

Name of Institute: Indus Institute of Technology and Engineering

Name of Faculty: Dr. Umang Patdiwala

Course code: ME0729

Course name: Introduction to Research (Open Elective)

Subject: Introduction to Research (OE-9)								
Program: B. Tech. (Mechanical)				Subject Code: ME0729			Semester: VII	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE) Theory	Continuous Internal Evaluation (CIE) Practical	Total Marks
3	0	0	3	16/40	***	24/60	***	100

Pre-requisites: None

Credit Points: 3

Offered Semester: VII

Course Coordinator

Full name: Dr. Umang Patdiwala

Department with sitting location: Mechanical Engg. 3rd Floor,
ME-HoD office, Bhanwar Building, Indus University

Telephone: 3327,

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Consultation times: Everyday (4.00 PM to 5:00 PM)

Students will be contacted throughout the session via e-mail and Google Classroom with important information relating to this course.

Course Objectives

1. To familiarize participants with basic of research and the research process.
2. To understand difference between discovery and research.
3. To select and define appropriate research problem and parameters.
4. To organize and conduct research (advanced project) in a more appropriate manner
5. To enable the participants in conducting research work and formulating research synopsis and report.

Course Outcomes:

1. After learning the course, the students should be able to:
2. Develop understanding of the basic framework of research process.
3. Develop understanding of various research designs and techniques.
4. Identify various sources of information for literature review and data collection.
5. Develop an understanding of the ethical dimensions of conducting applied research.
6. Appreciate the components of scholarly writing and evaluate its quality.
7. Be aware of the ethical principles of research, ethical challenges and approval processes
8. Describe quantitative, qualitative and mixed methods approaches to research.
9. Critically analyze published research.

Method of delivery

(Online Lecture), PPT & Video, Self-Assessment study Material, Problem Based Learning and Case Study)

Study time

(How many hours per week including class attendance)

	Lecture	Tutorial	Practical
No of hours	3	0	0

CO-PO Mapping (PO: Program Outcomes)

PO/PSO CO	PO											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3					2	1	-				
CO2	3	-	-	1	3	-	-	-	-	-	-	-
CO3	3	2	2	2	3	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-
CO5	3	-	3	1	3	-	-	-	-	-	-	-
CO6	2	3	-	1	-	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

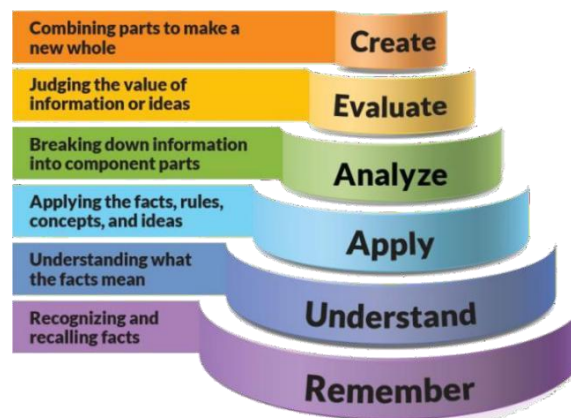


Figure 1: Blooms Taxonomy

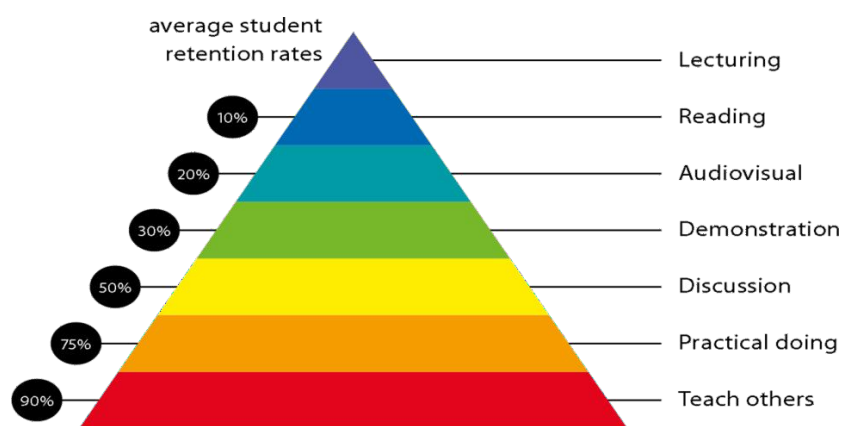


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	1 Professional knowledge, grounding & awareness

Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	2 Information literacy, gathering & processing
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	4 Problem solving skills
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	5 Written communication
	6 Oral communication
	7 Teamwork
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Lecture/tutorial times

(Give lecture times in the format below)

As Per Time Table provided to students

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

Details of referencing system to be used

Text books

1. Research Methodology for Engineers - R. Ganesan, MJP Publishers
2. Research Methodology: Methods and Techniques - C. R. Kothari, Publisher New - Age International
3. Research Methodology by Deepak Chawla & Neena Sodhi S. Chand Publication

Reference Books

1. Business Research Methods- Naval Bajpai Pearson Publication
2. Uma Sekaran, Research Methods for Business, John Wiley and Sons Inc., New York, 2000.
3. Gupta, S.P. Statistical Methods, 30th Sultan Chand, New Delhi

Additional Materials

<http://nptel.ac.in/courses/112103019/>

MOOC:

1. <https://nptel.ac.in/courses/121106007/>
2. <https://nptel.ac.in/courses/107108011/>

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

For Theory component CIE-TH (60 marks)	
Attendance Quizzes	10 marks
Class Test	40 marks
Assignment	10 marks
ESE-TH (40 Marks)	
	40

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

***Do not copy the work of other students.
Do not share your work with other students (except where
required for a group activity or assessment).***

Course schedule (subject to change)

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Weeks 1	An Introduction: Meaning, Objectives, Motivation, Type of Research, Research Approaches, Significance of Research, Research Process, Criteria of Good Research	1,2	Discussion
Weeks 2	Strategy and Tools for Discovery Strategic Planning Development Strategy and Process Assessment, Applying Search Strategies to Find Information, Discovery Procedures, types of discovery, Method of discovery, Techniques of discovery, Different between discovery and research	1,2	Worksheet Submission
Week 3	Research Problem Formulation: Selecting the Problem, Necessity of Defining the Problem, Literature Survey, Guidelines for literature review	2,3	Worksheet submission, Quiz
Week 4	Research Design: Meaning of Research Design, Need for Research Design, Different Research Designs, and Basic Principles of Design..	3,4	Assignment and Worksheet Submission
Week 5	Probability, Sampling and its Distributions: Probability laws, Probability distributions, Normal Distribution, Exponential distribution, Binomial distribution, Poisson distribution, Sampling, Sampling Design Process, Sampling Methods, Sampling distributions	3,4	Assignment and Worksheet Submission
Week 6	Design of Experiments and Regression Analysis: Planning of experiments, Taguchi Approach, Curve fitting, Types of regression analysis: Simple and Multiple regression analysis, Data analysis, Interpretation of results	4	Assignment and Worksheet Submission

Week 7	Probability, Sampling and its Distributions: Probability laws, Probability distributions, Normal Distribution, Exponential distribution, Binomial distribution,	4,6	Assignment and Worksheet Submission
Week 8	Poisson distribution, Sampling, Sampling Design Process, Sampling Methods, Sampling distributions Design of Experiments and Regression Analysis: Planning of experiments, Taguchi Approach, Curve fitting,		Assignment and Worksheet Submission, Quiz
Week 9	Types of regression analysis: Simple and Multiple regression analysis, Data analysis, Interpretation of results	5,6	Assignment and Worksheet Submission, Quiz
Week 10	Structure of Thesis Report and thesis writing: Preliminary Pages, Main body of Thesis, Summary, Appendices,	4,5,6	Assignment and Worksheet Submission, Quiz
Week 11	References Steps in writing the report, mechanics of writing, Presentation of figures and tables	5,6	Assignment and Worksheet Submission, Quiz
Week 12	Writing of papers and Synopsis: Audience Analysis, Preparing papers for Journals, Preparation of Synopsis	4,6	Assignment and Worksheet Submission, Quiz