George Mason University
Volgeneau School of Engineering, Telecommunications Program

Fall 2017 Syllabus for TCOM 547: Telecommunications Project Management

Instructor: Narendra Mangra
Email: nmangra@gmu.edu
Class Schedule: Thursdays 7:20 to 10pm
Office Hours: By appointment.

Course Overview and Learning Objectives

The wireless telecommunications landscape is rapidly evolving as it extends into traditional industries to
create new value propositions. Emerging mobile broadband technologies blur adjacent industry borders
and drive innovations in Smart Cities, Smart Grids, Intelligent Transportation Systems (ITS), Telehealth,
Public Safety, Mobile Money, etc.

Wireless telecommunications project managers may face challenges in working with cross-functional
teams from adjacent industries as they strive to integrate multiple complex mobile and internet
communications systems.

The course provides a structured approach for managing complex projects and emphasizes:

- Project Management Fundamentals:
  - Strategy & Organizational Structure
  - Sequenced PMBOK® Process Groups & Knowledge Areas
  - Project Environment

- Project Management Examples
  - Classroom project example – underlying wireless telecom infrastructure deployment that may
    be used to support Smart Cities
  - Selected Readings on Smart Cities, Smart Grids, Connected Vehicles / Intelligent
    Transportation Systems (ITS), Telehealth, Public Safety, Mobile Money, etc.

- Comprehensive Project Management Plan Development
  - Project Research and Analysis
  - Comprehensive Project Management Plan Development
At the end of this course, students should be able to:
1. Understand and apply the PMBOK® Knowledge Areas and Process Groups
2. Analyze and provide recommendations to improve project plans
3. Develop a comprehensive project management plan

Course Structure & Readings

Required readings are accessible via the Blackboard or the TCOM547 Course Packet. Optional readings are not required for this course, but may enhance our understanding of the subject matter. The basic reading and classroom discussion topics are shown below.

Industry Structure, Strategy, and Organizational Structure
Session 1: Industry Structure
Session 2: Strategy, Organizational Structure, *Smart Cities: Open Barcelona (Spain)*
Session 3: Project Life Cycle and Project Environment, *Network Deployment: Digicel (Jamaica)*

Initiating and Planning Process Groups
Session 4: Communications & Stakeholder Management, *Smart Grid Deployments: Customer Engagement Pilot Projects (US)*
Session 5: Project Requirements & Scope Baseline, *Mobile Money: MPESA (Kenya)*
Session 6: Project Schedule, Deliverable 1 Due (Project Management Fundamentals / London Heathrow Airport Terminal 5)
Session 7: Budgets, Human Resources & Quality Plans, *Telehealth: EHAS (Peru)*
Session 8: Risk Management & Procurement Plans, *ITS: Connected Vehicle Safety Pilot (US)*

Executing, and Monitoring & Controlling Process Groups
Session 9: Scope, Schedule & Cost Control
Session 10: Scope Verification, Quality Control & Quality Assurance, *E911 Deployments (US)*
Session 11: Project Communications & Performance Reports, Deliverable 2 Due (Project Analysis & Recommendations)
Session 12: Risk Monitoring, Procurement Contract Award & Monitoring, *Smart Aarhus (Denmark)*
Session 13: Team Management

Project Closing Process Group
Session 14: Project & Contract Closure, Lessons Learned, Deliverable 3 Due (Comprehensive Project Management Plan Due)

Details provided in Session Outline section below. Course Packets may be purchased through Study.net-http://www.study.net/r_mat.asp?crs_id=30115787

**PMBOK® and PMP Certification**

This course addresses the ten (10) Knowledge Areas and the five (5) Process Groups that are described in the PMBOK®. The relevant PMBOK® sections are shown in the course syllabus as a benefit to students that are studying for the PMP Certification.

This course also contains readings and class discussions on the revised areas necessary for PMP renewals. These areas include strategy and business management (e.g. industry structure, strategy, organizational structure, telecommunications industry, etc), technical project management (e.g. scope, cost, schedules, quality, etc), and leadership (e.g. communications, negotiations, leadership styles, etc
Note – This course does not address PMP certification testing strategies, and the PMBOK® is **not** required for this course. However, students who are interested in pursuing PMP Certifications may benefit from the following optional text:


**Performance Evaluation**

Students will earn grades based on their understanding of the project management concepts, ability to assess projects and provide suitable recommendations, and their ability to create a comprehensive project management plan at the end of this course. The grading details are shown below:

- **Assignments & contribution to class discussions** 20%
- **Written Deliverable 1 – Project Management Concepts: T5 Mega-Project Analysis** 20%
  - Individual Assignment
- **Written Deliverable 2 - Project Analysis & Presentation** 30%
  - Group Assignment
- **Written Deliverable 3 - Project Management Plan & Presentation** 30%
  - Group Assignment

**Contribution to class discussions (20%)**

This course will focus on “real world” telecommunication issues that project managers may face in a network rollout. The readings and homework assignments are designed to enhance our understanding of the subject material. Students may be called upon to start off a discussion based on the required readings and assignments. It is expected that students prepare for each session and actively participate in our discussions.

**Written Deliverable 1: - Project Management Concepts: Terminal 5 Mega-Project Analysis (20%)**

This deliverable will be completed individually. Students will demonstrate their understanding of the project management concepts discussed in this course via a written analysis of the T5 project.

The T5 project is a mega-project (well over $1B) that resulted in the construction of the Terminal 5 Building at the Heathrow International Airport. The project also included several phases and involved 180 IT vendors and 163 IT systems. Please read the article below very carefully and describe how BAA approached the project within the context of the PMI Process Groups and Knowledge. For example, how did BAA approach the cost structure, risks, procurement, integration, etc. Would you classify this project as a success or failure? Why or why not? I am not looking for a summary of the paper, but your insight into how the specific knowledge areas were addressed.

Written Deliverable 2: Project Analysis & Presentation (30%)
Students will work in project teams and select an actual project from a publicly available database or source. Students will provide a concise analysis of the project's intended value proposition, outcome (if completed), and status (if ongoing). The project should be analyzed within the context of the PMI Knowledge Areas. Students should state the areas and reasons where they agree with how the project was handled, and offer alternative recommendations for areas where they disagree. The project deliverables will include a written report and a class presentation.

Sample Project Databases:

International Projects

US Based Projects
- Broadband USA - [http://www2.ntia.doc.gov/awards](http://www2.ntia.doc.gov/awards)
- Smart Grid - [https://www.smartgrid.gov/recovery_act/index.html](https://www.smartgrid.gov/recovery_act/index.html)
- Smart City Challenge - [https://www.transportation.gov/smartcity/visionstatements/index](https://www.transportation.gov/smartcity/visionstatements/index)

Written Deliverable 3: Project Management Plan & Presentation (30%)
Students will form groups and create and present a comprehensive Project Management Plan to the class. This plan should contain elements of the PMI Knowledge Areas and the Project Process Groups. The plan should include the value proposition, project assumptions & constraints, risks & contingencies, project monitoring & controlling techniques, and any other relevant information necessary to evaluate the proposed Project Management Plan. The project deliverables will include a written report and a class presentation.

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<tr>
<th>Final Grade</th>
<th>Points Accumulated</th>
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<td>A+</td>
<td>97.0 to 100</td>
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<td>94.0 to 96.9</td>
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<td>90.0 to 93.9</td>
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<td>B+</td>
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<td>84.0 to 86.9</td>
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<td>B-</td>
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<td>C+</td>
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<td>Less than 70.0</td>
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General Information

Academic Integrity
GMU is an Honor Code university (please refer to the University Catalog for a full description of the code and the honor committee process). Academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else’s work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

GMU Email Accounts
Students must activate their GMU email accounts to receive important University information, including messages related to this class.

Office of Disability Services
If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. http://ods.gmu.edu

Other Useful Campus Resources:
Writing Center: A114 Robinson Hall; (703) 993-1200; http://writingcenter.gmu.edu
University Resources “Ask a Librarian” http://library.gmu.edu/mudge/IM/IMRef.html
Counseling and Psychological Services (CAPS): (703) 993-2380; http://caps.gmu.edu
University Policies: The University Catalog, http://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university affairs.
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<thead>
<tr>
<th>Session 1 – Aug 31</th>
<th>Introduction to the Telecommunications Industry &amp; Project Management</th>
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<tbody>
<tr>
<td><strong>Required Readings:</strong></td>
<td><strong>Optional Readings (Wireless Telecommunications Industry):</strong></td>
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<tr>
<td><strong>PMBOK® Reference – Chapter 1</strong></td>
<td><strong>Topics:</strong></td>
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</tbody>
</table>
| **Topics:** | • PM Framework  
  o Enterprise Environmental Factors  
  o Project Phases  
  o Knowledge Areas  
  o Effective Project Management Components |
| *• Wireless Network Deployment*  
  o Introduction to Wireless Telecommunications Industry  
  o Wireless Telecommunications Industry Trends* |  |

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<th>Session 2 - Sep 7</th>
<th>Strategy &amp; Organizational Structure</th>
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<td><strong>Required Readings:</strong></td>
<td><strong>Optional Readings (Smart City):</strong></td>
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**SECTIONS**

**SESSIONS**
**PMBOK® Reference – Chapter 2**

**Topics:**
- PM Framework
  - Strategy Development
  - Balanced Scorecard
  - Organizational Structure
  - Organizational Process Assets
  - Portfolio, Program & Project Management
  - Centralized and Decentralized PMO Structures
- Wireless Network Deployment
  - Wireless Network Deployment Strategy

**Classroom Discussions:**
- Smart City Discussion: Open Barcelona (Spain)

**Session 3 - Sep 14**

**Project Life Cycle & Wireless Telecommunications Project Environment**

**Required Readings:**
- *The Celtic Tiger Moves to the Beat of the Reggae Boyz*, Inger Boyett, Nottingham University Business School, Published 2005,

**PMBOK® Reference – Chapter 3**

**Topics:**
- PM Framework
  - Project Conception
  - Project Life Cycle
- Wireless Network Deployment
  - Wireless Technologies, Networks, Architecture, Applications
  - Wireless Network Deployment Lifecycle

**Classroom Discussions:**
- Wireless Network Deployment – Digicel (Jamaica)
Session 4 - Sep 21

Project Initiation & Planning Process Groups: Project Charter, Communications & Stakeholder Management

Readings:
- Consumer engagement: An insight from smart grid projects in Europe, Institute for Energy and Transport, Flavia Gangale, Anna Mengolini, Ijeoma Onyeji, Joint Research Centre of the European Commission Petten, the Netherlands, Energy Policy, Volume 60, September 2013, pages 621 – 628

Optional Readings (Smart Grid):

PMBOK® Reference – Sections 4.1, 4.2, 13.1 & 13.2, 10.1

Topics:
- PM Framework: Initiating Project Phase
  - Project Charter
  - Project Management Plan Components
  - Stakeholder Register & Stakeholder Management Plan
  - Communications Management Plan
- Wireless Network Deployment
  - Market Setup

Classroom Discussion:
- Smart Grid Deployments: Customer Engagement Pilot Projects (US)
## Session 5 – Sep 28

### Project Requirements & Scope Baseline

**Readings:**

**PMBOK® Reference – Sections 5.1 – 5.4**

**Topics:**
- PM Framework: Planning Project Phase
  - Scope Management
    - Project Requirements
    - Scope Baseline – Project Scope Statement, Work Breakdown Structure (WBS)
- Wireless Network Deployment
  - Network Deployment Scope

**Classroom Discussion:**
- Mobile Money / Mobile Financial Services: M-PESA (Kenya)

## Session 6 - Oct 5

### Project Schedule

**Readings:**
- **Critical Chain Project Management: Motivation and Overview**, Hilbert Robinson, Robert Richards, 2010 IEEE Aerospace Conference, September 23, 2009

**Optional Readings:**
  - Chapters 3 - 6

**PMBOK® Reference – Sections 6.1 – 6.6**

**Topics:**
- PM Framework: Planning Project Phase
  - Time Management Knowledge Area – Planning Phase
    - Activity Definition, Sequencing, Resource Estimation & Duration Estimation
    - Schedule Baseline
- Wireless Network Deployment
  - Time-to-market considerations

**Written Deliverable 1:**
Project Management Concepts - T5 Mega-Project Analysis Due (UK)
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<tr>
<th>Session 7 - Oct 12</th>
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<tr>
<td><strong>Budgets, Human Resources &amp; Quality Plans</strong></td>
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<tr>
<td><strong>Readings:</strong></td>
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<tr>
<td><strong>PMBOK® Reference – Sections 7.1 – 7.3, 8.1, &amp; 9.1</strong></td>
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<td><strong>Optional Readings:</strong></td>
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<td><strong>Topics:</strong></td>
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<tr>
<td>- PM Framework: Planning Project Phase</td>
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<td>o Human Resource Plan</td>
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<td>o Quality Management Plan</td>
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<td>o Process Improvement Plan</td>
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<td>o Cost Baseline</td>
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<tr>
<td>o Burn Rates and Funding Requirements</td>
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<tr>
<td>- Wireless Network Deployment</td>
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<tr>
<td>o Resource Procurements &amp; outsourced services</td>
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<td>o Implications of Link Budget Assumptions</td>
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<td>o Design Review</td>
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<td>o Search Rings</td>
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<td><strong>Classroom Discussion:</strong></td>
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<td>Telehealth Exercise: EHAS (Peru)</td>
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<td><strong>Deliverables:</strong></td>
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<td>- Project Selection Due (Project Analysis Deliverables due on Nov 9)</td>
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<td>Session 8 - Oct 19</td>
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<td><strong>PMBOK Reference</strong></td>
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<td><strong>Topics:</strong></td>
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<td><strong>Classroom Discussion:</strong></td>
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<tr>
<th>Session 9 - Oct 26</th>
<th>Project Execution &amp; Monitoring &amp; Controlling Process Groups - Scope, Schedule &amp; Cost Control</th>
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<tr>
<td><strong>Readings:</strong></td>
<td><strong>Supervising Projects You Don’t (Fully) Understand: Lessons for Effective Project Governance by Steering Committees</strong>, Christoph Loch, Magnus Mähring, and Svenja Sommer, California Management Review 2017, Vol. 59(2) 45–67</td>
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<td><strong>Earned Value Project Management Method and Extensions</strong>, Frank Anbari, Project Management Journal, Published December 2003</td>
</tr>
<tr>
<td><strong>PMBOK® Reference</strong></td>
<td><strong>Sections 4.3 – 4.5, 5.6, 6.7, &amp; 7.4</strong></td>
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</tbody>
</table>
Topics:
- PM Framework: Executing / Monitoring & Controlling Project Phases
  - Deliverables & Work Performance Information
  - Schedule & Cost Forecasts
  - Change Requests
  - Work Performance Measurements
- Wireless Network Deployment
  - Site Candidate Selection
  - Physical Site Construction
  - Systems Integration

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<tr>
<th>Session 10 – Nov 2</th>
<th>Scope Verification, Quality Control &amp; Quality Assurance</th>
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<tr>
<td><strong>PMBOK® Reference</strong></td>
<td>Sections 5.5, 8.2, &amp; 8.3</td>
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Topics:
- PM Framework: Executing / Monitoring & Controlling Project Phases
  - Quality Control Measurements
  - Validated Changes
  - Validated & Accepted Deliverables
  - Change Requests
- Wireless Network Deployment
  - Site testing
  - Network Optimization

Deliverables:
- Project Analysis Presentations Begin
- Final Project Topic Selection

Classroom Discussion – E-911 / LBS Project: Wireless Enhanced 911 Services (USA)
| Session 11 - Nov 9 | **Project Communications & Performance Reports**  
*PMBOK® Reference – Sections 10.2, 10.3, 13.3, 13.4*  
**Topics:**  
- PM Framework: Executing / Monitoring & Controlling Project Phases  
  - Project Communications  
  - Change Requests  
  - Performance Reports  
- Wireless Network Deployment  
  - Internal & External Team Communications  
**Deliverables:**  
- Continuation of Project Analysis Presentations  
- Written Deliverable 2 - Project Analysis Due |
| Session 12 - Nov 16 | **Risk Monitoring, Procurement Contract Award & Monitoring**  
*Readings:*  
*PMBOK® Reference – Sections 11.6, 12.2 & 12.3*  
**Topics:**  
- PM Framework: Executing / Monitoring & Controlling Project Phases  
  - Work Performance Information  
  - Change Requests  
  - Selected Sellers  
  - Agreements  
- Wireless Network Deployment  
  - Performance Monitoring  
  - Pre-launch Coordination  
**Classroom Discussion – Smart Aarhus (Denmark)** |
| Nov 23 | **Thanksgiving Recess** |
### Session 13 – Nov 30

**Team Management**

**Readings:**

*PMBOK® Reference – Sections 9.2 – 9.4,*

**Topics:**
- PM Framework: Executing / Monitoring & Controlling Project Phases
  - Project Staff Assignments
  - Resource Calendars
  - Team Performance Assessments
- Wireless Network Deployment
  - Network Deployment Coordination

**Final Deliverables:**
*Project Management Plan Presentations begin*

### Session 14 - Dec 7

**Project & Contract Closure, Lessons Learned**

**Required Readings:**
- *Lost Roots: How Project Management Came to Emphasize Control Over Flexibility and Novelty*, Lenfle Sylvain, Christoph Loch, California Management Review, Fall 2010, Vol 53

*Optional Readings:*
- *Closing the Gap: The Link Between Project Management Excellence and Long Term Success*, Economist Intelligence Unit, October 2009

*PMBOK® Reference – Sections 4.6, 12.4*

**Topics:**
- PM Framework: Closing Project Phase
  - Closed Procurements
  - Final Product or Service and/or Transition
  - Project Closeout & documentation
- Wireless Network Deployment
  - System Warranties

**Final Deliverables:**
*Project Management Plan Presentations (continued)*
*Written Deliverable 3 - Project Management Plan Due*