

PROJECT ENGINEERING AND MANAGEMENT

ENGE 352

Lecture : 4
Tutorial : 0
Practical : 0

Year : III
Part : II

Course Objectives:

The objective of this course is to introduce fundamental principles of project engineering and management relevant to geomatics practice. The course covers feasibility studies, preparation, evaluation, and implementation of project proposals. It emphasizes application of planning, scheduling, budgeting, and control techniques, along with management of project risks and resources for efficient execution of geomatics engineering projects.

1 Introduction (4 hours)

- 1.1 Project definition, characteristics, types
- 1.2 Project life cycle and its phases
- 1.3 Project stakeholders: Roles, responsibilities and expectations
- 1.4 Introduction to project management frameworks: Waterfall, agile and hybrid models

2 Project Appraisal and Feasibility Studies (8 hours)

- 2.1 Project appraisal methods: Concepts and importance
- 2.2 Feasibility studies for geomatics projects: Technical, economic, legal, and environmental aspects
- 2.3 Project proposal development: Objectives, scope, resources, and timeline
- 2.4 Developing technical and financial proposals

3 Project Planning and Scheduling (8 hours)

- 3.1 Planning and its importance
- 3.2 Work breakdown structure
- 3.3 Bar chart, linked bar chart and milestone chart
- 3.4 Network techniques: Critical path method (CPM); Program evaluation and review technique (PERT)
- 3.5 Time cost trade-off analysis
- 3.6 Resource (Labor, material and equipment) planning and scheduling
- 3.7 Resource leveling and smoothing
- 3.8 Monitoring, evaluation and control
- 3.9 Earned value analysis

- 4 Procurement of Goods, Works and Services (14 hours)**
- 4.1 Public procurement act and regulation
 - 4.2 Types, method and tools of procurement
 - 4.2.1 Goods, works and services
 - 4.2.2 Direct, sealed quotation, tender
 - 4.2.3 Force account, users' committee
 - 4.2.4 Expression of interest, request for proposal
 - 4.3 Preparation of detailed cost estimate
 - 4.4 Technical sanction and budget approval
 - 4.5 Procurement condition, steps and provisions
 - 4.6 Tender and standard bidding documents
 - 4.7 Tender notice, submission
 - 4.8 Methods of selection and evaluation of proposals
 - 4.9 Types of contract: Based on payment; Build own operate transfer; Design and built; Turnkey; Engineering procurement construction
 - 4.10 Negotiations, contract award and agreement
- 5 Project Implementation, Monitoring and Control (8 hours)**
- 5.1 Project execution: Managing resources, communication and risk
 - 5.2 Project monitoring and control: Tracking progress, identifying deviations and taking corrective actions
 - 5.3 Project schedule control
 - 5.4 Cost control: Budgeting, forecasting and earned value management
 - 5.5 Quality control: Ensuring adherence to standards and specifications
- 6 Project Financing and Risk Management (8 hours)**
- 6.1 Project finance and capital structure
 - 6.2 Capital budgeting decisions and their importance
 - 6.3 Funding sources (Loans, grants, equity), capital budgeting
 - 6.4 Selecting and managing vendors and suppliers
 - 6.5 Project risk and types
 - 6.6 Sources of risk and risk management
 - 6.7 Risk identification: Qualitative and quantitative
 - 6.8 Risk response planning, monitoring and controlling
- 7 Project Leadership and Team Management (6 hours)**
- 7.1 Effective project leadership
 - 7.2 Team dynamics and collaboration
 - 7.3 Project communication management
- 8 Project Closure and Post-Project Evaluation (4 hours)**
- 8.1 Project Closure: Finalizing deliverables, documenting lessons learned

8.2 Post-Project Evaluation: Analyzing project success, identifying areas for improvement

Assignments:

1. Feasibility study for a land surveying project
2. Creating a schedule for a GIS-based urban planning project
3. Managing a remote sensing project
4. Financing a large-scale geomatics project
5. Leading a team on a 3D modeling project
6. Risk management in construction projects
7. Evaluating a geomatics project

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Mark distribution*
1	4	4
2	8	8
3	8	8
4	14	14
5	8	8
6	8	8
7	6	6
8	4	4
Total	60	60

* There may be minor deviation in marks distribution.

References

1. Kerzner, H. (2022). Project management: A systems approach to planning, scheduling, and controlling. John Wiley & Sons.
2. Project Management Institute. (2021). A guide to the project management body of knowledge (PMBOK® guide). Project Management Institute.
3. Nicholas, J. M., Steyn, H. (2020). Project management for engineering, business, and technology. Routledge.
4. Portny, S. E. (2022). Project management for dummies. John Wiley & Sons.
5. Croswell, P. L. (2009). GIS project management. ESRI Press.
6. Ogaja, C. A. (2011). Geospatial data acquisition: Methods and technologies. CRC Press.