Subject		Contact hours per week				Evaluation Scheme			
Course No.	**Course Title**	**Lecture L**	**Practical P**	**Tutorial T**	**Credits**	**Internals**	**Mid-Sem. Exam.**	**End-Sem. Exam.**	**Total**
Semester-1									
CE-601	Introduction to Research	3	1	1	4	30	20	50	100
CE-602	Theory of Elasticity and Plasticity	3	0	1	4	30	20	50	100
CE---	Elective-I	3	0	1	4	30	20	50	100
CE---	Elective-II	3	0	1	4	30	20	50	100
	Total	**12**	**1**	**4**	**16**				**400**

Course No.	Course Title	Course Type	Credits	Contact Hours		
				L	P	T
CE 601	**Introduction to Research**	DC	4	3	1	1

UNIT-1

Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research. Defining the Research Problem: Concept and need, Identification of Research problem, defining and delimiting Research problem. Research Questions and Hypothesis: Variables and their linkages, characteristics of good Hypothesis. Research question and formulation of hypotheses-directional and non-directional hypotheses, Basis for hypotheses.

Unit-II

Research design: Meaning, Need, Features of Good Design, Concepts, Types. Basic principles of Experimental Design, various methods of Research. Survey, Philosophical, Historical, Experimental, Causal Comparative, Genetic, Case Studies. Tools for Data Collection: Collections of Primary Data, Collection of Data through questionnaire and Schedules, other Observation Interview Methods, Collection of Secondary Data, Selection of appropriate method for data collection, Case Study, Focus Group Discussion, Techniques of developing research tools, viz. Questionnaire and rating scales etc. Reliability and validity of Research tools. Sampling: Probability and Non-Probability sampling- types and criteria for selection. Developing sampling Frames

UNIT-III

Descriptive Statistics: Measurement Scales, Sources of error in measurement. Measures of central Tendency (Mean, medium, Mode), Measures of dispersion (range, mean deviation, standard deviation) Graphical representation of Data. Inferential statistics: Normal Probability Curve- Meaning, characteristics and applications. Standard error. Confidence Intervals and Fiduciary limits. Type I and Type II errors. Estimating

Population Means.

a. Correlations: Rank Difference Method Pearson's Product Moments Correlation Significance of correlation. Concept of Variance. Other methods of Correlation (Concept and application only)- Partial and Multiple correlation Biserial, Point Biserial, tetra choric and Phi correlation. Regression and Multiple Regression equations (concept and applications)
b. Sampling Distribution, Null Hypothesis- Alternative Hypothesis. Testing the Significance of difference between means(z and 't' test)
c. Analysis of Variance (ANOVA) and Analysis of covariance (ANCOVA)-concept and applications only.
d. Factor Analysis and Path Analysis (concept and applications).

UNIT-IV

Non-Parametric Statistics: Sign Test, man- Whitney u Test, Chi Square test steps, Characteristics and applications. Relationship between chi square and phi correlation. Logic: Logical form, deductive and inductive reasoning, consistency, validity, soundness and completeness, western and oriental conception of logic. Writing Research Report: Format and style. Review of related literature its implications at various stages of research. (Formulation of research problem, hypothesis, interpretation and discussion of results). Major findings, Conclusions and suggestions. Citation of references and Pribliography.

PRACTICAL

1. Word Processing: Word features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Keyboard shortcut, Editing, Previewing, Printing and Formatting a Document, Advanced Features of MSWord, Find and replace, using thesaurus, using Auto-Multiple Functions, Mail Merge, Handling Graphics, tables and Charts, Covering a word Document into various Formats like-text, Rich Text format, WordPerfect, HTML,PDF etc.
2. Worksheet: Excel: Worksheet Basics, Working with single and multiple work book, working with formula & cell referencing, Auto sum, Copying formulae, Absolute & relative addressing, Worksheet with ranges, Formatting of worksheet, Previewing and printing Worksheet, Graphs and charts, Database, Creating and using Macros, Multiple Worksheets-concepts, Creating and using, data analysis and display.
3. Presentation: PowerPoint: Creating Slide show with animations. Auto Wizard, Creating a Blank presentation, auto layout, Screen layout and views, insert anew slide, applying design template, changing slide layout, recording and hiding a slide4s, slide show and editing custom slide, resizing a text box, Text Box Properties, Delete a text Box, Bulleted Lists, numbered lists, adding notes, video and audio, Adding text editing options, Formatting text, Replace fonts, Line spacing, change case spelling check, color schemes, Adding clip art, Adding an image form a file, Editing graphic, Auto Shapes, Word Art, backgrounds, Action Buttons, Slide Animation, Preview Slide transactions, Slide Show options, Slide Master, Header and Footer, Slide Numbers, Date and Time.
4. Education and Research Resources on Net: Encyclopedia, Wikipedia, On-Line Tutorials and lectures, Virtual labs, Open Course-wares, Electronic Journals, E-Books, Digital Libraries, and Searching research Information.
5. Professional Written Communication: Students prepare E-mails, Letters, memos, proposals, formal and informal reports. Oral Communication: Impromptu and Extemporaneous methods of delivery.
6. Oral Presentations using usual aids such as handouts, over head transparencies and presentation software such as PowerPoint.

Text Books and Reference Materials

1. Best and Kahn, Research Methodology, PHI Limited.
2. Kothari, C.R. Research Methodology (Methods and Techniques), New Age Publisher.
3. Kerlinger, Foundation of Research.
4. Fundamentals of modern statistical methods by Rand R. wilcox.
5. Power Analysis for Experimental research A Practical Guide for the Biological, Medical and social Sciences by R. Barker Bausell, Yi-Fang Li Cambridge University Press.
6. Design of Experience: Statistical Principles of Research Design and Analysis, by Robert O. Kuehl Brooks/cole.

Course No.	Course Title	Course Type	Credits	Contact Hours		
				L	P	T
CE 602	Theory of Elasticity and Plasticity	DC	4	3	0	1

UNIT 1

Theory of stresses, infinitesimal and finite strain, strain-displacement relationships, elastic constants

UNIT 2

Stress and displacements functions, plane problems in Cartesian and polar co-ordinates

UNIT 3

Elements of plasticity, failure and yield criteria, flow rule.

UNIT 4

Velocity field, plastic stress-strain relationships, incremental plasticity.

Text Books and Reference Materials

1. Theory of Elasticity by S.P. Timoshenko & J.N. Goodier, Tata McGrawHill.
2. Plasticity: Theory and Applications by Alexander Mendelson, New York, MacMillan,1970
3. Solid Mechanics by S.M.A. Kazimi, Tata McGrawHill.
4. Advanced Mechanics of Solids by L.S. Srinath, Tata McGrawHill.
5. Computational Elasticity by M. Ameen, Narosa PublishingHouse.
6. Introduction to Engineering Plasticity by G.K. Lal & N.V. Reddy, Narosa PublishingHouse.
7. Plasticity for Structural Engineers by Chen & Han, CengageLearning.