Abstracts for *The Engineering Capstone Course - Fundamentals for Students and Instructors*

**Preface**

The capstone course may be divided into five phases, which are

* Team selection
* Project selection
* Proposal preparation and presentation
* Project development
* Final report, presentation and demonstration

Each of these phases has a set of objectives and deliverables that comprise the capstone project process.

**Chapter 1 – Engineering and the Capstone Course**

**Chapter Objectives**

After studying this chapter, you should be able to:

Understand the field of engineering.

Describe what engineers do.

Gain familiarity with the basic elements of a capstone or project design course.

Explain the capstone or senior project timeline.

**Chapter 2 – The Capstone Team**

**Chapter Objectives**

After studying this chapter, you should be able to:

Understand what a team is.

Compare different types of teams.

Gain insight into the elements of forming a team.

Explain team development and behavior.

Understand the basics of conflict management associated with teams.

Relate ethics to project teams.

Understand how to assess team performance.

**Chapter 3 - Basic Team Communications**

**Chapter Objectives**

After studying this chapter, you should be able to:

Understand a meeting’s purpose.

Prepare a meeting agenda.

Manage the meeting follow-on process.

Participate in a brainstorming session.

Prepare and deliver a quality presentation.

**Chapter 4 - Capstone Class Written and Oral Submittals**

**Chapter Objectives**

After studying this chapter, you should be able to:

Identify the capstone course phases.

Avoid common report writing errors.

Gain insight into the project selection process.

Use a SWOT tool to evaluate a project.

Understand the required written and oral deliverables expected in the capstone course.

Recognize the importance of market research in project selection.

Prepare a list of project tasks.

Understand the importance of finances in a project.

Prepare a project budget.

Use a weekly status log.

Prepare a weekly project status report.

Evaluate project risk.

Prepare and use a project specification.

Prepare a project proposal and final report.

**Chapter 5 - Project Development**

**Chapter Objectives**

After studying this chapter, you should be able to:

Understand the phases of the engineering design process.

Understand the cost impact of design errors.

Gain familiarity with alternate engineering design approaches.

Understand the difference between design verification and validation.

Evaluate a design with the use of a test verification matrix.

Implement the engineering design process with your team.

**Chapter 6 - Innovative Capstone Project Examples**

**Chapter Objectives**

After studying this chapter, you should be able to:

Understand the components of the product, process, or system lifecycle.

Gain an understanding of common capstone team issues.

Gain ideas for a team capstone project.

Understand the elements of a successful project.

**Chapter 7 – Intellectual Property**

**Chapter Objectives**

After studying this chapter, you should be able to:

Understand the meaning of intellectual property.

Understand what a patent is and how long it is viable.

Understand the reasons to do a patent search.

Learn how to do a patent search.

Describe the types of patents.

Understand the invention protection that an individual can obtain without a patent attorney.

Understand when to obtain professional assistance.

Understand what a patent attorney does.

**Chapter 8 – Epilogue**

The Blind Men and the Elephant is a Hindu fable that illustrates the importance of collaboration. The blind men in the fable represent potential team synergy. Individually they do not have a grasp of the situation. If they were to collectively pool their knowledge and abilities, they would have a better understanding of the animal in front of them. Each one of us sees things exclusively from their viewpoint. Each of us could be partly correct but yet, come to a wrong conclusion. We would benefit and gain an improved perspective if we collaborate.