

## **M.Sc. in Smart Control Systems for Energy Management**

---

### **Course Structure**

**Course Code :** SM7401

**Course Title :** Research Methods

**Credit Hours :** 3

### **Course Description**

The course provides graduate students with an overall understanding of the nature of academic research. Research design, qualitative and quantitative research, sources of data. Data collection procedures, measurement strategies and results analysis. Evaluating and writing research report. Error analysis. Presentation skills.

### **Course Objectives**

To provide an understanding of the main research methods used in Mechanical engineering and develop the necessary knowledge and skills for pursuing research projects, theses or dissertations.

### **Course Topics**

- Nature of Mechanical Engineering Research
- Formulation of research problem
- Literature review and technical writing
- Research methods and research design
- Statistical analysis: parametric and non-parametric techniques, regression and factor analysis.
- Advanced statistical topics
- Modeling techniques, optimization, simulation, and IT applications in research
- Research validation
- Error Analysis
- Presentation skills

### **References**

- Tan, W. "*Practical Research Methods*" Pearson Prentice Hall, New York, 2004.
- Cramer, D. "*Advanced Quantitative Data Analysis*" Open University Press, McGraw-Hill Education, 2003.
- Bryman, A. and Cramer, D. "*Quantitative Data Analysis with SPSS Release 12.0*", Routledge, London, 2004.
- Sree Ramulu, U. S. "*Thesis Writing*" – Oxford and IBH Publishing, New Delhi, India. 1988.
- John R. Taylor, "*An Introduction to Error Analysis- The study of uncertainties in physical Measurements*", USA, 1982.