompass the following topics: Interest Rates, Time Value of Money, Financial Statements with focus on Cash Flows, Estimating Capital Projects, Economic Feasibility Analysis and Engineering Ethics.</p> <p>The Project Management section of the course will cover all phases of the project life cycle, starting from Project Initiation through Project Closeout. We will review various tools and methodologies that have been effective in managing various aspects of the project. We will also touch on new project management methodologies and approaches applicable to a wide range of projects including engineering and technology projects. These concepts include Agile, Scrum, Kanban etc.</p>

	<p>There will be assignments, mini cases, quizzes, term project, and a final exam to assess and reinforce concepts learnt in this class. This course offers a mixture of individual and group assignments.</p> <p>It is expected that students will work in teams for the term project.</p>
<p><b>COURSE LEARNING OUTCOMES:</b></p>	<ul style="list-style-type: none"> <li>• Effectively apply knowledge of Engineering Management including Engineering Economics and Project Management in real world situations.</li> <li>• Identify, formulate, and solve engineering problems.</li> <li>• Effectively function on multidisciplinary and virtual teams.</li> <li>• Apply course learnings and modern management tools to engineering practice.</li> </ul>
<p><b>INSTRUCTIONAL METHODS:</b></p>	<p>This section is distance learning / online section, and therefore all course materials will be delivered through an online medium. The class will not meet in person.</p> <p>Canvas:</p> <ul style="list-style-type: none"> <li>• Canvas is an online platform used by NJIT to facilitate delivery of online lectures and materials.</li> <li>• Accessed via <a href="http://canvas.njit.edu">canvas.njit.edu</a></li> <li>• PowerPoint slides, homework problems, video links and other supporting materials will be uploaded for student review and download.</li> <li>• Assignments will be posted on Canvas.</li> <li>• Submissions will be via Canvas as well.</li> <li>• Canvas will also serve as a tool for group collaborations and discussions related to all class assignments and projects.</li> </ul> <p>Textbooks/Assigned Literature:</p> <ul style="list-style-type: none"> <li>• There are two textbooks for this course. Both are required as one of the textbook covers Engineering Economics and the other covers Project Management section of the course.</li> <li>• It is expected that the students will read and refer to assigned textbooks as we will be covering materials from the same. Homework assignments will also be mostly from textbook. Lecture materials make the best effort to explain the material, but students must read/refer to the assigned literature for detailed explanation and understanding of the topic.</li> </ul> <p>Web Resources:</p> <ul style="list-style-type: none"> <li>• Links to articles, videos, and other materials will be posted in Canvas in respective weeks. These links will be helpful in reinforcing concepts learned in this course.</li> </ul>

	It is also expected that students review online resources and current news in order to reinforce concepts learnt in class. It is all about connecting theory to real-life situations!
<b>NJIT HONOR CODE:</b>	<p>Please read and follow the NJIT University Code for Academic Integrity</p> <p>Any violation of the code will null and void all assignments and grades for this course. The alleged action will be reported to the Dean of Students office for further action. The NJIT Integrity and Honor Code site is provided below.</p> <p><a href="http://www5.njit.edu/doss/policies/honorcode/index.php">http://www5.njit.edu/doss/policies/honorcode/index.php</a></p>
<b>PERSONAL MATTERS &amp; HEALTH ISSUES</b>	The instructor should not be exposed to family matters, health, hospitalization, or other serious personal matters. Should a serious event happen, please, communicate the issue directly and solely to the Dean of Students who will advise on how to proceed.
<b>ACADEMIC INTEGRITY</b>	<p>Since this is a distance learning / online course, all assignments, projects, and quizzes/exams can be completed from any location. It is expected that students will not collaborate with each other while completing assignments, quizzes, or exams unless otherwise indicated.</p> <p>Please note that there are tools and capabilities available to identify if students are collaborating on quizzes and exams. Any identified occurrence of collaboration will be referred to the department and to the Dean of Students for further action.</p>
<b>ASSIGNMENTS:</b>	<p>To gain maximum benefit from the course, there are a mix of individual and group assignments to be completed over the course of the semester.</p> <p>There will be assignments due each week. Typically, individual assignments will be due on Fridays, and group assignments will be due on Sundays.</p> <p>Please make sure that the assignments are submitted via Canvas in a designated area on time every week.</p> <p><b>Assignments will <u>NOT</u> be accepted via email on any other medium. NO EXCEPTIONS!</b></p> <p>Please make sure you read the syllabus carefully and get to know the assignment due dates.</p>
<b>DELIVERABLE DUE DATES:</b>	All assignments due dates are indicated in the 'Detailed Course Schedule' section in this document. Assignment must be received in Canvas by 11:55pm on the day they are due. <b>It is recommended that you DO NOT</b>

	<p><b><u>wait until the last minute for submission to avoid any technical issues etc.</u></b>  <b><u>Any assignment not received in Canvas by the due date/time will automatically receive 'F' grade.</u></b></p>
<b>GRADING:</b>	<p>Please see Grading schedule mentioned in the 'Grading' section of this document.</p> <p>The course will follow NJIT recommended grading scheme as follows:</p> <p>A: for superior performance (90% or higher)  B+: for excellent performance (87% to 89.99%)  B: for very good performance (82% to 86.99%)  C+: for acceptable performance (76% to 81.99%)  C: for fair performance (70% to 75.99%)  D: for minimal performance (65% to 69.99%)  F: otherwise</p>
<b>SOFTWARE PROGRAMS:</b>	<p>It is expected that the students will have access to Microsoft Excel, Microsoft Word and Microsoft Project or similar throughout the duration of this course. The course contains several exercises that need to be completed in Microsoft Excel and Microsoft Project. Furthermore, the final project for the course will require the use of these software applications as well. No other software is required for this course. Note that depending on your familiarity with Microsoft Excel, you may be able to use Microsoft Excel to create project plans for the term project. We will cover this in detail as we progress through the semester.</p> <p>There are some free open source applications comparable to Microsoft Project but not as extensive as Microsoft Project:</p> <ul style="list-style-type: none"> <li>• Trello</li> <li>• Freecamp</li> <li>• Basecamp</li> </ul> <p>Most web-based software's may also allow the student groups to collaborate where an account can be created for each member of the group to access required information.</p> <p>We will discuss project management software in detail as we get closer to the project management section of this course.</p>
<b>INSTRUCTOR AVAILABILITY:</b>	<p>I will generally be available every day of the week. I will be checking emails regularly and will respond within 24 hours. I will also be available by phone if needed, but it is best to reach me via email first. However, feel free to call me in case you do not hear from me within 24 hours, or if you have an urgent question.</p>

	There are days when I am travelling for work and during those days, I may be slow in responding to emails or queries, however it should not affect my availability or the class schedules overall.
<b>PEER EVALUATIONS:</b>	As in the corporate world we will have peer evaluations in this course. You will be grading your group members at the end of the semester or various attributes. Peer evaluations will be counted towards the final grade for this course. This is typically known as 360-degree evaluation. Each student must submit a peer evaluation.  <b>PLEASE NOTE: FAILURE TO SUBMIT A PEER EVALUATION WILL SEVERLY AFFECT THE PROJECT GRADE. LATE SUBMISSIONS WILL NOT BE ACCEPTED. PLEASE SEE THE EVALUATION DUE DATE MENTIONED IN THE DETAILED COURSE SCHEDULE.</b>
<b>COURSE EVALUATIONS:</b>	Like other courses at NJIT, you will have an opportunity to submit course evaluation, where you will grade the course, content, and me. Your feedback is very important to me and to NJIT and will help me in improving this course going forward. It is all about continuous improvements!

Grading:

<b>Class Participation (Online) – contribution to forums, questions, and case studies</b>	<b>20%</b>
<b>Quizzes (3 total)</b>	<b>15%</b>
<b>Term Project</b>	<b>25%</b>
<b>Final Project Report and Presentation</b>	<b>15%</b>
<b>Peer Evaluation/Group Performance</b>	<b>5%</b>
<b>Final Exam</b>	<b>20%</b>

**SYLLABUS CONTINUED ON THE NEXT PAGE**



**SEE DETAILED COURSE SCHEDULE ON THE NEXT PAGE**

## Detailed Course Schedule

WEEK #	DATE	TOPICS	ASSIGNMENT	SUBMISSION DATES
1	9/2/2019 – 9/8/2019	<b>Engineering Management, Introduction Class Expectations</b>	Introductions (Class) (I)	9/6/2019
2	9/9/2019 – 9/15/2019	<b>Time Value of Money &amp; Compounding</b> Interest Rates, Inflation, Time Value of Money, Cash Flows, Single-Payment, Uniform-Series, Gradient Series, Annual Compounding	<b>Schaum's Chapter 1 &amp; 2</b> Discussions questions (I) Assigned problems (G) Team Building Activity (G) – 'Two truths and a lie'	9/13/2019 9/15/2019 9/15/2019
3	9/16/2019 – 9/22/2019	<b>Basic Relationships &amp; Continuous Compounding</b> Algebraic Relationships, Discrete, Periodic Compounding, Continuous Compounding	<b>Schaum's Chapter 3, 4 &amp; 5</b> Discussion questions (I) Assigned problems (G) Team Building Activity (G) – 'What matters to me'	9/20/2019 9/22/2019 9/22/2019
4	9/23/2019 – 9/29/2019	<b>Evaluation Methodologies &amp; Quiz1</b> Equivalence, MARR, FMV	<b>Schaum's Chapter 6</b> Quiz 1 – Schaum's Chapter 1 -5 (I)	<b>9/27/2019 – 9/29/2019</b> Note: Quiz will open Friday evening and will be available through Sunday evening.
5	9/30/2019 – 10/6/2019	<b>Evaluation Methodologies</b> Present Worth, Future Worth, NPV, Rate of Return, Payback, ROI, Cost-Benefit Ratio, Budget Allocation	<b>Schaum's Chapters 7, 8 &amp; 9</b> Discussion questions (I) Assigned problems (G)	10/4/2019 10/6/2019
6	10/7/2019 – 10/13/2019	<b>Economic Feasibility Analysis</b> Retirement and replacement decisions/economics, Depreciation	<b>Schaum's Chapters 10 &amp; 11</b> Discussion questions (I)	10/11/2019
7	10/14/2019 – 10/20/2019	<b>Quiz 2</b>	Quiz 2 – Schaum's Chapter 6 – 11 (I)	<b>10/18/2019 – 10/20/2019</b>

				Note: Quiz will open Friday evening and will be available through Sunday evening.
8	10/21/2019 – 10/27/2019	<b>INITIATING: Project Management Concepts, Project Identification, Proposal Development &amp; Project Initiation</b> Project Life Cycle, RFP – Proposal Preparation, Contracts <b>*Term Project Introduction*</b>	<b>Gido chapter 1, 2, &amp; 3</b> Assigned questions (I) Project Ideas Deliverable (G)	10/25/2019 10/27/2019
9	10/28/2019 – 11/3/2019	<b>PLANNING &amp; COMMUNICATIONS: Project Planning, Communication &amp; Documentation</b> Project Scope, WBS, Sequencing Activities, Communication Types, Project Teams, Presentations, Change Control, Communication Tools & Methodologies	<b>Gido Chapter 4, 5, 12</b> Assigned questions (I) Project Proposal Deliverable (G)	11/1/2019 11/3/2019
10	11/4/2019 – 11/10/2019	<b>Quiz 3</b>	Quiz 3 – Gido Chapter 1- 5, 12 (I)	<b>11/8/2019 – 11/10/2019</b> Note: Quiz will open Friday evening and will be available through Sunday evening.
11	11/11/2019 – 11/17/2019	<b>PERFORMING: Project Performing &amp; Controlling</b> Resource Planning & Utilization, Project Financials, Risk Management	<b>Gido Chapter 6, 7, 8</b> Assigned questions (I)	11/15/2019
12	11/18/2019 – 11/24/2019	<b>CLOSING: Project Closeout &amp; Management Structures + Earned Value Management</b> Project Close Out Process, Tools, and Deliverables, Earned Value Management	<b>Gido Chapter 9</b> Assigned questions (I) Term Project Report (G)	11/22/2019 11/24/2019



13	11/25/2019 – 11/27/2019	<b>PEOPLE &amp; ORGANIZATIONS:</b> Project Manager, Project Team, Project Management Organizational Structure	<b>Gido Chapter 10, 11 &amp; 13</b> <a href="#">Assigned questions (I)</a>	11/27/2019
14	11/28/2019 – 12/1/2019	<b>Thanksgiving Recess – Enjoy!</b>		
15	12/2/2019 – 12/8/2019	<b>Project Management Approaches &amp; Methodologies</b> Agile, Scrum, SAFe, Kanban etc., team dynamics	<b>Lecture Slides</b> Term project submission (Final Report) (G)	12/8/2019
16	12/9/2019 – 12/11/2019	<b>Final Exam Review</b>	<b>Review all course materials</b> <a href="#">Peer evaluation submission (I)</a> Group/Video slide presentation (Final) (G)	12/11/2019 12/11/2019
	12/12/2019 – 12/13/2019	<b>Reading Days</b>		
	12/14/2019 – 12/15/2019	<b>Final Exam</b> (Comprehensive – Engineering Economics and Project Management) (I)		<b>Final Exam –</b> <b>12/14/2019 –</b> <b>12/15/2019</b> Note: FINAL EXAM will be available from Saturday morning through Sunday evening.

NOTE:

- (I) indicated individual submissions
- (G) indicates group submissions