Course Syllabus

ENGR 5174 – Engineering Program and Project Management
Monday 4:00 PM – 6:45 PM

1. CATALOG DESCRIPTION

The project approach has applied in the accomplishment and management of complex technical work typically performed by engineers, scientists and other technology professionals. Practical application and ongoing enhancement of program and project management systems with emphasis on process, techniques, standards, empirical guidelines, computer software, teamwork and economic considerations.

2. LEARNING OBJECTIVES

Having successfully completed this course the student will:

- Be able to apply the project approach in the performance and management of technology related work.
- Understand project lifecycle and the project management process.
- Understand the interactive role of technical work planning, scheduling, budgeting and inspection planning within the project management process.
- Be able to apply specific techniques in support of each phase of the project management process (i.e. start-up, project strategic planning, organizing, work planning, scheduling, estimating, resourcing, budgeting, inspection planning, activating, controlling, performance improvement, close-out).
- Understand the structure and function of Project Management Information Systems.
- Be able to apply selected software packages in support of engineering program/project management.
- Be able to evaluate and plan for the enhancement of a project management system using generally accepted standards (e.g. C/SCS criteria and PMI certification standards).
- Be able to recognize practices that lead to success and failure in program/project management.
- Be familiar with various critical issues and special applications of program/project management.
3. APPLICATION

Engineers, scientists and other technical professionals must accomplish complex technical work to provide their customers with the satisfaction of obtaining deliverables that meet specific requirements. Some of these technical professionals will also assume managerial responsibility for this work and the resulting deliverable(s). One technique that has proven to be quite effective in this regard is the “project approach”.

The purpose of this course in Engineering Program and Project Management is to provide technical professionals with the knowledge and tools required to use the project approach in the performance and management of complex technical work and effectively use the project approach to assure desired performance and results.

The project approach and project management in particular has evolved as a popular topic in the literature and syllabi of many non technical professional and semi-professional communities, supported by the availability of generic software such as Microsoft Project, Schedule Plus and other time management packages. However, this course in Engineering Program and Project Management is not intended as a substitute for generally available basic instruction in generic project software or project scheduling and control techniques used in basic task management.

The course was developed and is presented by the Department of Industrial and Systems Engineering for students in engineering, scientific or other technology-based programs of instruction. It does seek to provide students with a much deeper understanding of the project approach and a broad range of application techniques that support the practice of program/project management in the contemporary engineering, scientific and high-tech communities. Students completing this course will have enhanced their capabilities for both the practice of technology based project management and the reengineering or enhancement of project, multi-project and program management systems, including project management information systems.

The content of this course includes coverage of topics important to the practice of project management in the engineering/hi-tech environment such as deliverable disintegration; WBS translation techniques; network planning; grass roots, parametric and statistical estimating techniques; critical path management; time and resource constrained scheduling; project definition using baseline planning; organization development and supervised teamwork; resource acquisition and outsourcing; risk/contingency management; performance measurement and control; inspection planning; C/SCSC; earned value techniques project management information systems; software evaluation; start-up and closeout administration etc.
4. PREREQUISITES AND CO-REQUISITES

While there are no prerequisite requirements other than good standing in a technology based graduate program, incoming students will benefit from having some general instruction and/or experience in the basic principles and general practice of management. After completing this course students will also benefit from further study in more focused areas such as statistical estimating, team management, information technology and business management.

5. INSTRUCTOR

Ken Harmon, Director
ISE Extended Campus Enterprise
   Systems Engineering Program
   Engineering Administration Program
   System Performance Laboratory
Associate Professor, Industrial and Systems Engineering
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Fax: 703/538-8450
Office Hours: By Appointment

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Phone: 787-4645955
Office Hours: By Appointment
6. REQUIRED TEXT


7. ASSIGNMENTS AND MATERIAL POLICY

Assignments and course materials will be posted on Scholar with due dates as shown on the semester schedule. Students will post assignments for grading and materials to be shared with the class on the Scholar web site.

The electronic mail and a course Scholar web site will be used as the primary mechanisms for distributing course-related information and updates. The Scholar website is located at: [http://scholar.vt.edu/portal](http://scholar.vt.edu/portal)

8. VIDEO RESOURCES

Every class will be recorded and available online for the students one business day after the class. The link is: [http://media1.vbs.vt.edu/content/classes/z3771/](http://media1.vbs.vt.edu/content/classes/z3771/)

9. GRADING

Homework Assignments 6 @ 8% each = 48%
Course Project = 30% (25% Document; 5% Presentation)
Final Exam = 16%
Participation/Contribution = 06%

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100%
10. COURSE PROJECT (Proposal Assignment)

Part I

An initial “concept paper” describing the unsolicited proposal that students are considering should be submitted for instructor feedback as early in the semester as possible but no later than Noon 9-16-12. This concept document should be a 1-2-page narrative that identifies the customer, deliverable and includes a tentative list of the major project activities.

Part II

Students must form a two-person team with another member of the class. The team is to prepare an unsolicited proposal – to deliver something (i.e. a specific item that has to be created/produced/built etc.) to a particular customer that will also have certain potential value to various other stakeholders. The proposal document should be sufficiently comprehensive so as to satisfy the decision making needs of the customer(s) and any other stakeholder(s), including those who might be called upon to sponsor this initiative (i.e. provide funding or other resources and/or authorize the use of required resources). Students would of course use The Project Approach in managing the overall effort, if they were to ultimately accomplish the work associated with this proposal.

Any initiative that would be of personal interest and/or value to the members of the team would be acceptable. An example of an appropriate “proposal/project” might be to publish an article or book, add a room onto your home, landscape the back yard, overhaul an antique auto, build and test fly an experimental airplane etc. Note: Please select an initiative that the two members of the team are equally committed to accomplish.

The primary assignment is to submit an unsolicited proposal that includes an initial but comprehensive project master plan, addressing both the strategic and the operational aspects of the proposed project. Please scope the initial project description to have ~20-25 major activities. This document should include a letter proposal plus all appropriate exhibits. It is due by no-later-than Noon 12-3-12.

11. FINAL EXAM

One final exam will be administered during the course. This will be a take-home exam with comprehensive course coverage. It is an individual effort administered under the VT honor code.
12. ACADEMIC HONESTY

Honesty in your academic work is important in developing professional integrity. The Virginia Honor Code will be strictly enforced. All aspects of your course work are covered by the Honor Code. Any suspected violations of the Honor Code will be promptly reported to the Honor System. The faculty and students of Virginia Tech will not tolerate any form of academic dishonesty.

The “Graduate Honor System Constitution” is detailed in the Graduate Policies, Procedures, and Course catalog, and is posted on the Virginia tech web site: http://www.honorsystem.vt.edu/?q=node/33

13. INCLEMENT WEATHER POLICY

Winter often brings inclement weather to Virginia forcing the University to cancel classes. If either the Main Campus in Blacksburg, or the Campus in Northern Virginia is closed due to inclement weather, class will be cancelled for that evening. However, I will make every effort to record the lecture, and make that available for you to view on-line at your leisure.

14. SPECIAL ACCOMODATIONS

Any student with special needs or circumstances should feel free to meet to contact me.

15. STUDENT ABSENCES AND MISSED WORK

The streaming of class sessions is archived for enrolled students. However, attendance is expected and in-class discussion assignments are scheduled throughout the semester. When a student is unable to attend class they are expected to notify the course GA as soon as possible prior this class session.
16. PRINCIPLES OF COMMUNITY STATEMENT

“Virginia Tech is a public land-grant university, committed to teaching and learning, research, and outreach to the Commonwealth of Virginia, the nation, and the world community. Learning from the experiences that shape Virginia Tech as an institution, we acknowledge those aspects of our legacy that reflected bias and exclusion. Therefore, we adopt and practice the following principles as fundamental to our on-going efforts to increase access and inclusion and to create a community that nurtures learning and growth for all of its members:

- We affirm the inherent dignity and value of every person and strive to maintain a climate for work and learning based on mutual respect and understanding.
- We affirm the right of each person to express thoughts and opinions freely. We encourage open expression within a climate of civility, sensitivity, and mutual respect.
- We affirm the value of human diversity because it enriches our lives and the University. We acknowledge and respect our differences while affirming our common humanity.
- We reject all forms of prejudice and discrimination, including those based on age, color, disability, gender, national origin, political affiliation, race, religion, sexual orientation, and veteran status. We take individual and collective responsibility for helping to eliminate bias and discrimination and for increasing our own understanding of these issues through education, training, and interaction with others.
- We pledge our collective commitment to these principles in the spirit of the Virginia Tech motto of Ut Prosim (That I May Serve).”

The Virginia Tech Principles of Community are intended to increase access and inclusion and to create a community that nurtures learning and growth for all of its members. They are defined at: [http://www.vt.edu/principles.php](http://www.vt.edu/principles.php)
### 17. COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
<th>Topic</th>
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<tbody>
<tr>
<td>8-27-12</td>
<td>I</td>
<td>• Introductions (Unit 1.0)</td>
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<td>• Course Overview and Semester Schedule (Unit 2.0)</td>
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<td>• Semester Expectations (Unit 3.0)</td>
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<td>• Enterprise Theory, Systems Thinking, Performance Assurance and The Project Approach (Unit 4.0)</td>
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<td>• Background Knowledge (Unit 5.0)</td>
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<td>◦ Working to Achieve Stakeholder Satisfaction</td>
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<td>◦ The Project Approach to Work Management</td>
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<td>◦ Systems Thinking</td>
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<td><strong>Assigned Readings</strong></td>
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<td>*JL - 1, 2, 23, 24, 25 Glossary (pgs 553-557)</td>
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<td>*PM - Section I Chapter 1; Section II Chapter 3; Appendicies A-G; Glossary</td>
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<td>*SM - pgs vii-xi</td>
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<td><strong>Homework 1</strong></td>
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<td><strong>Student Bio</strong></td>
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<td>9-3-12</td>
<td>II</td>
<td>• Project Initiation (Unit 6.1)</td>
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<td>• Performance Planning: Managerial Work (Unit 6.2)</td>
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<td>• Project Strategic Planning (Unit 7.0)</td>
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<td>• Project Start-Up Activities (Unit 8.0)</td>
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<td>• Course Project: Proposal Assignment (Unit 19.0)</td>
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<td><strong>Assigned Readings</strong></td>
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<td>JL - 3, 4, 5, 18, pgs 535-541</td>
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<td>PM - Chapter 2; Section III; Chapter 4</td>
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<td>SM - 1, 2, 3, 4, 12, pgs 273, 282</td>
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<td><strong>Proposal Assignment: (Course Project)</strong></td>
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<td>Concept Paper (Posted: 9-4-12  Due: Noon 9-16-12)</td>
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<td>9-10-12</td>
<td>III</td>
<td>• Performance Planning: Direct Work</td>
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Project Deliverables (Unit 9.1)
Project Work (Unit 9.2)
Resource Requirements (Unit 9.3)

Assigned Readings
JL - 6
PM - Chapter 5
SM - 5, 7, 8, 10, 13

Proposal Assignment: (Course Project)
Concept Paper (Posted: 9-4-12  Due: Noon 9-16-12)

Homework 1
(Posted: Noon 8-28-12  Due: Noon 9-9-12)

Homework 2
(Posted: Noon 9-11-12  Due: Noon 9-23-12)

9-17-12  IV

• Performance Planning: Direct Work
Activity Time Estimating and Scheduling
of Project Work (Unit 9.4)

Assigned Readings
JL - 7, 8, 9, 10
PM - Chapter 6
SM – 11

Proposal Assignment: (Course Project)
Concept Paper (Posted: 9-4-12  Due: Noon 9-16-12)

9-24-12  V

• Performance Planning: Direct Work
Cost Estimating and Project Budgeting (Unit 9.5)

Assigned Readings
PM – Chapter 7
SM 11

• Performance Planning: Direct Work
Technical Requirements (Total Quality) (Unit 9.6)

Assigned Readings
PM - Chapter 8
SM - 9, 15

Homework 2
(Posted: Noon 9-11-12  Due: Noon 9-23-12)

Homework 3
(Posted: Noon 9-25-12  Due: Noon 10-7-12)
• Performance Planning: Indirect/Administrative Work
  Human Resources (Unit 10.2)
  Procurement (Unit 10.1)
  Marketing and Other Business Functions
  Information Processing

Assigned Readings
  *JL* - 13
  *PM* – Chapters 9, 12

• Issue, Risk and Change Management (Unit 11.0)

Assigned Readings
  *JL* - 17
  *PM* - Chapter 11
  *SM* – Pages 41, 93-1-1, 106, 167, 177

Homework 3
(Posted: Noon 9-25-12 Due: Noon 10-7-12)

Homework 4
(Posted: Noon 10-9-12 Due: Noon 10-21-12)

• Execute Plans & Direct Project Operations (Unit 12.0)

Assigned Readings
  *JL* – 26, 27, 28, 29, pgs 541-543, 545
  *PM* – Sections 3.5, 4.3
  *SM* – 14

• Monitor and Control Project Performance (Unit 13.0)

Assigned Readings
  *JL* - 11, 12, 13, 14, pg 544
  *PM* – Sections 3.6, 4.4, 5.5, 6.6, 7.3
  *SM* – 6

Homework 4
(Posted: Noon 10-9-12 Due: Noon 10-21-12)

Homework 5
(Posted: Noon 10-23-12 Due: Noon 11-11-12)

• Project Communications, Information Systems and
Knowledge Management (Unit 14.0)

Assigned Readings
JL – 20, pgs 544-545
PM – Chapter 10

11-5-12 XI

• Project Close-Out or Extension (Unit 15.0)
• Project Integration Management (Unit 16.0)

Assigned Readings
JL – 13, 15, 16, 21
PM – Sections 3.7, 12.4, pgs 71-72
SM – 16, 17, 18, 19

Homework 5
(Posted: Noon 10-23-12 Due: Noon 11-11-12)

11-12-12 XII

• Development of Project Capabilities (Unit 18.1)
Project, Program, Portfolio and Enterprise Management
People, Process, Tools and Leadership

Assigned Readings
JL - 19, 20, 30, pgs 547-552, 559-570
PM - Section 9.3, Pages 14, 191, PMI Web Site (OPM3)
SM - 2, 19, pgs 261, 263-271, Glossary 273 – 282

11-19-12 THANKSGIVING BREAK

11-26-12 XIII

• Development of Project Capabilities (Unit 18.2)
Capability Assessment
Development Initiatives
Enterprise Transformation
Management Systems Engineering

Assigned Readings
JL - 19, 20, 30, pgs 547-552, 559-570
PM - Section 9.3, Pages 14, 191, PMI Web Site (OPM3)
SM - 2, 19, pgs 261, 263-271, Glossary 273 – 282

12-3-12 XIV

• Project Presentations/Discussion

Assigned Student Presentations: Proposal Assignment
(Slides Due: Noon 12-2-12 for Presentations on: 12-3-12)
12-10-12 XV

• Project Presentations/Discussion

Proposal Document (Course Project Report)
(Due: Noon 12-10-12)

Assigned Student Presentations: Proposal Assignment
(Slides Due: Noon 12-9-12 for Presentations on: 12-10-12)

Final Exam (Take-Home)
(Posted: Noon 12-11-12 Due: Noon 12-17-12)

* Typical Reading Assignments:


SR = Read a Supplemental Article (Note: distributed by instructor)

MS = Microsoft Project Software