

**Scheme & Syllabus of M. Tech (CSE) Programme**

**Semester III**

| S. No | Subject Code     | Subject                       | Periods Per Week |   |    | Scheme of Examination and Marks |     |       |             | Credit L+[T+P]/2 |
|-------|------------------|-------------------------------|------------------|---|----|---------------------------------|-----|-------|-------------|------------------|
|       |                  |                               | L                | T | P  | PRE**                           |     | ESE * | Total Marks |                  |
|       |                  |                               |                  |   |    | Mid Sem                         | TA  |       |             |                  |
| 1.    | SOE-M-CSE-21-301 | Elective V                    | 3                | 1 | 0  | 30                              | 20  | 50    | 100         | 4                |
| 2.    | SOE-M-CSE-21-302 | Internship/ Project/ Research | 0                | 0 | 16 | 0                               | 100 | 100   | 200         | 8                |
| 3.    | SOE-M-CSE-21-303 | Seminar                       | 0                | 2 | 4  | 0                               | 30  | 20    | 50          | 2                |
| Total |                  |                               | 3                | 1 | 20 | 30                              | 150 | 170   | 350         | 14               |

**Elective-V**

| S. No | Subject Code        | Subject Name                                          |
|-------|---------------------|-------------------------------------------------------|
| 1.    | SOE-M-CSE-21-301(1) | Web Analytics in Digital Marketing                    |
| 2.    | SOE-M-CSE-21-301(2) | Data Analysis & Decision Making in Business Analytics |
| 3.    | SOE-M-CSE-21-301(3) | Healthcare Data Analytics                             |
| 4.    | SOE-M-CSE-21-301(4) | Operations Research                                   |

**L:** Lecture, **T:** Tutorial, **P:** Practical, **ESE:** End Semester Examination, **T.A:** Teacher's Assessment.

# SCHOOL OF ENGINEERING

## Department of Computer Science & Engineering



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|                            |          |                                           |                     |          |                            |
|----------------------------|----------|-------------------------------------------|---------------------|----------|----------------------------|
| <b>Programme</b>           | <b>:</b> | <b>M. Tech.</b>                           | <b>Semester</b>     | <b>:</b> | <b>3<sup>rd</sup></b>      |
| <b>Name of the Course:</b> | <b>:</b> | <b>Web Analytics in Digital Marketing</b> | <b>Course Code:</b> | <b>:</b> | <b>SOE-M-CSE-21-301(1)</b> |
| <b>Credits</b>             | <b>:</b> | <b>4</b>                                  | <b>No of Hours</b>  | <b>:</b> | <b>4 Hrs./week</b>         |
| <b>Max Marks</b>           | <b>:</b> | <b>100</b>                                |                     |          |                            |

### Course Description:

The Objective of the Digital Marketing and Web Analytics Course is to provide students with the knowledge about business advantages of the digital marketing and its importance for marketing success and assess that how website visitors view and interact with a site's pages and features, and business intelligence, which would allow using data on customer purchasing patterns, demographics, and demanding trends to make effective strategic decisions.

### Course Outcomes:

After Completion of the course Students will be able to:

| <b>CO Number</b> | <b>Course Outcome</b>                                                                            |
|------------------|--------------------------------------------------------------------------------------------------|
| CO1              | To provide students with the fundamentals and essentials of Digital marketing and web analytics. |
| CO2              | To make understand to design and Implementing website.                                           |
| CO3              | To enable students to use of optimization techniques.                                            |
| CO4              | To enable students to use of Google analytics.                                                   |

### Syllabus:

#### UNIT-I: Introduction of the Digital Marketing

Digital vs. Real Marketing, Digital Marketing Channels, Creating initial digital marketing plan, Content management, SWOT analysis, Target group analysis.

#### UNIT-II: Web Design

Optimization of Web sites, MS Expression Web, creating web sites, MS Expression, SEO Optimization, Writing the SEO content, Writing the SEO content, Google AdWords- creating accounts, Google AdWords- types.

#### UNIT-III: Web Analytic fundamentals:

Capturing data: Web logs or JavaScripts tags, Separate data serving and data capture, Type and size of data, Innovation, Integration, selecting optimal web analytic tool, understanding clickstream data quality, identifying unique page definition, Using cookies, Link coding issues.

### UNIT-IV: Web analytics 2.0

Web analytics 1.0, Limitations of web analytics 1.0, Introduction to analytic 2.0, Competitive intelligence analysis: CI data sources, Toolbar data, Panel data, ISP data, Search engine data, Hybrid data, Website traffic analysis: Comparing long term traffic trends, Analyzing competitive site overlap and opportunities.

### UNIT-V: Google Analytics

Brief introduction and working, Adwords, Benchmarking, Categories of traffic: Organic traffic, Paid traffic; Google website optimizer, Implementation technology, Limitations, Performance concerns, Privacy issues.

### Text Books:

1. Sterne J., Web Metrics: Proven methods for measuring web site success, John Wiley and Sons (2002).
2. Digital Marketer. Pullizi, J. (2014) Epic Content Marketing, Mcgraw Hill Education.

### Reference Books:

3. Clifton B., Advanced Web Metrics with Google Analytics, Wiley Publishing, Inc. (2010), 2nd ed.
4. Kaushik A., Web Metrics: Proven methods for measuring web site success, John Wiley and Sons (2002), 1st ed.

## CO-PO & PSO Correlation

| Course Name: Web Analytics in Digital Marketing |                  |   |   |   |   |      |   |   |
|-------------------------------------------------|------------------|---|---|---|---|------|---|---|
| Course Outcomes                                 | Program Outcomes |   |   |   |   | PSOs |   |   |
|                                                 | 1                | 2 | 3 | 4 | 5 | 1    | 2 | 3 |
| CO1:                                            | 3                |   | 1 |   | 1 | 2    | 2 | 3 |
| CO2:                                            | 1                | 2 | 3 |   |   | 3    | 2 | 2 |
| CO3:                                            | 2                | 2 | 2 |   |   | 2    | 2 | 3 |
| CO4:                                            | 3                | 2 | 1 |   |   | 1    | 2 | 2 |

Note: 1.: Low 2.: Moderate 3.: High

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|                            |          |                                                                  |                     |          |                            |
|----------------------------|----------|------------------------------------------------------------------|---------------------|----------|----------------------------|
| <b>Programme</b>           | <b>:</b> | <b>M. Tech. ( 01PG021)</b>                                       | <b>Semester</b>     | <b>:</b> | <b>3<sup>rd</sup></b>      |
| <b>Name of the Course:</b> |          | <b>Data Analysis &amp; Decision Making in Business Analytics</b> | <b>Course Code:</b> |          | <b>SOE-M-CSE-21-301(2)</b> |
| <b>Credits</b>             | <b>:</b> | <b>4</b>                                                         | <b>No of Hours</b>  | <b>:</b> | <b>4 Hrs./week</b>         |
| <b>Max Marks</b>           | <b>:</b> | <b>75</b>                                                        |                     |          |                            |

### Course Description:

This course provides step by step evolution from Barter System to present Digital & online Business System, which moves everything of day to day work in every Core. Importance of Web, Social & Mobile analytics is well accepted today in Business. Here students learn Different operational & Functional Architecture of Business Intelligence, Data Warehousing Technologies. Data Mining & finally Smarter Decisions using different Analytical Tools.

### Course Outcomes:

After Completion of the course Students will be able to:

| CO Number | Course Outcome                                                                              |
|-----------|---------------------------------------------------------------------------------------------|
| CO1       | Describe the basic concepts of business analytics and optimization.                         |
| CO2       | Describe the basic concepts of business intelligence, components and architecture.          |
| CO3       | Explain the basic concepts of data mining                                                   |
| CO4       | Explain the basic concepts of web, social media and mobile analytics with its future trends |

### Syllabus:

#### UNIT-I: Introduction to Business Analytics

What is BA? Objective of BA, BA user, BA options. Introduction to Business Analytics, the value of Business Analytics to Business organization, the impact of Business Analytics on diverse industries, Advantages to implementing BA solutions, Key Business Analytics concepts, BA support for decision-making, High-level architecture of Business Analytics, the need for Business Analytics, the importance of reference architecture, Meaning of the Business reference architecture.

#### UNIT-II: Descriptive Analytics

Business Intelligence (BI), Scope of BI solutions and their fitting into existing infrastructure, BI Components and architecture, BI Components, Future of Business Intelligence, SaaS and Cloud computing techniques, Functional areas of BI tools, End user assumptions, Setting up data for BI.

**UNIT-III: Data warehouse**

OLAP and advanced analytics, Supporting the requirements of senior executives including performance management, Glossary of terms and their definitions specific to the field of BI and BI systems.

**UNIT-III: Introduction to Big Data**

Challenges, 5 V's, Ecosystem; Google's Solution Vs Hadoop, Hadoop: Ecosystem, Architecture, Cluster.

**UNIT-IV: Predictive Analytics**

Introduction, what is Data Mining? Concepts of Data mining, Technologies Used, Data Mining Process, KDD Process Model, CRISP – DM, Mining on different kinds of data, Applications of Data Mining, Challenges of Data Mining

**UNIT – V: Social, Web and Mobile Analytics**

Overview of web & social media. Need of using analytics, Web analytics technical requirements. Social media environment, Impact of social media on business, current analytics platforms, Web Analytics Vs Mobile Analytics, Social media Analytics Vs Mobile analytics, Need of mobile analytics, Basics of mobile computing, WAP gateway or GGSN support, APNs or regional POPs support, Architecture components, mobile web-services, overview of mobile cloud.

**Text Books:**

- Wayne Winston, S. Albright, Business Analytics: Data Analysis & Decision Making, 5E, 2014.

**Reference Books:**

- Swain Scheps, "Business Intelligence for Dummies", 2016.
- Randy Bartlett, A practitioner's Guide to Business Analytics, 2013.

**CO-PO & PSO Correlation**

| <b>Course Name: Data Analysis &amp; Decision Making in Business Analytics</b> |                         |          |          |          |          |             |          |          |
|-------------------------------------------------------------------------------|-------------------------|----------|----------|----------|----------|-------------|----------|----------|
|                                                                               | <b>Program Outcomes</b> |          |          |          |          | <b>PSOs</b> |          |          |
| <b>Course Outcomes</b>                                                        | <b>1</b>                | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>1</b>    | <b>2</b> | <b>3</b> |
| <b>CO1:</b>                                                                   | <b>3</b>                | <b>3</b> | <b>2</b> |          |          | <b>3</b>    | <b>3</b> | <b>3</b> |
| <b>CO2:</b>                                                                   | <b>2</b>                |          | <b>2</b> |          |          | <b>3</b>    | <b>3</b> | <b>2</b> |
| <b>CO3:</b>                                                                   | <b>2</b>                | <b>2</b> | <b>2</b> |          |          | <b>2</b>    | <b>2</b> | <b>3</b> |
| <b>CO4:</b>                                                                   | <b>2</b>                | <b>2</b> | <b>1</b> |          |          | <b>1</b>    | <b>2</b> | <b>1</b> |

**Note:** 1.: Low 2.: Moderate 3.: High

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|----------------------------|----------------------------------|---------------------|----------------------------|
| <b>Programme</b>           | <b>: M. Tech. (01PG021)</b>      | <b>Semester</b>     | <b>: 3<sup>rd</sup></b>    |
| <b>Name of the Course:</b> | <b>Healthcare Data Analytics</b> | <b>Course Code:</b> | <b>SOE-M-CSE-21-301(3)</b> |
| <b>Credits</b>             | <b>: 4</b>                       | <b>No of Hours</b>  | <b>: 4 Hrs./week</b>       |
| <b>Max Marks</b>           | <b>: 100</b>                     |                     |                            |

### Course Description:

This course will enable the students to build a basic working knowledge of data analysis on clinical intelligence platforms using appropriate techniques and methodologies.

### Course Outcomes:

After Completion of the course Students will be able to:

| CO Number | Course Outcome                                                                         |
|-----------|----------------------------------------------------------------------------------------|
| CO1       | Describe the tools and techniques used for data analytics in health care organizations |
| CO2       | Understand the electronic health records and clinical decision support systems         |
| CO3       | Identify techniques to gain insights from biomedical image analysis                    |
| CO4       | Understand the genomic data and its applications in personalized medicine              |
| CO5       | Understand the use of Natural Language Processing in clinical text                     |

### Syllabus:

#### UNIT-I: Introduction to Healthcare Data Analytics

Introduction, Healthcare Data Sources and Basic Analytics: Electronic Health Records, Biomedical Image Analysis, Sensor Data Analysis, Biomedical Signal Analysis, Genomic Data Analysis, Clinical Text Mining, Mining Biomedical Literature, Advanced Data Analytics for Healthcare, Applications and Practical Systems for Healthcare

#### UNIT-II: Electronics Health Records and Clinical Decision Support Systems

Introduction to EHR, Components of EHR, Benefits of EHR, Challenges of using HER, Types of Biomedical Signals: ENG, EMG, ECG, EEG, EGG, PCG, Introduction to CDSS, Types of CDSS: Knowledge-based CDSS, Non-Knowledge-based CDSS, Diagnostic Decision Support, Challenges of CDSS: Technical Design Issues, Legal and Ethical Issues

#### UNIT-III: Biomedical Image Analysis

Introduction, Biomedical Imaging Modalities, Object Detection, Image Segmentation, Image Registration, Feature Extraction: Object features, feature selection and Dimensionality Reduction, Principal Component Analysis

### UNIT-IV: Genomic Data Analysis for Personalized Medicine

Introduction to genomics data, Genomic data generation, Methods and standards for Genomic data analysis, Types of Computational Genomics Studies towards Personalized Medicine: Discovery of Biomarker and Molecular Signatures, Genome-Wide Association Study, Discovery of Disease Relevant Gene Networks

### UNIT-V: Natural Language Processing and Data Mining for Clinical Text

Introduction to Natural Language Processing, Core NLP components: Morphological Analysis, Lexical Analysis, Syntactic Analysis, Semantic Analysis, Data Encoding, Mining Information from Clinical Text, Challenges of Processing Clinical Reports, Clinical Applications

#### Text Books:

1. Chandan K. Reddy and Charu C. Aggarwal “Healthcare Data Analytics”, Chapman & Hall/CRC.

#### Reference Books:

2. Vikas Kumar, “Healthcare Analytics made simple”, Packet Publishing Limited.
3. Hui Yang and Eva K. Lee “Healthcare Analytics: From Data to Knowledge to Healthcare Improvement”, Wiley publication.

### CO-PO & PSO Correlation

| Course Name: Healthcare Data Analytics |                  |   |   |   |   |      |   |   |
|----------------------------------------|------------------|---|---|---|---|------|---|---|
| Course Outcomes                        | Program Outcomes |   |   |   |   | PSOs |   |   |
|                                        | 1                | 2 | 3 | 4 | 5 | 1    | 2 | 3 |
| CO1:                                   | 3                |   | 2 |   |   | 3    |   | 3 |
| CO2:                                   | 1                |   |   |   |   |      | 3 | 2 |
| CO3:                                   | 2                | 2 | 2 |   |   | 2    | 2 |   |
| CO4:                                   |                  | 2 | 1 |   |   | 1    | 2 | 3 |
| CO5:                                   |                  | 3 |   |   |   | 1    |   | 1 |

**Note:** 1.: Low 2.: Moderate 3.: High

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|----------------------------|----------|--------------------------------|----------------------|----------|---------------------------------|
| <b>Programme</b>           | <b>:</b> | <b>M. Tech. (01PG021)</b>      | <b>Semester</b>      | <b>:</b> | <b>3<sup>rd</sup></b>           |
| <b>Name of the Course:</b> |          | <b>Operations<br/>Research</b> | <b>Course Code:</b>  |          | <b>SOE-M-CSE-21-<br/>301(4)</b> |
| <b>Credits</b>             | <b>:</b> | <b>4</b>                       | <b>No of Hours :</b> |          | <b>4 Hrs./week</b>              |
| <b>Max Marks</b>           | <b>:</b> | <b>100</b>                     |                      |          |                                 |

### Course Description:

Operations Research now a day widely used in the area of decision making for the real life problems. Managers and decision makers get idea for optimizing and approximating industrial problems. They not only strive to devise appropriate measures for problem solving but also apply scientific techniques to monitor the organizations ongoing activities such as production mix, transportation, queuing, assignment, goal and game problem.

### Course Outcomes:

After Completion of the course Students will be able to:

| CO Number | Course Outcome                                                                                               |
|-----------|--------------------------------------------------------------------------------------------------------------|
| CO1       | Formulate mathematical problems and select optimal problems solving techniques for a given problem using LP. |
| CO2       | Formulate and solve transportation problem.                                                                  |
| CO3       | Formulate and solve Assignment problem.                                                                      |
| CO4       | Demonstrate and solve problems related to Decision Theory and Decision Tree.                                 |
| CO5       | Demonstrate and solve real life problem relating to Queuing Theory and Game Theory.                          |

### Syllabus:

#### UNIT-I: Linear Programming

Basic concept; Structure of Linear Programming Model; Application areas of Linear Programming; General Mathematical Model of Linear Programming Problem; Guidelines on Linear Programming Model Formulation; Examples of LP Model Formulation in various functional areas of management; Graphical Solution Method of LP Problems; The Simplex Method (Maximization Case; Minimization Case-Two Phase Method & Big M Method).

#### UNIT-II: Relational Data Models

Transportation Problem: Mathematical Model of Transportation Problem; The Transportation Algorithm; Methods for Finding Initial Solution (North-West Corner



Method, Least Cost Method, Vogel’s Approximation); Test of Optimality- MODI Method (Transportation Algorithm).

**UNIT-III: Assignment Problem:**

Mathematical Model of Assignment Problem; Solution Methods of Assignment Problem, Hungarian Method for solving Assignment Problem; Variations in the Assignment Problem,

Multiple Optimal solutions, Maximization Case in Assignment Problem, Unbalanced Assignment Problem, Restrictions on Assignments.

**UNIT-IV: Decision Theory and Decision Tree:**

Steps of Decision making Process; Types of Decision Making Environment; Decision Making under Uncertainty (Optimism Criterion, Pessimism Criterion, Equal Probabilities criterion, Coefficient of Optimism Criterion, Regrate Criterion); Decision Tree Analysis, Decision Making with Utilities.

**UNIT-V: Queuing Theory:**

Basis of Queuing theory, elements of queuing theory, Kendall’s Notation, Operating characteristics of a queuing system, Classification of Queuing models, Preliminary examples of M/M/1:∞/FCFA. Game Theory: Introduction, Characteristics of Game Theory, Two Person, Zero sum games, Pure strategy. Dominance theory, Mixed strategies (2x2, mx2), Algebraic and graphical methods.

**Text Books:**

1. Hamdy Taha “Operations Research: An Introduction”, Pearson
2. R. Paneerselvam, “Operations Research”, Prentice Hall of India Pvt. Ltd.

**Reference Books:**

1. P Mariappan “Operations Research”, Pearson
2. H N wagner “Operations Research”, Prentice Hall.
3. Ronald Rardin “Optimization in Operations Research”, Pearson Education Inc.
4. R. Paneerselvam, “Operations Research”, Prentice Hall of India Pvt. Ltd.

**CO-PO & PSO Correlation**

| Course Name: Operations Research |                  |   |   |   |   |      |   |   |
|----------------------------------|------------------|---|---|---|---|------|---|---|
|                                  | Program Outcomes |   |   |   |   | PSOs |   |   |
| Course Outcomes                  | 1                | 2 | 3 | 4 | 5 | 1    | 2 | 3 |
|                                  |                  |   |   |   |   |      |   |   |

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|-------------|----------|----------|----------|--|----------|----------|----------|----------|
| <b>CO1:</b> | <b>3</b> | <b>3</b> | <b>2</b> |  | <b>2</b> | <b>3</b> | <b>3</b> | <b>3</b> |
| <b>CO2:</b> | <b>2</b> |          | <b>3</b> |  | <b>3</b> | <b>3</b> | <b>3</b> | <b>2</b> |
| <b>CO3:</b> | <b>2</b> |          | <b>2</b> |  | <b>2</b> | <b>2</b> | <b>2</b> | <b>2</b> |
| <b>CO4:</b> |          | <b>2</b> | <b>1</b> |  | <b>1</b> | <b>1</b> | <b>2</b> | <b>3</b> |
| <b>CO5:</b> |          | <b>3</b> | <b>2</b> |  |          | <b>1</b> | <b>3</b> | <b>1</b> |

**Note:** 1.: Low 2.: Moderate 3.: High

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|----------------------------|-----------------------------|---------------------|-------------------------|
| <b>Programme</b>           | <b>: M. Tech. (01PG021)</b> | <b>Semester</b>     | <b>: 3<sup>rd</sup></b> |
| <b>Name of the Course:</b> | <b>Seminar</b>              | <b>Course Code:</b> | <b>SOE-M-CSE303</b>     |
| <b>Credits</b>             | <b>: 2</b>                  | <b>No of Hours</b>  | <b>: 2 Hrs./week</b>    |
| <b>Max Marks</b>           | <b>: 50</b>                 |                     |                         |

### Course Description:

Research Seminar have its own importance in a career of a student who is pursuing a professional degree. It is considered as a part of PG curriculum.

### Course Outcomes:

After Completion of the course Students will be able to:

| CO Number  | Course Outcome                                                                                                                   |
|------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>CO1</b> | gain in-depth knowledge and use adequate methods in the major subject/field of study.                                            |
| <b>CO2</b> | create, analyze and critically evaluate different technical/research solutions                                                   |
| <b>CO3</b> | clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings        |
| <b>CO4</b> | identify the issues that must be addressed within the framework of the specific dissertation in order to take into consideration |
| <b>CO5</b> | able to apply principles of ethics and standards, skill of presentation and communication techniques.                            |

### Contents

Project work is of duration of one semesters and is expected to be completed in the seventh/eighth semester. Each student group consisting of not more than four members is expected to design and develop a complete system or make an investigative analysis of a technical problem in the relevant area. The project batches are expected to fix their topics, complete preliminary studies like literature survey, field measurements etc. in the seventh semester.

Student shall study the topic of project work and define problem statement. The student shall evolve design and/or do experimental study and/or fabricate engineered device to obtain solution to the identified problem. The student shall prepare a report and shall present a seminar on the basis of work done at the end of semester.

**CO-PO & PSO Correlation**

| <b>Course Name: Seminar</b> |                         |          |          |          |          |             |          |          |
|-----------------------------|-------------------------|----------|----------|----------|----------|-------------|----------|----------|
|                             | <b>Program Outcomes</b> |          |          |          |          | <b>PSOs</b> |          |          |
| <b>Course Outcomes</b>      | <b>1</b>                | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>1</b>    | <b>2</b> | <b>3</b> |
| <b>CO1:</b>                 | <b>1</b>                |          |          |          |          | <b>3</b>    |          |          |
| <b>CO2:</b>                 |                         | <b>2</b> | <b>1</b> |          | <b>1</b> |             |          | <b>2</b> |
| <b>CO3:</b>                 |                         | <b>2</b> |          |          | <b>1</b> |             | <b>1</b> | <b>2</b> |
| <b>CO4:</b>                 | <b>1</b>                | <b>2</b> |          |          | <b>1</b> |             | <b>1</b> | <b>1</b> |
| <b>CO5:</b>                 | <b>1</b>                |          |          |          |          | <b>3</b>    |          |          |

**Note:** 1.: Low 2.: Moderate 3.: High

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|----------------------------|----------|------------------------------------------|---------------------|----------|-----------------------|
| <b>Programme</b>           | <b>:</b> | <b>M. Tech.</b>                          | <b>Semester</b>     | <b>:</b> | <b>3<sup>rd</sup></b> |
| <b>Name of the Course:</b> |          | <b>Internship/ Project/<br/>Research</b> | <b>Course Code:</b> |          | <b>SOE-M-CSE302</b>   |
| <b>Credits</b>             | <b>:</b> | <b>8</b>                                 | <b>No of Hours</b>  | <b>:</b> | <b>8 Hrs./week</b>    |
| <b>Max Marks</b>           | <b>:</b> | <b>200</b>                               |                     |          |                       |

### Course Description:

The project work can be an investigative analysis of a technical problem in the relevant area, planning and/or design project, experimental project or computer application based project on any of the topics. Each project will submit project synopsis by the end of the semester. Project evaluation committee consisting of three or four faculty members specialized in the various fields shall study the feasibility of each project work before giving consent.

### Course Outcomes:

After Completion of the course Students will be able to:

| CO Number | Course Outcome                                                                                                                   |
|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| CO1       | Gain in-depth knowledge and use adequate methods in the major subject/field of study.                                            |
| CO2       | Create, analyze and critically evaluate different technical/research solutions                                                   |
| CO3       | Clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings        |
| CO4       | Identify the issues that must be addressed within the framework of the specific dissertation in order to take into consideration |
| CO5       | Apply principles of ethics and standards, skill of presentation and communication techniques.                                    |

### Contents

Project work is of duration of one semesters and is expected to be completed in this semester. Each student is expected to design and develop a complete system or make an investigative analysis of a technical problem in the relevant area. The student is expected to fix their topics, complete preliminary studies like literature survey, field measurements etc. in the third semester.

Student shall study the topic of project work and define problem statement. The student shall evolve design and/or do experimental study and/or fabricate engineered device to obtain solution to the identified problem. The student shall prepare a report and shall present a seminar on the basis of work done at the end of semester.

### CO-PO & PSO Correlation

| Course Name: Internship/ Project/ Research I |                  |   |   |   |   |      |   |   |
|----------------------------------------------|------------------|---|---|---|---|------|---|---|
|                                              | Program Outcomes |   |   |   |   | PSOs |   |   |
| Course Outcomes                              | 1                | 2 | 3 | 4 | 5 | 1    | 2 | 3 |
| CO1:                                         | 3                |   | 2 | 3 | 1 | 3    |   | 3 |
| CO2:                                         | 1                |   | 2 | 3 | 3 |      | 3 | 2 |
| CO3:                                         | 2                | 2 | 2 | 2 | 2 | 2    | 2 | 3 |
| CO4:                                         |                  |   |   | 2 | 2 | 1    | 2 | 3 |
| CO5:                                         |                  |   |   | 3 | 2 | 1    | 3 | 1 |

**Note:** 1.: Low 2.: Moderate 3.: High