

Lesson 4

What is a Thesis / Capstone Project?

CS 411
Thesis 1



What is a Thesis?



A thesis may be defined as the report of a scholar upon some piece of research which he has completed.

It is the culmination of a devious process extending from the initial insight into the opportunity for investigation to the insertion of the final footnote (Cole and Bigelow, 1935).

In the area of computing, it is defined as a technical report on a systematic investigation of a problem that can be solved using computing.

What is a Capstone Project?



A *capstone project* is an undertaking appropriate to a professional field. It should significantly address an existing problem or need.

- *IT Capstone Project* focuses on the infrastructure, application, or processes involved in implementing computing solution to a problem.
- *IS Capstone Project* focuses on business processes and the implications of introducing a computing solution to a problem.
- *EMC Capstone Project* deals with the game development and digital animation technology.

Computer Science Topics:



A. Current Computer Science Topics

- Software and Development Theory
- Mobile Computing Systems
- Software Extensions or Plug-ins
- Expert Systems and Decision Support Systems
- Systems Software (software tools/utilities, interpreters, simulators, compilers, security aspects)
- Intelligent Systems
- Game Development
- Computer Vision
- Image / Signal Processing

Computer Science Topics:

- Natural Language Processing
- Pattern Recognition and Data Mining
- Bioinformatics
- Graphics Applications
- Cloud Computing
- Parallel Computing
- Embedded Systems
- Emerging Technologies



Computer Science Topics:



B. Foundations of Computer Science

- Automata and Formal Languages
- Data Structures and Algorithm Design and Analysis
- Web Semantics
- Coding Theory
- Programming Languages
- Visualization Systems
- Computer and Architecture
- Modelling and Simulation
- Grid Computing
- Pervasive Computing

Computer Science Topics:

C. Human Computer Interaction

- Usability
- Affective Computing
- Empathic Computing



Information Technology Topics:



A. *Software Development*

- Software Customization
- Information Systems Development for an Actual Client (*with pilot testing*)
- Web Applications Development (*with at least alpha testing on live servers*)
- Mobile Computing Systems

Information Technology Topics:



B. Multimedia Systems

- Game Development
- E-Learning Systems
- Interactive Systems
- Information Kiosks

C. IT Management

- IT Strategic Plan for sufficiently complex enterprises
- IT Security Analysis, Planning and Implementation

Styles of document organization:



1. ***Chapter-by-chapter format***, in which a literature review is followed by chapters describing the methodology and results of discrete research projects that address the principal research question/objective, the study aims to answer.
2. ***Manuscript format***. When this format is applied in the sciences, the contents are organized as a unified body of text with sections for a literature review, materials and methods, and results and discussion.



Sustainable Development Goals (SDGs)

The *Sustainable Development Goals (SDGs)* are a global framework adopted by the United Nations in 2015 through the **2030 Agenda for Sustainable Development**. The SDGs consist of **17 interconnected goals** designed to address economic, social, and environmental challenges while promoting sustainable and inclusive development worldwide.

Sustainable Development Goals



The 17 Sustainable Development Goals:



SDG 1: No Poverty

End poverty in all its forms everywhere by ensuring access to basic services, social protection, and economic opportunities.

SDG 2: Zero Hunger

End hunger, achieve food security, improve nutrition, and promote sustainable agriculture.

SDG 3: Good Health and Well-Being

Ensure healthy lives and promote well-being for all at all ages through quality healthcare, disease prevention, and health promotion.

The 17 Sustainable Development Goals:



SDG 4: Quality Education

Ensure inclusive, equitable, and quality education and promote lifelong learning opportunities for all.

SDG 5: Gender Equality

Achieve gender equality and empower all women and girls by eliminating discrimination and promoting equal opportunities.

SDG 6: Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all.

The 17 Sustainable Development Goals:



SDG 7: Affordable and Clean Energy

Ensure access to affordable, reliable, sustainable, and modern energy for everyone.

SDG 8: Decent Work and Economic Growth

Promote sustained, inclusive, and sustainable economic growth, productive employment, and decent work.

SDG 9: Industry, Innovation and Infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

SDG 10: Reduced Inequalities

Reduce inequalities within and among countries by promoting social, economic, and political inclusion.

The 17 Sustainable Development Goals:



SDG 11: Sustainable Cities and Communities

Make cities and communities inclusive, safe, resilient, and sustainable.

SDG 12: Responsible Consumption and Production

Ensure sustainable consumption and production patterns through resource efficiency and waste reduction.

SDG 13: Climate Action

Take urgent action to combat climate change and its impacts through adaptation, mitigation, and resilience-building measures.

SDG 14: Life Below Water

Conserve and sustainably use oceans, seas, and marine resources.

The 17 Sustainable Development Goals:

SDG 15: Life on Land

Protect, restore, and promote sustainable use of terrestrial ecosystems and biodiversity.



SDG 16: Peace, Justice and Strong Institutions

Promote peaceful and inclusive societies, provide access to justice, and build effective, accountable institutions.

SDG 17: Partnerships for the Goals

Strengthen global partnerships among governments, industries, academia, civil society, and international organizations to achieve the SDGs.