Name of Institute:IITE
Name of Faculty:Prof. Miloni Ganatra

Course code: EC0319
Course name: Digital Logic Design
Pre-requisites: Decimal, Binary Number, Mathematical Analysis, Theorems

Credit points: 4

Offered Semester: 3

Course coordinator (weeks 01 - 12)
Full name: Prof. Miloni Ganatra
Department with siting location:E.C –Machine Lab -2nd Floor ,Bhanwar Building
Telephone:9974592124
Email:miloniganatra.ec@indusuni.ac.in
Consultation times:2nd & 4th Saturday

Course lecturer (weeks 01 - 12)
Full name: Prof. Miloni Ganatra
Department with siting location: E.C –Machine Lab -2nd Floor ,Bhanwar Building
Telephone: 9974592124
Email: miloniganatra.ec@indusuni.ac.in
Consultation times: 2nd & 4th Saturday

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives
By participating in and understanding all facets of this course a student will:

1) To prepare students to perform the analysis and design of various digital electronic circuits.
2) To explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra, Combinational & Sequential logic, state elements and finite state machine (FSMs).

Course Outcomes (CO)
After successful completion of this course, students will be able to

1) Apply the concepts of number base conversions & understand number representation and conversion between different representation in digital electronic circuits

2) Able to perform the conversion among different number systems, Familiar with baisc logic gates, Independently or work in team to build simple logic circuits using basic.
3) Understand Boolean algebra and basic properties of Boolean algebra; able to simplify simple Boolean functions by using the basic Boolean properties.
4) To analyze logic processes and implement logical operations using combinational logic circuits.
5) To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines.

Course Outline

UNIT-I

[12 hours]

Number System:
Decimal, Binary, Octal, Hexadecimal number system, Conversion of numbers from one number system to other, complement method of addition ,subtraction using 9's and 10's compliment method & 1's and 2's complement method.

Binary Codes:
Weighted and Non-weighted code, 8421 BCD code, XS-3 code, Gray code, Binary to Gray conversion, Gray to Binary conversion

Logic Gates & Boolean Algebra: AND, OR, NOT, NAND, NOR, X-OR, X-NOR, BUFFER, Axioms and laws of Boolean algebra, D'morgans theorem, Duality, Reduction of Boolean expression.

UNIT-II

[12 hours]

Boolean Algebra - II & Simplification of Boolean Functions: Converting AND/OR/INVERT logic to NAND/NOR logic , POS and SOP expressions, Simplification of Boolean expression using Karnaugh Map for 2 to 5 variables, Don't care conditions and Tabulation method

Combinational Logic: Introduction, Design Procedure, Code Conversion, Multilevel NAND and NOR circuit

UNIT-III

[12hours]

Combinational Circuits   with MSI & LSI

The Half-adder, The Full-adder, The Half-subtractor, The Full-Subtractor, Parallel Binary Adders, Binary Subtractor, Adder- Subtractor, BCD adder, Code converters, Parity bit Generators/Checkers, Comparators, Decoders, BCD to 7-Segment Decoders, Encoders, ,

Multiplexers, Applications of Multiplexer, Demultiplexers , Circuit implementation using PLDs (PLA, PAL)

Flip Flop :
S-R Flip-flop, JK Flip-flop, D Flip-flop, T Flip-flop, Master-slave Flip-flop, Conversion of Flip flop

UNIT-IV

[12hours]

Shift Registers, Counters & FSM Design

Shift Registers: Serial-in Serial-out Shift register, Serial-in Parallel-out Shift register, Parallel-in Serial-out Shift register, Parallel-in Parallel-out Shift register

Counters: Asynchronous counter, Design of Asynchronous counter, Synchronous counters, Design of Synchronous counter

FSM Design: State Diagram, State Table, State Assignment, Moore and Mealy Model

Method of delivery
(Face to face lectures,PPT, **Chalkboard**)

Study time
(9 hours per week including class attendance)

CO-PO Mapping (PO: Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	-	3	2	-	-	1	-	-	-
CO2	3	3	3	1	3	1	-	-	-	-	-	-
CO3	1	2	3	1	3	2	-	-	-	-	-	-
CO4	1	1	3	2	2	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention (For reference)
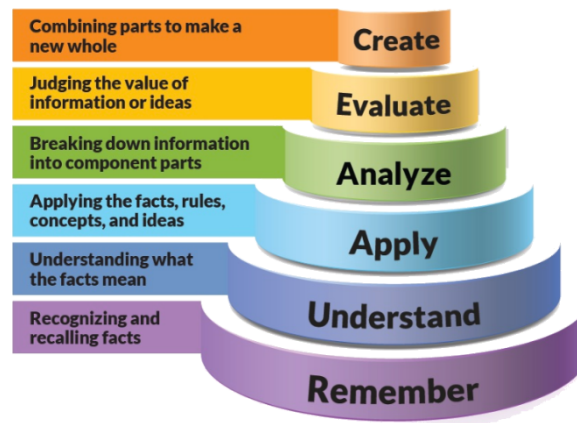(Blooms taxonomy has been given for reference)

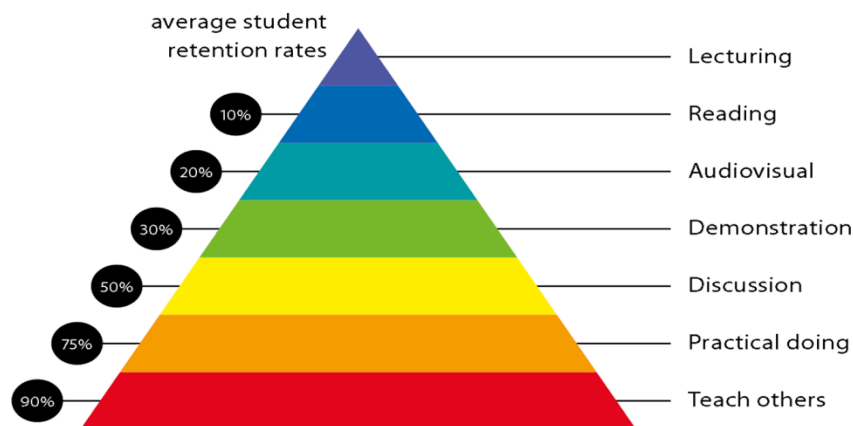Figure 1: Blooms Taxonomy

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	**2 Information literacy, gathering & processing**

variety of sources and technologies. Acknowledge the work and ideas of others.	
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**

Practical work:
Lab Experiments & Outcome of Digital Logic Design Lab:
Outcome:
Upon successful completion of this course students should be able to:

1. Implementation for basic logic gates & digital Circuits using ICs.

2. Implementation & Analyze the operation of medium & high complexity standard combinational circuits like the encoder, decoder, multiplexer, demultiplexer, adder ,subtractor

3. Implementation &Analyze the operation of a flip-flop and examine relevant timing diagrams

4. Implementation & Analyze the operation of counters and shift registers

5. Design and operate practical digital logic circuits

6. Report findings and evaluate results.

List of Lab Experiment:
1. To Verify the Behaviour of Logic Gates using Truth Table and Familiarization with Digital Integrated Circuits

2. Familiarization with the Different Portions of the Datasheet for a Digital IC and Using the Datasheet to Gather Relevant Information to Utilize the IC as a Component in another Digital Logic Circuit

3. Realization of basic gates using Universal Gates.

4. Verification of Demorgans Theorem.

5. Implementation of Half Adder & Full Adder Circuits.

6. Implementation of Half Subtractor & Full Subtractor Circuits

7. Implementation of Code Converters using Basic Gates

8. Implementation of Multiplexes (4-1 MUX/8-1 MUX)

9. Implementation of Decoders (3-8 Decoder/4-16 decoder)

10. Realization of Flip-Flop using Gates.

11. Implementation of Shift Registers using Flip Flop. (Serial-in Serial-out Shift register, Serial-in Parallel-out Shift register, Parallel-in Serial-out Shift register, Parallel-in Parallel-out Shift register)

12. Implementation of Asynchronous Counters (4 bit Up/down)

13. Implementation of Synchronous Counters (4 bit Up/down)

Lecture/tutorial times
(Give lecture times in the format below)

Example:

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 in written work

Text Books:

1) Morris Mano, "Digital Logic and Computer Design", Pearson , ISBN 13: 9788177584097

Reference Books:

1) Ronald J. Tocci, Gregory L. Moss, "Digital Systems", 10 Ed, Pearson, ISBN 9780135103821

2) D.C.Green, "Digital Electronics"5th Ed., Pearson, 2005, ISBN-9788177580686

Web Resources:

1) Digital Circuits & Systems (http://nptel.ac.in/courses/117106086/1)
2) Circuits and Electronics (https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-electronics-spring-2007/index.htm)

ASSESSMENT GUIDELINES
Your final course mark will be calculated from the following:

Theory:
Quiz (10 Marks)
Mid Term (25 Marks)
Seminar (15 Marks)
Attendance +Class Pratication (10 Marks)
ESE (40 Marks)

Practical:
Mini Project (30 Marks)
Practical Performance + Lab manual (20 Marks)
Attendance +Class Pratication (10 Marks)
ESE (40 Marks)

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)

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Course schedule (subject to change)

(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

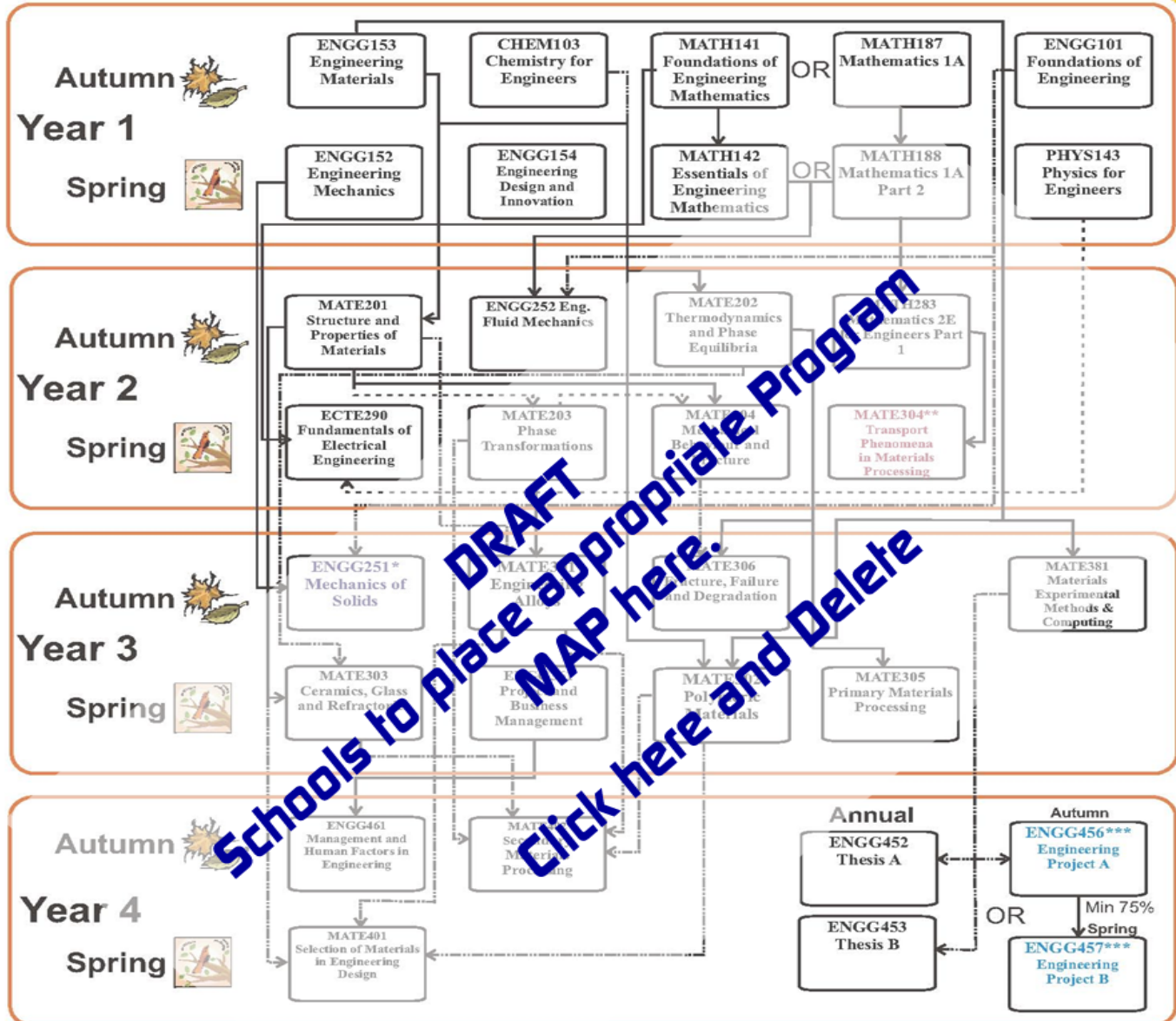| Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Weeks 1	**Number System:** Decimal, Binary, Octal, Hexadecimal number system, Conversion of numbers from one number system to oth	1,2	BB,PPT
Weeks 2	complement method of addition ,subtraction using 9's and 10's compliment method & 1's and 2's complement method	1,2	BB,PPT
Week 3	**Binary Codes:** Weighted and Non-weighted code, 8421 BCD code, XS-3 code, Gray code, Binary to Gray conversion, Gray to Binary conversion	1,2	BB,PPT
Week 4	**Logic Gates & Boolean Algebra:** AND, OR, NOT, NAND, NOR, X-OR, X-NOR, BUFFER, Axioms and laws of Boolean algebra, D'morgans theorem, Duality, Reduction of Boolean expression.	1,2	BB,PPT
Week 5	**Boolean Algebra - II & Simplification of Boolean Functions:** Converting AND/OR/INVERT logic to NAND/NOR logic , POS and SOP expressions	1,2,3	BB,PPT Quiz-1
Week 6	Simplification of Boolean expression using Karnaugh Map for 2 to 5 variables, Don't care conditions and Tabulation method	2,3	BB,PPT Assignment-1 Submission
Week 7	**Combinational Logic**: Introduction, Design Procedure, Code Conversion, Multilevel NAND and NOR circuit	3,4	BB,PPT
Week 8	**Combinational Circuits with MSI & LSI**	3,4	BB,PPT Assignment-2 Submission

		The Half-adder, The Full-adder, The Half-subtractor, The Full-Subtractor, Parallel Binary Adders, Binary Subtractor, Adder- Subtractor, BCD adder, Code converters, Parity bit Generators/Checkers		
	Week 9	Comparators, Decoders, BCD to 7-Segment Decoders, Encoders, , Multiplexers, Applications of Multiplexer, Demultiplexers , Circuit implementation using PLDs (PLA, PAL)	2,3,4	BB,PPT
	Week 10	**Flip Flop :** S-R Flip-flop, JK Flip-flop, D Flip-flop, T Flip-flop, Master-slave Flip-flop,	3,4	BB,PPT
	Week 11	Conversion of Flip flop	3,4	BB,PPT
	Week 12	**Shift Registers:** Serial-in Serial-out Shift register, Serial-in Parallel-out Shift register, Parallel-in Serial-out Shift register, Parallel-in Parallel-out Shift register	4,5	BB,PPT
	Week 13	**Counters:** Asynchronous counter, Design of Asynchronous counter,	4,5	BB,PPT
	Week 14	Synchronous counters, Design of Synchronous counter	4,5	BB,PPT Assignment-3Submission
	Week 15	**FSM Design:** State Diagram, State Table, State Assignment, Moore and Mealy Model	4,5	BB,PPT

PROGRAM MAP for Bachelor of Engineering (Materials Engineering)

DEGREE - 2012

Autumn Year 1

- ENGG153 Engineering Materials
- CHEM103 Chemistry for Engineers
- MATH141 Foundations of Engineering Mathematics **OR** MATH187 Mathematics 1A
- ENGG101 Foundations of Engineering

Spring Year 1

- ENGG152 Engineering Mechanics
- ENGG154 Engineering Design and Innovation
- MATH142 Essentials of Engineering Mathematics **OR** MATH188 Mathematics 1A Part 2
- PHYS143 Physics for Engineers

Autumn Year 2

- MATE201 Structure and Properties of Materials
- ENGG252 Eng. Fluid Mechanics
- MATE202 Thermodynamics and Phase Equilibria
- MATH283 Mathematics 2E Engineers Part 1

Spring Year 2

- ECTE290 Fundamentals of Electrical Engineering
- MATE203 Phase Transformations
- MATE204 Mechanical Behaviour and Fracture
- MATE304** Transport Phenomena in Materials Processing

Autumn Year 3

- ENGG251* Mechanics of Solids
- MATE3 Engineering Alloys
- MATE306 Structure, Failure and Degradation
- MATE381 Materials Experimental Methods & Computing

Spring Year 3

- MATE303 Ceramics, Glass and Refractories
- ENGG Project and Business Management
- MATE Polymeric Materials
- MATE305 Primary Materials Processing

Autumn Year 4

- ENGG461 Management and Human Factors in Engineering
- MATE Secondary Materials Processing
- **Annual** ENGG452 Thesis A
- **Autumn** ENGG456*** Engineering Project A

Spring Year 4

- MATE401 Selection of Materials in Engineering Design
- ENGG453 Thesis B **OR** Min 75% **Spring** ENGG457*** Engineering Project B

Electives *

- MATE 411 Advanced Materials and Processing
- MATE412 Electronic Materials
- MATE413 Structural Characterisation Techniques
- MATE422 Iron and Steelmaking
- MATE433 Surface Engineering

Legend:
- → Pre-requisite
- ----→ Co-requisite
- –––→ Assumed Knowledge

* Note: Students will take three electives
Some electives are only offered every 2nd year

ENGG251* Note: Full time students entering Year 3 in 2012 will need to take one elective in Autumn as they have already completed ENGG251

MATE304** Note: Full time students entering Year 3 in 2012 will need to take MATE304 in Spring of their 4th year or take it in 2012 and defer another subject to Spring 2012

ENGG456***Note: If ENGG456 Engineering Project A (6cp) is done instead of a thesis, a student needs to complete 4 electives and is not eligible for honours

DRAFT
Schools to place appropriate Program MAP here. Click here and Delete

Name of Institute: Institute of Technology & Engineering
Name of Faculty: Prof. Hardik Prajapati

Course code: EC0318
Course name: Network Analysis
Pre-requisites: Laplace Transform, Calculus, Knowledge of circuit elements like Resistor, Inductor and Capacitor.
Credit points: III
Offered Semester: III

Course coordinator
Full name: Prof. Hardik Prajapati
Department with siting location: Electronics & Communication Dept., EC Lab -1, Bhanwar Building
Telephone: M: 9099374230, Extension : 3113
Email: hardikprajapati.ec@indusuni.ac.in
Consultation times: Monday to Friday : 4:15 to 4:50, Every second and fourth Saturday

Course lecturer
Full name: Prof. Hardik Prajapati
Department with siting location: Electronics & Communication Dept., EC Lab -1, Bhanwar Building
Telephone: M: 9099374230, Extension : 3113
Email: hardikprajapati.ec@indusuni.ac.in
Consultation times: Monday to Friday : 4:15 to 4:50, Every second and fourth Saturday

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives
By participating in and understanding all facets of this course a student will:

1. Describe, apply and analyze basic network concepts emphasizing series and parallel combination of passive components, source transformation and shifting.
2. Describe, apply and analyze use of mesh and nodal techniques for formulating the transfer function of networks.
3. Apply and analyze various network theorems in solving the problems related to electrical circuits.
4. Describe and analyze two port networks and methods of analyzing the electrical networks.

Course Outcomes (CO)

1. Understand and solve the circuits using node and mesh analysis
2. Know concept of different network theorems and use the optimum method to solve the circuit..
3. Understand the working of capacitor and inductor and how to apply initial conditions.
4. Use Laplace transform to solve the circuits.
5. Understand two port parameters and how to find out different types of them.

Course Outline

UNIT-I : Introduction to Basic Concepts & Network Equations

Electromotive force, Electric Current, Electric Power, Basic circuit components, Classification of circuit elements & Networks, Voltage and current sources, Dependent sources, Current division rule, Voltage division rule, KVL,KCL, Nodal Analysis of Circuits Containing Resistors and Independent and Dependent Sources, Source Transformation Theorem for circuits with independent sources, Source Transformation Theorem for circuits with Dependent sources, Nodal Analysis of Circuits Containing Dependent Sources, Mesh Analysis of Circuits with Resistors and Independent Voltage Sources, Mesh Analysis of Circuits with Independent Sources, Mesh Analysis of Circuits Containing Dependent Sources.

UNIT-II: Initial Conditions

Initial conditions in elements, procedure for evaluating initial conditions, Solution of circuit equations by using Initial Conditions.

Laplace Transform Analysis and Circuit Applications

Notions of Impedance and Admittance – Manipulation of Impedance and Admittance- Notions of Transfer Function- Equivalent circuits for inductors and capacitors – Nodal and Loop analysis in the s-domain – Switching in RLC circuits- Switched capacitor circuits and conservation of charge

UNIT-III : Two Port Network

Y- Parameter, Z-Parameter, h-parameter, ABCD-parameter, Relation between two port parameters, Parallel connection of two network

UNIT-IV : Circuit Theorems and Their Application in Electric Networks

Linearity of a Circuit and Superposition Theorem, Substitution Theorem, Compensation Theorem, Thevenin's Theorem and Norton's Theorem, Determination of Equivalents for Circuits with Dependent Sources, Reciprocity Theorem , Maximum Power Transfer Theorem, Millman's Theorem, Duality Theorem, Duality between Electricity and Magnetism

Method of delivery
Lectures, Power Point Slides, Tutorial, Quiz, Test

Study time
3 Hours Per week

CO-PO Mapping (PO: Program Outcomes)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	3	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	3	1	3	-	-	-	-	-	-	-
CO3	3	2	2	2	3	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	1
CO5	3	2	3	1	3	-	-	-	-	-	-	-

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	**5 Written communication**
	6 Oral communication

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.	**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**

Practical work:

No Practical

Lecture/tutorial times

Lecture	Tuesday	2:00 – 3:00 PM
Lecture	Friday	11:10 - 12:10 PM
Tutorial	Thursday	12:20 – 1:20 PM

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 in written work

TEXT BOOKS:
1. M.E. Van Valkenberg, "Network Analysis", Prentice Hall of India, 3rd edition, 2000, ISBN: 9780136110958.
2. K Channa Venkatesh, D. Ganesh Rao, Network Analysis, Cenage Learning
3. Roy Choudhury, "Networks and Systems", 2nd edition, 2006, New Age International Publications, ISBN: 9788122427677.

REFERENCE BOOKS:

1. Hayt, Kemmerly and Durbin "Engineering Circuit Analysis", TMH 7th edition, 2010.
2. U A Patel, "Network Analysis And Synthesis", Mahajan Publication House
3. J. David Irwin and R. Mark Nelms, "Basic Engineering Circuit Analysis", John Wiley, 8th edition, 2006.
4. Charles K Alexander and Mathew N O Sadiku, " Fundamentals of Electric Circuits", Tata McGraw-Hill, 3rd edition, 2009.

Additional Materials:
PPTs of all units will be provided.

ASSESSMENT GUIDELINES
Your final course mark will be calculated from the following:

Test 1	15%
Test II	15%
Test III	15%
Assignment 1	15%
Final exam (closed book)	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:
No practical

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)

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Course schedule (subject to change)

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Weeks 1	Electromotive force, Electric Current, Electric Power, Basic circuit components, Classification of circuit elements & Networks, Voltage and current sources, Dependent sources, Current division rule, Voltage division rule, KVL,KCL, Nodal Analysis of Circuits Containing Resistors and Independent and Dependent Sources	1	Lecture & Tutorial
Weeks 2	Source Transformation Theorem for circuits with independent sources, Source Transformation Theorem for circuits with Dependent sources, Nodal Analysis of Circuits Containing Dependent Sources,	1,2	Lecture & Tutorial
Week 3	Mesh Analysis of Circuits with Resistors and Independent Voltage Sources, Mesh Analysis of Circuits with Independent Sources, Mesh Analysis of Circuits Containing Dependent Sources, Test	*1,2*	Lecture , Tutorial & Test
Week 4	Initial conditions in elements, procedure for evaluating initial conditions, Solution of circuit equations by using Initial Conditions	2,3	Lecture & Tutorial
Week 5	Laplace transform, Analysis and Circuit Applications, Notions of Impedance and Admittance , Manipulation of Impedance and Admittance, Notions of Transfer Function	1,3	Lecture & Tutorial
Week 6	Nodal and Loop analysis in the s-domain – Switching in RLC circuits- Switched capacitor circuits and conservation of charge, Test	*1,4*	Lecture , Tutorial & Test

Subject: Network Analysis (EC0318) Semester : III (2021)

Week 7	**Two Port Network** **,** Y- Parameter, Z-Parameter	1,4		Lecture & Tutorial
Week 8	h-parameter, ABCD-parameter	1,4		Lecture & Tutorial
Week 9	Relation between two port parameters, Parallel connection of two network, Test	*1*		Lecture , Tutorial & Test
Week 10	Linearity of a Circuit and Superposition Theorem, Substitution Theorem, Compensation Theorem	5,6		Lecture & Tutorial
Week 11	Thevenin's Theorem and Norton's Theorem, Determination of Equivalents for Circuits with Dependent Sources, Reciprocity Theorem	5,6		Lecture & Tutorial
Week 12	Maximum Power Transfer Theorem, Millman's Theorem, Duality Theorem, Duality between Electricity and Magnetism	5,6		Lecture & Tutorial
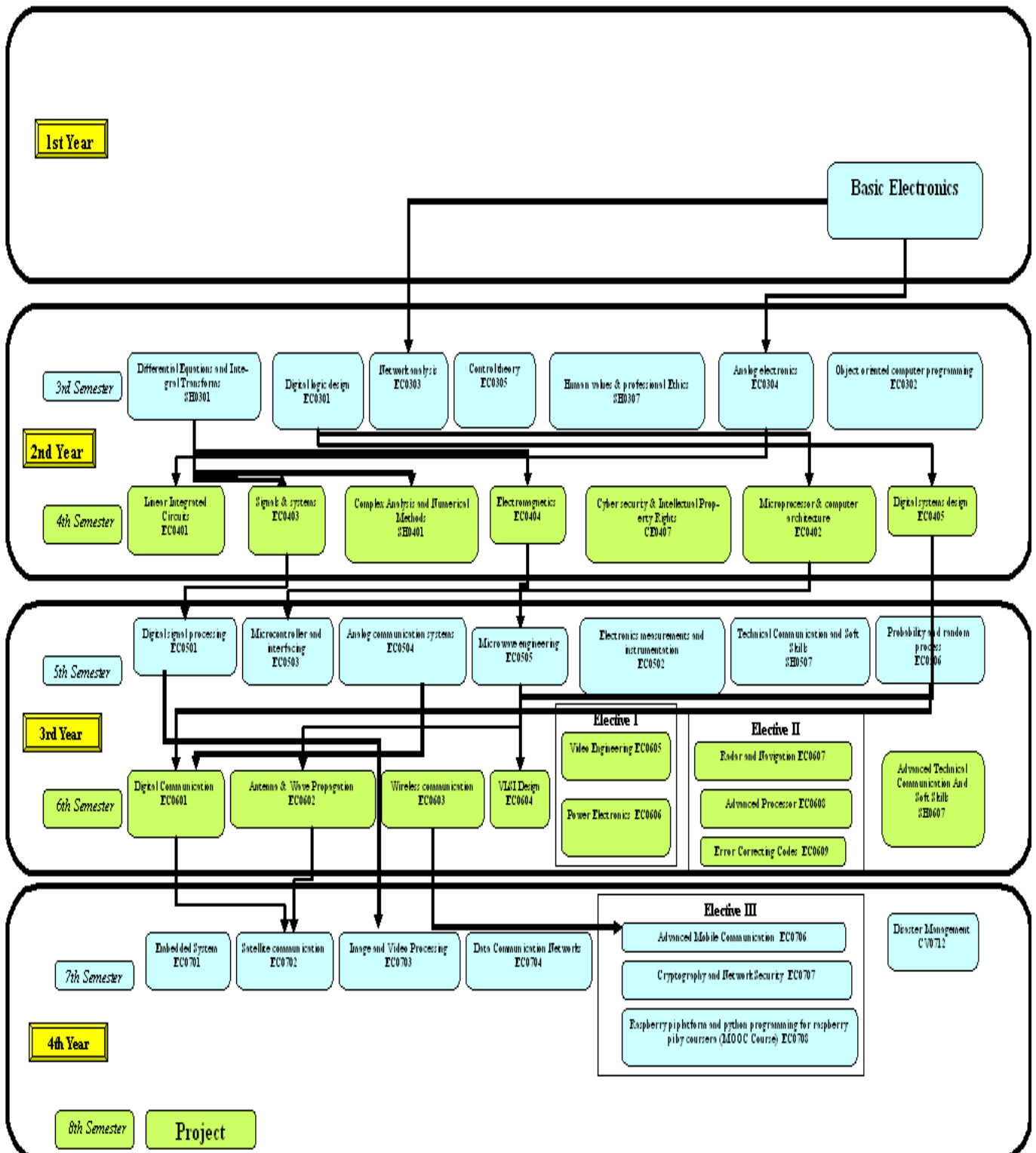
Name of Institute: Indus Institute of Technology and Engineering
Name of Faculty: Dr Minesh P Thaker

Course code: EC0317
Course name: Analog Electronics
Pre-requisites: Basic Electronics
Credit points: 4
Offered Semester: IV the

Course Coordinator (weeks 01 – 16)
Full Name: Dr Minesh P Thaker
Department with siting location:EC LAB 6
Telephone: 3201
Email: mineshthaker.ec@indusuni.ac.in
Consultation times:

Students will be contacted throughout the Session via **Google Classroom** with important information relating to this Course.

Course Objectives
By participating in and understanding all facets of this Course a student will:

1) **Study** the basic principles, configurations and practical limitations of Amplifiers
2) **Analyse** , **design**, **construct** and **create** various linear and non-linear applications of Transistor,Op-amps
3) **Analyze** and **design** transistorized oscillators and multi-vibrators
4) **Analyze**, **design** and **explain** the characteristics and applications of Amplifiers and Oscillators
5) **Understand ,design construct** an**d create** the Regulated Power supplies using Transistors

Course Outcomes (CO)

CO1	To **explain** the Transistor's basic construction, characteristics, parameter limitations, various configurations and applications of Transistor.
CO2	To **compare** and **select** the various Transistor amplifier using performance parameter given in the data sheets
CO3	To **analyze** basic Transistorized circuits, particularly various linear and non-linear circuits.
CO4	To **design** basic Transistor circuits, particularly various Oscillators and Multivibrators
CO5	To **apply** the concepts of op-amps and become proficient with computer skills (eg., Multisim) for the analysis and design of circuits

CO6	To **create** the analog circuit system for domestic applications

Course Outline
(Key in topics to be dealt)

UNIT I		
Chapter	**Titles**	**Hrs**
Chapter	Bipolar Transistor Biasing Single Resistor biasing , voltage divider biasing and bias stability, integrated circuit biasing, multi stage circuits, biasing for FETs Transistor at Low Frequencies Graphical Analysis of CE Configuration, Transistor Hybrid Model, The h Parameters conversion formula for the parameter, Analysis of transistor amplifier using h parameters. The emitter follower. Millers theorem, cascading transistor amplifier	14
UNIT II		
Chapter	Feedback Amplifier-classification of basic amplifiers, the feedback concept, transfer gain with feedback, characteristics of feedback, input & output resistance of feedback, Methods of analysis of feedback amplifiers, voltage series, current series , voltage shunt and current shunt feedback amplifiers. Sinusoidal Oscillator, Phase Shift Oscillators, Resonant circuit oscillators, A general forms of oscillators, Wien bridge oscillator, crystal oscillator, Frequency Stability.	11
UNIT III		
Chapter	Output Stages and Power amplifier Series and Shunt voltage regulator Concepts and Design ,Classification of amplifiers,2nd order and higher order Harmonic Distortions, Class B push pull amplifier, Class AB Amplifier, Power Circuits and Systems Series voltage regulator Shunt Voltage Regulator	11
UNIT IV		
Chapter	Operational amplifier Transistorized, Differential amplifier, emitter coupled differential amplifier, transfer characteristic of differential amplifier. example of IC operational amplifier, measurement of OPAMP parameters Multi Vibrators, Mono stable Astable and Bistable Multivibrators	12

Method of delivery
(Face to face lectures, self study material, Active Learning Techniques)
Face to Face lectures via chalk-Blackboard and power point presentations.

Study time
(How many hours per week including class attendance)
3 hours Theory
2 Hours Lab

CO-PO Mapping (PO: Program Outcomes)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO 1	3	3	3	3	3	-	2	1	1-	1	1	1
CO 2	3	2	3	1	3	-	-	-	-	-	-	-
CO 3	3	2	2	2	3	-	-	-	-	-	-	-
CO 4	3	2	1	-	-	-	-	-	-	-	-	1
CO 5	3	2	3	1	3	-	3	3	-	-	-	1
CO 6	3	3	1	1	3	-	3	3	-	-	-	1

Blooms Taxonomyand Knowledge retention(For reference)
(Blooms taxonomy has been given for reference)

Figure 1: Blooms Taxonomy
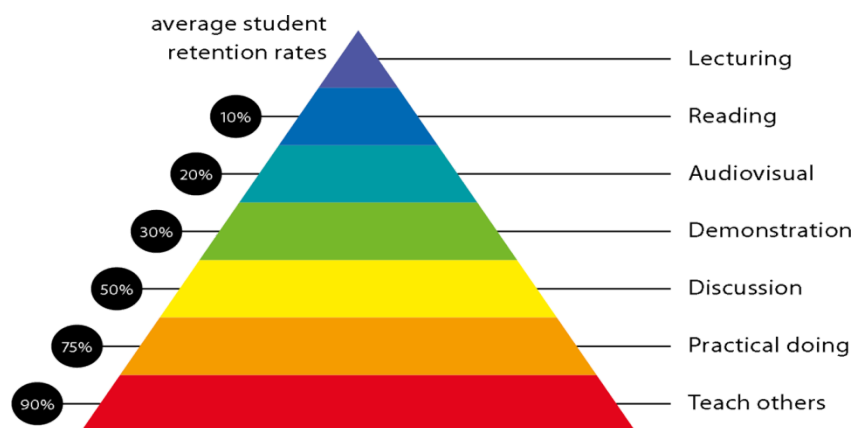
<div align="center">**Figure 2: Knowledge retention**</div>

Graduate Qualities and Capabilities covered
(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of EC_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	**5 Written communication** **6 Oral communication** **7 Teamwork**

collaboratively and engage with people in different settings. Recognize how culture can shape communication.

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

Practical work:
(Mention what practical work this Course involves)
Practicals on Biasing, analysis and Design of amplifier, oscillators, power supply, power amplifier, Multi-vibrators

Lecture/tutorial times
(Give lecture times in the format below)

:
Lecture	Tuesday,Thursday	9.00 – 09.55	Room LH 21
Lecture/Tutorial	Friday – 09.55 10.50		Room LH 21
Practicals	Monday.Tuesday Friday		

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 mid and end semester examinations.

Details of referencing system to be used in written work

Text books

T1	**Text Book** Jacob Millman and Christos Halkias "Integrated Electronics" Tata Mc Grow Hill edition

R1	**Reference Books** Donald Neamen "Electronics Circuits Analysis and Design", Tata McGrow Hill 2nd Edition onwards.
R2	Shalivahanan "Electronics Devices and Circuits", Tata McGrow Hill 3rd Edition onwards.
R3	Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", 9th Ed. Pearson Education.

Additional Materials

All material will be found on Google class room of this subject.

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

For Theory:

Design Submission(1)	10%	Design amplifier/ Oscillator/Multivibrator
Quiz(1)	10%	From all units
Assignments (2)	20% (at completion of every two units)	From all units
Class Test(2) (Open Book Test)	20% (at completion of every two units)	From each units
Final exam (closed book)	40% end semester exam	From all units

For Practical

Regularities on submission (stage wise)	20%	Assessment is based on Regularities ,accuracy and speed are the major parameters to be observed
Mini Project	40%	Student has to gone through four stages. Design, Simulation, testing Using Bread Board and final on General Purpose board. 5% on Each stage
Final exam (closed book)	40%	Final exam consists of two. One is Viva Voce of 30% and 30 % of Practical performance at the time of exam.

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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 1% 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)

(Mention quiz, assignment submission, breaksetcas well in the table under the Teaching Learning Activity Column)

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Weeks 1	Unit 1 mentioned in the syllabus	1 2	Search and finalize the title for mini Project in this two week
Weeks 2	Unit 1 mentioned in the syllabus	1 2	Assignment 1
Week 3	Unit 1 mentioned in the syllabus	*1 2 3*	
Week 4	Unit 2 mentioned in the syllabus	2 3	Assignment 1 submission and assignment 2 given, Test
Week 5	Unit 2 mentioned in the syllabus	2 3 4	Quiz
Week 6	Unit 2 mentioned in the syllabus	*2 3 4*	*Assignment 3 given and Assignment 2 submission*
Week 7	Unit 3 mentioned in the syllabus	3 4	open book test
Week 8	Unit 3 mentioned in the syllabus	3 4 5	Assignment 4 given and Assignment 3 submission
Week 9	Unit 3 mentioned in the syllabus	*3 4 5*	
Week 10	Unit 4 mentioned in the syllabus	3 4 5	Assignment 4 submission
Week 11	Unit 4 mentioned in the syllabus	3 4 5	Open Book Test
Week 12	Unit 4 mentioned in the syllabus	3 4 5	Final Assessment declaration.
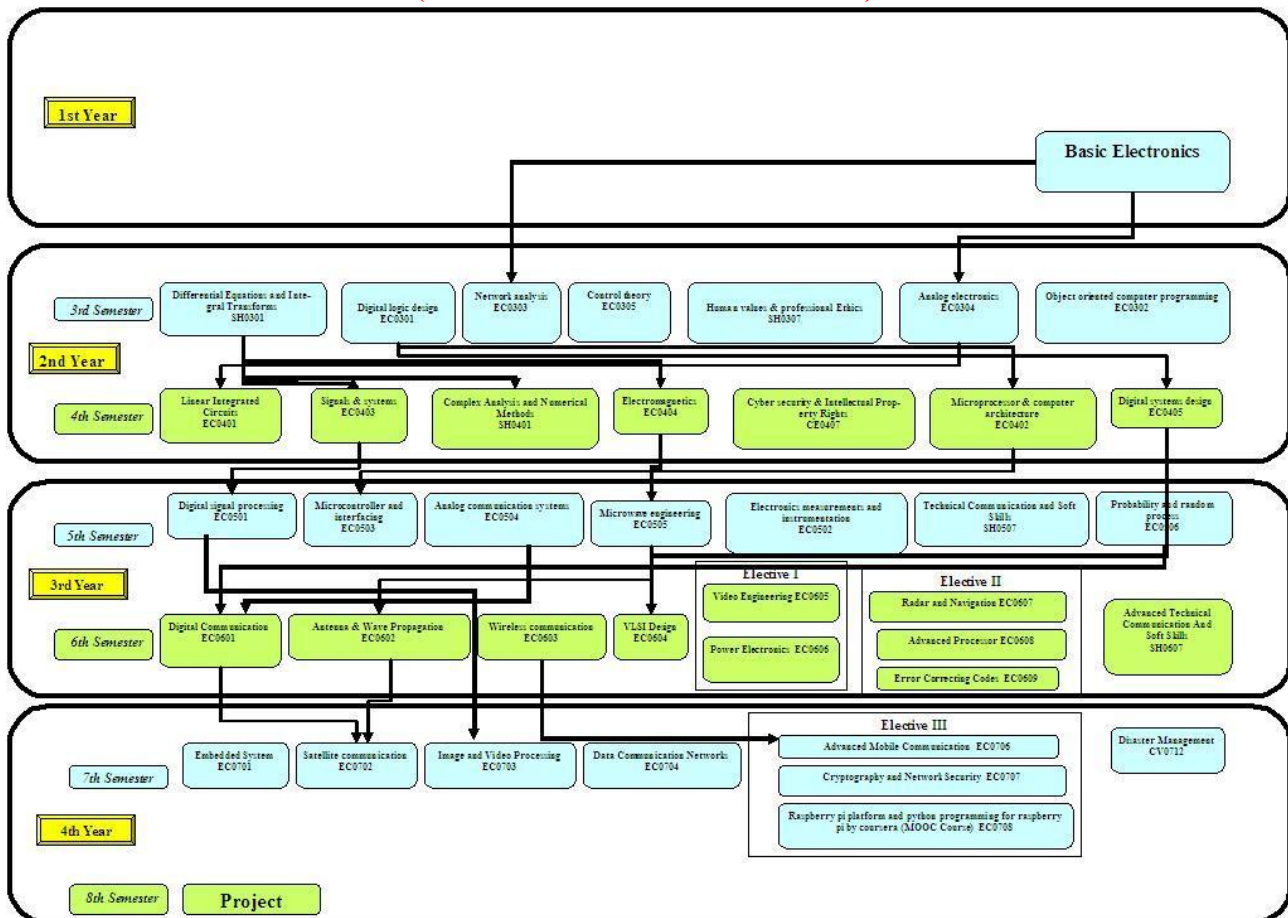
Name of Institute: Institute of Technology & Engineering
Name of Faculty: Dr. Minesh Thaker

Course code: EC0316
Course name: Dr. Minesh Thaker
Pre-requisites: Differential equations, Laplace Transform, Basic Electronics
Credit points: 3
Offered Semester: III

Course coordinator
Full name: Dr. Minesh Thaker
Department with siting location: Electronics & Communication Dept., EC Lab -3, Bhanwar Building
Telephone: M: 9909039918, Extension: 3201
Email: mineshthaker.ec@indusuni.ac.in
Consultation times: Monday to Friday: 4:15 to 4:50, Every second and fourth Saturday

Course lecturer
Full name: Dr. Minesh Thaker
Department with siting location: Electronics & Communication Dept., EC Lab -3, Bhanwar Building
Telephone: M: 9909039918, Extension: 3201
Email: mineshthaker.ec@indusuni.ac.in
Consultation times: Monday to Friday: 4:15 to 4:50, Every second and fourth Saturday

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives
By participating in and understanding all facets of this course a student will:

1. To understand the basic elements and structures of feedback control systems.
2. To Specify control system performance in the frequency-domain in terms of gain and phase margins, and design compensators to achieve the desired performance.
3. To develop & design electronic control systems.

Course Outcomes (CO)

1. Explain the basic elements and structures of feedback control systems. **[BT-2]**
2. Determine control system performance in the frequency-domain in terms of gain and phase margins to achieve the desired performance. **[BT-3]**
3. Determine the stability of a closed-loop control system. **[BT-3]**
4. Apply root-locus technique to analyze control systems **[BT-4]**
5. Develop the techniques to analyze the response and stability of systems with applications to design electronic control systems. **[BT-4]**
6. Design & Develop electronic control systems. **[BT-6]**

Course Outline

Unit-1

Introduction to Basic Concepts & Mathematical modeling
Definition of control system, Open-loop & Closed-loop control system with examples, classifications of control system, Properties of good control system, Open loop vs Closed-loop control system.

Transfer function, properties, advantages and disadvantages of transfer function, poles & zeros of transfer function, state variable model, Modeling of Mechanical system, Dynamic model of RLC network, Analogous system.

Block diagram formulation, Block diagram reduction, Signal Flow graph, Mason's Gain formula.

Unit -2
Transient response analysis
Standard test signals, First-order and second order systems, Higher order systems, Transient response of system, Steady-state error for unit , ramp and parabolic inputs.

Unit-3
Time domain Stability Analysis& Root Locus
RH stability criteria, Effect of Proportional, derivative and integral control, MATLAB simulations, Introduction to root locus, Rules for constructing the root locus, System analysis with the help of Root-locus, Root-locus plot using MATLAB.

Unit -4
Frequency Response Analysis
Introduction, Specification for frequency response, Polar-plots, Bode plots, Nyquist plots, Stability analysis, MATLAB simulations

Method of delivery
Lectures, Power Point Slides, Tutorial, Quiz, Test

Study time
3-4 Hours Per week

CO-PO Mapping (PO: Program Outcomes)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO 1	3	2	2	1	-	-	-	-	-	-	-	2
CO 2	3	2	3	2	2	-	-	-	-	-	-	-
CO 3	2	3	2	-	1	-	-	-	-	-	-	-
CO 4	3	2	2	3	2	-	-	-	-	-	-	
CO 5	2	2	3	2	2	-	-	-	-	-	-	-
CO 6	2	3	3	3	3	-	-	-	-	-	2	-
	2.5	**2.3**	**2.5**	**2.2**	**2**						**2**	**2**

Blooms Taxonomy and Knowledge retention (For reference)
(Blooms taxonomy has been given for reference)

Figure 1: Blooms Taxonomy

Subject: Control Theory (EC0316)   Semester: III (2021)

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	**5 Written communication**
	6 Oral communication
	7 Teamwork

with people in different settings. Recognize how culture can shape communication.	
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**

Practical work:
No Practical

Lecture/tutorial times

Lecture	Wednesday	10.00 – 11.00 am	Online mode/Room LH 21
Tutorial	Wednesday	11.10 – 12.10 am	Online mode /Room LH 21
Lecture	Friday	10.00 – 11.00 am	Online mode /Room LH 21

compulsory for being eligible for semester examinations.

Details of referencing system to be used in written work

Text Books:
1. Katsuhiko Ogata, Modern Control Engineering, Prentice Hall india, fourth edition, 2007
2. Benjamin C.Kuo, "Automatic Control Systems", John Wiley & Sons

Reference Books:
1. B.S.Manke, Linear Control Sytems with MATLAB Applications, Khanna Publisher, Ninth Edition 2009
2. M. Gopal,Control Systems, Tata McGraw Hill, 3rd edition,2008
3. I J Nagrath, M Gopals "Control system Engineering", 5th Ed.

Additional Materials:
PPTs of all units will be provided.

ASSESSMENT GUIDELINES
Your final course mark will be calculated from the following:

Attendance (>80%)	05%
Presentation/Test-1/Quiz-1	05%
Assignment/Test-2/Quiz-2	10%
MID semester Examination	40 %
Final exam (closed book)	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:
No practical

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.

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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	Definition of control system, classifications of control system, Open-loop & Closed-loop control system with examples, Properties of good control system, Open loop vs Closed-loop control system.	1	Lecture & Tutorial
	Weeks 2	Transfer function, properties, advantages and disadvantages of transfer function, poles & zeros of transfer function, state variable model, Modeling of Mechanical system	1,3	Lecture & Tutorial
	Week 3	Dynamic model of RLC network, Analogous system. Block diagram formulation, Block diagram reduction, Signal Flow graph, Mason's Gain formula.	*1,3,6*	Lecture , Tutorial & Test
	Week 4	**Transient response analysis** Standard test signals, First-order and second order systems	1,3	Lecture & Tutorial
	Week 5	Higher order systems, Transient response of system, Steady-state error for unit , ramp and parabolic inputs.	1,3	Lecture & Tutorial
	Week 6	Time domain Stability Analysis& Root Locus, RH stability criteria, Effect of Proportional	*3,4,5*	Lecture , Tutorial & Test
	Week 7	Derivative and integral control, MATLAB simulations, Introduction to root locus	1,4	Lecture & Tutorial
	Week 8	Rules for constructing the root locus, System analysis with the help of Root-locus, Root-locus plot using MATLAB, Test	1,4	Lecture & Tutorial

	Week 9	Introduction of Frequency Response Analysis, Specification for frequency response, Polar-plots	*1,2*	Lecture , Tutorial & Test
	Week 10	Bode plots, Nyquist plots	5,6	Lecture & Tutorial
	Week 11	Stability analysis, MATLAB simulations	3,5,6	Lecture & Tutorial
	Week 12	Revision , Test		Lecture & Tutorial

Program map for B.Tech (Electronics & Communication Engineering)

Computer Science (B)
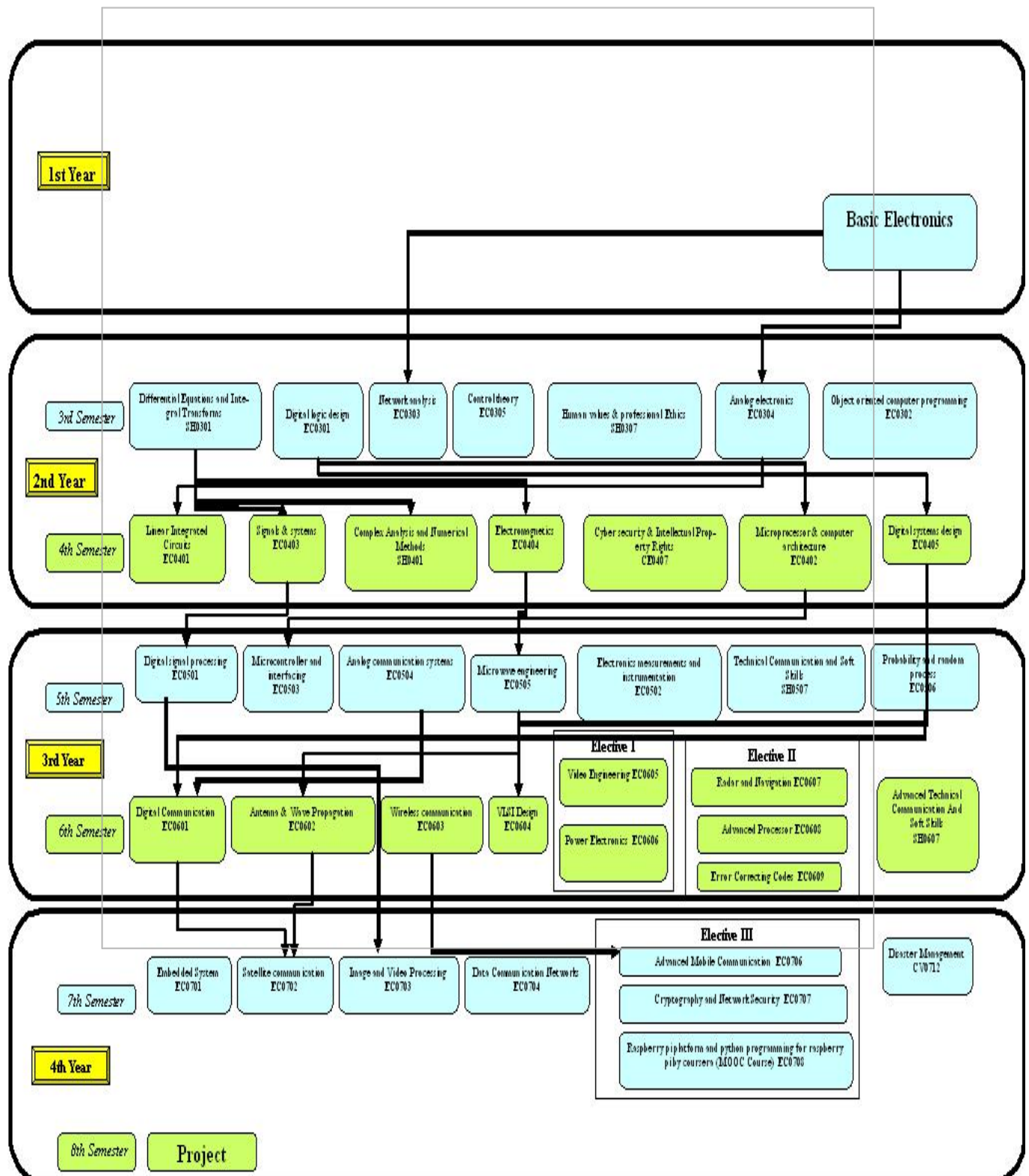
Name of Institute: IITE
Name of Faculty: Prof. Ronak Patel

Course code: MA0312
Course name: Basics of Probability, Statistics & Numerical Methods
Pre-requisites: Calculus, Basic Statistics
Credit points: 04
Offered Semester: 03

Course coordinator (weeks 1 - 15)
Full name: Prof. Ronak Patel
Department with siting location: Mathematics Department, ISHLS,4th floor
Bhanwar building, Indus University, Ahmadabad
Telephone: 3424
Email:ronakpatel.ec@indusuni.ac.in
Consultation times: Monday to Friday (4:00 PM to 5:00 PM)

Course lecturer (weeks 1 - 15)
Full name: Prof. Ronak Patel
Department with siting location: Mathematics Department, ISHLS,4th floor
Bhanwar building, Indus University, Ahmadabad
Telephone: 3424
Email:ronakpatel.ec@indusuni.ac.in
Consultation times: Monday to Friday (4:00 PM to 5:00 PM)

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives:
By participating in and understanding all facets of this course a student will:

1) To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2) To provide an ability to apply knowledge of basic science and engineering fundamentals.
3) To provide an ability to undertake problem identification, formulation and solution.
4) To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.
5) To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.

6) To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
7) To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

Course Outcomes (CO):

By participating and understanding all facets of this course a student will be able to :

1) To understand the concept of probability, Characteristics of random variable, probability mass function and cumulative distribution function. [BT-2]
2) To learn the concept of discrete distribution : Binomial distribution and Poisson distribution. [BT-4]
3) To develop the awareness about testing of hypothesis, mean, standard deviation, coefficient of variance, F-test and T-test. [BT-5]
4) To learn Numerical Interpolation and its brief information. [BT-6]
5) To understand numerical differentiation and integration. [BT-2]
6) To solve problem of Algebraic, transcendental equations and various numerical method. [BT-3]

Course Outline

COURSE OUTLINE		
Unit 1	**Basics of Probability:** Introduction to Probability, Characteristics of random variable, Probability mass function, cumulative distribution function, probability density function. **Probability distributions:** Discrete distributions: Binomial distribution, Poisson distribution, Continuous distributions: Normal distribution	**10 hours**
Unit 2	**Statistics:** Introduction and application of statistics, types of statistics, testing of hypothesis**,** Mean, standard deviation, coefficient of variation, F-test , t-test , Chi Square test, Correlation and regression.	**10 hours**
Unit 3	**Interpolation** Finite differences and Interpolation: Finite differences Forward, Backward & Central difference operators and difference tables. Interpolation Formula with equal intervals: Newton's forward, Newton's backward, Central difference interpolation by Stirling's formula Interpolation Formula with unequal intervals: Lagrange's & Newton's divided difference interpolation	**12 hours**

	Numerical differentiation: Using Newton's forward and backward interpolation formula Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.	
Unit 4	**Numerical Methods** Basic Errors. Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method, Newton-Raphson method., Convergence condition for these methods, Numerical methods in Linear Algebra: Gauss-Jacobi, Gauss-seidel method Largest Eigen values and corresponding Eigen vectors: By power method Numerical Solutions of ordinary differential equations: Taylor's Method, Euler's Method, Improved Euler Method (Heun's Method), Runge-Kutta method of order four	**13 hours**

Text Book:

 B . V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill.

Reference Books:
1. Erwin Kreyszig, "Advanced Engineering Mathematics" (8th Edition), Wiley Eastern Ltd., New Delhi.
2. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi
3. Murray Spiegel , "Advanced Mathematics for Engineering & Science: Schaum's Outline Series", Tata McGraw Hill Publication
4. Merel C Potter, J.L. Goldberg, "Advanced Engineering Mathematics" (3rd Edition), Oxford India Publication.
5. Python Programming And Numerical Methods: A Guide For Engineers And Scientists,
   https://pythonnumericalmethods.berkeley.edu/notebooks/Index.html

List of Practicals:

1. Programs to find roots of transcendental equations (N-R Method, Bisection Method)
2. Programs to find solutions to linear equations (Gauss seidel method)
3. Programs to find largest eigenvalue and corresponding eigenvector (Power Method)
4. Program to solve ODE (Euler's Method)
5. Program for Numerical Differentiation (Forward and backward interpolation)
6. Program for Numerical Integration (Simpson's Rule and Trapezoidal Rule)
7. Program to implement binomial distribution
8. Program to implement Poisson distribution
9. Program to find mean, standard deviation and variance.
10.   Develop program for F-test/ T-test/ Chi-square test.

Computer Science (B)

Method of delivery: **Lectures, Self-Study Material**

Study time: **3 hours Lecture + 2 hour Practical every week**

Blooms Taxonomy and Knowledge retention (For reference)
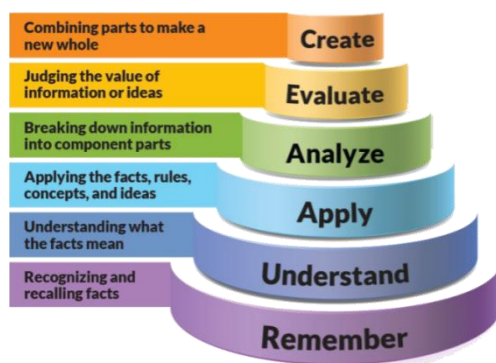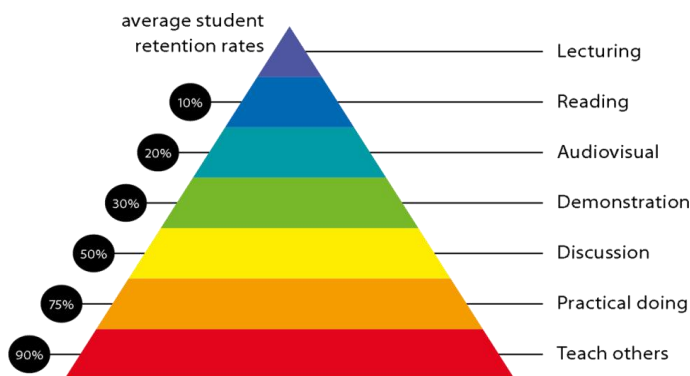(Blooms taxonomy has been given for reference)

| 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	**4 Problem solving skills**

effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	
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**

Practical work:
2 Hrs/week

Lecture/practical times
(Give lecture times in the format below)

Lecture/Tutorial	Day	Time	Class Code (Google Class room)
Lecture	Monday	10.00 AM to 11.00 PM	
Lecture	Tuesday	11.10 AM to 12.10 PM	moj5mua
Lecture	Wednesday	03.10 PM to 4.10 PM	
Practical	Friday	2.00 PM to 4.10 PM	
Link to Google Class Room: https://meet.google.com/xfk-cpmu-qwi			

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.

Computer Science (B)

ASSESSMENT GUIDELINES
Your final course mark will be calculated from the following:

Type of Examination	Weightage	Bifurcation
Internal Examination (CIE-Theory)	60%	▢ 40 Marks - MSE (Mid Semester Examination - Closed book examination) ▢ 05 Marks - Attendance (if > 80%) ▢ 10 Marks - Assignments ▢ 05 Marks - Presentation
External Examination (ESE-Theory)	40%	▢ Closed Book Examination
Internal Examination (CIE-Practical)	60%	▢ 50 Marks - Lab performance / Lab manual work ▢ 10 Marks - Viva
External Examination (ESE- Practical)	40%	▢ 20 Marks - Viva ▢ 20 Marks - Practical exam or quiz

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.**

Computer Science (B)

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)

Computer Science (B)
Course schedule (subject to change)
(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Unit-IV	Weeks 1	Basic Errors, convergence conditions for solution of algebraic and transcendental equations, Bisection method and related examples,	CO-6	Online Lecture, Assignment , Tutorial
	Weeks 2	Regula-Falsi method and related examples, Newton Raphson method and related examples	CO-6	Online Lecture, Assignment , Tutorial
	Week 3	Solution of SLE using Gauss-Jacobi Method Solution of SLE using Gauss-Seidel method Largest Eigen value and corresponding eigen vector using power method	CO-6	Online Lecture, Assignment , Tutorial
Unit-III	Week 4	Numerical solution of ODE – Taylor's Method Numerical solution of ODE – Euler's Method Numerical solution of ODE – Improved Euler (Heun's) Method Numerical solution of ODE – RungeKutta Method of order four	CO-5	Online Lecture, Assignment , Tutorial
	Week 5	Understanding interpolation, finite differences (forward and backward), constructing forward, backward and central difference tables Interpolation with equal intervals – Newton forward interpolation Interpolation with equal intervals – Newton backward interpolation Interpolation with equal intervals – Stirling's formulae	CO-4	Online Lecture, Assignment , Tutorial
	Week-6	Interpolation with unequal intervals – Lagrange's interpolation Interpolation with unequal intervals – Newton's divided difference interpolation Numerical differentiation using Newton's forward and backward interpolation Related examples on numerical differentiation	CO-4	Online Lecture, Assignment , Tutorial
	Week-7	Numerical Integration –Trapezoidal rule Numerical Integration –Simpson's 1/3rd rule Numerical Integration –Simpson's 3/8th rule	CO-5	Online Lecture, Assignment , Tutorial

UNIT-I	Week-8	Introduction to Probability, types of Events, axioms, theorem.	CO-1	Online Lecture, Assignment , Tutorial
	Week-9	Conditional probability, characteristics of random variable.	CO-1	Online Lecture, Assignment , Tutorial
	Week-10	Discrete distributions: Binomial distribution, Poisson distribution	CO-2	Online Lecture, Assignment , Tutorial
	Week-11	Continuous distributions: Normal distribution	CO-2	Online Lecture, Assignment , Tutorial
UNIT - II	Week-12	Introduction and application of statistics, types of statistics	CO-3	Online Lecture, Assignment , Tutorial
	Week-13	testing of hypothesis**,** Mean, standard deviation	CO-3	Online Lecture, Assignment , Tutorial
	Week-14	coefficient of variation, F-test , t-test , Chi Square test	CO-3	Online Lecture, Assignment , Tutorial
	Week-15	Correlation and regression.	CO-3	Online Lecture, Assignment , Tutorial

Name of Institute: ITE, INDUS UNIVERSITY
Name of Faculty: ZANKAR V YADAV

Course code: SS0301
Course name: HUMAN VALUES & PROFESSIONAL ETHICS
Pre-requisites:
Credit points: **2**
Offered Semester: **3**

Course coordinator (weeks 01 - 15)
Full name: ZANKAR V YADAV
Department with sitting location: ME, Ground Floor Workshop Lab
Telephone:1022
Email: zankarvyadav.me@indusuni.ac.in
Consultation times: 4 pm to 5 pm

Course lecturer (weeks 01 - 15)
Full name: KRUNAL PARIKH
Department with siting location:. ME, 1st FLOOR FPE LAB
Telephone:3102
Email: krunalparikh.me@indusuni.ac.in
Consultation times: 4 pm to 5 pm

Course lecturer (weeks 01 - 15)
Full name: RAHUL PATEL
Department with siting location:. ME, 3rd FLOOR EG LAB-1
Telephone:3301
Email: rahulpatel.me@indusuni.ac.in
Consultation times: 4 pm to 5 pm

Students will be contacted throughout the session via mail with important information relating to this course.

Course Objectives
Course Objectives
1. To facilitate arriving at correct decisions because, correct decisions form basis for success anywhere and in any venture
2. To decode success
3. To achieve Emotional stability through righteous earning of wealth
4. To understand and discriminate between ethical and unethical practices
5. To study moral issues and critical decision making
6. To understand the role of ethics in promoting sustainable development.

Course Outcomes (CO)

1. Identify the ways to decode success and redefining it for global sustainability
2. Understand the difference between the ethical and unethical practices in surrounding and explore the reasons behind them
3. Apply correct decisions to form basis for success in all ventures of life
4. Analyse various components of self(mind, body, soul)
5. Estimate the Emotional stability through righteous earning of wealth
6. Develop the thought process for promoting sustainable practices in multiple domains of life and society

Course Content

Music with invocation of thought process, Decoding success: Skill or a trait or both?, Decoding self to decode success, Understanding Self-Confidence, Selfrespect, Self-esteem, False prestige towards removal of Identity crisis, Components of self (mind, body, spirit), Idea of self (Which of the three am I?), Mind and conscience, Psychosomatic (mind over matter) effect and dis-ease, Effect of ethics and values on well being, Handling insecurity, anxiety and pressure,Handling failures, guilt, Status and success, Success redefined., Happiness being the key to success and not vice-versa, From self to society to global-sustainability

Method of delivery
Power Point presentations

Study time
2 Hours a week

CO-PO Mapping (PO: Program Outcomes)

PO1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO / CO	1	2	3	4	5	6
1	√		√		√	
2		√				
3			√	√		
4				√		√
5	√	√			√	
6			√			√
7				√		
8	√	√				
9				√		
10		√			√	
11						
12	√			√	√	

Blooms Taxonomy and Knowledge retention(For reference)
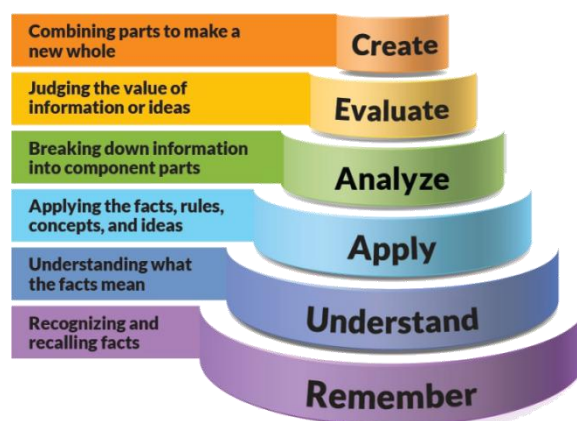(Blooms taxonomy has been given for reference)

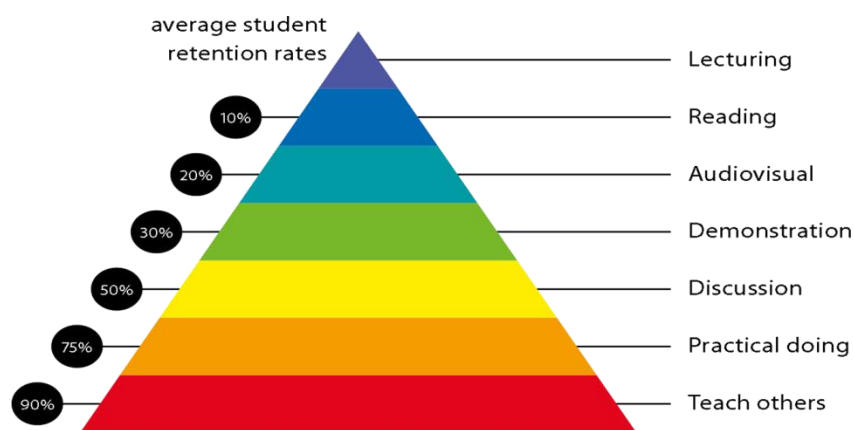**Figure 1: Blooms Taxonomy**

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	**2 Information literacy, gathering & processing**

sources and technologies. Acknowledge the work and ideas of others.	
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**

Practical work:
NIL

Lecture/tutorial times
(Give lecture times in the format below)

Monday:	10:00 to 11:00 AM	3rd CS(A)
	11:10 to 12:10 PM	3rd CS(C)
	02:00 to 03:00 PM	3rd (ME & Civil)
Wednesday:	10:00 to 11:00 AM	3rd CS(B)
Thursday:	11:10 to 12:10 PM	3rd CS(C)
	02:00 to 03:00 PM	3rdCS(A)
Friday:	11:10 to 12:10 PM	3rd CS(B)
	03:10 to 04:10 PM	3rd (ME & Civil)

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.

Reference Books

1. The Mahabharata box set - Bibek Debroy, ISBN-13: 978-0143424789
2. The Valmiki Ramayana, Set of 3 Vols - Bibek Debroy, ISBN-13: 978-0143441144
3. Honest truth of dishonesty Dan Ariely, Harper (2012), ISBN: 0062183591 / 9780062183590
4. "Seven Spiritual Laws of Success", Deepak Chopra, Amber-Allen Publisher, ISBN: 9782290339954
5. "The Vedas and Upanishads for Children", Roopa pai,Hachette India, ISBN:9789351952961
6. The Gita : for Children - Roopa Pai, Hachette India Local; Latest edition, ISBN: 9789351950127
7. Go for Growth, Narsinhbhai K Patel, Ahmedabad Management Association
8. Be a Winner, Narsinhbhai K Patel, Ahmedabad Management Association
9. Swadharma: Puranic stories for children
10. Pearls of Wisdom from Hinduism – Nicholas Sutton and Hanuman Dass
11. The Power of Dharma: The Universal Moral Principle - Nicholas Sutton and Hanuman Dass
12. Two Vedic Tales: Stories from The Mahabharata and the Puranas
13. Inside Job (documentary) - Matt Damon (Actor), Gylfi Zoega (Actor), & 1 More Rated: U/A (Parental Guidance) Format: Blu-ray
14. Ethical and Spiritual Values in Indian Scriptures - Ved Prakash Bhatia
15. The Upanishads Demystified : Ethical values - Ved Prakash Bhatia

Additional Materials

Power Point Presentations
Web Resources: http://nptel.ac.in/courses

ASSESSMENT GUIDELINES
Your final course mark will be calculated from the following:

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CIE Evaluation Pattern:

1. **Introspection Report [20 Marks]**
2. **Interview of an Ethical Person [25 Marks]**
3. **Skit [25 Marks]**
4. **Seminar [20 Marks]**
5. **Attendance [10 Marks]**

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SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component will be considered for supplementary assessment in the CIE component of concerned semester. Students must submit the above, during the CIE Theory examination period to take up the CIE component and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/Laboratory Report:
An Introspection Report & Seminar Report 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)
(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

Week #	Topic & contents	CO Addressed
Weeks 1	Introduction to Human Values & ProfessionalEthics: Morals,Values&ServiceLearning, Virtues:Honesty,Sharing,Courage,Value of Time	1,2,3
Weeks 2	Virtues:Honesty,Sharing,Courage,ValueofTime,Cooperation,Commitment,Empathy	4,6
Week 3	Effect of ethics and values on well being, Handling insecurity, anxiety and pressure	1,2,3
Week 4	Mind and conscience, Psychosomatic (mind over matter) effect and dis-ease,	5
Week 5	Handling failures, guilt, Status and success, Success redefined.,Happiness being the key to success and not vice-versa,	3
Week 6	**Interview of an Ethical Person**	
Week 7	From self to society to global-sustainability Decoding success: Skill or a trait or both?,	3
Week 8	Decoding self to decode success Understanding Self-Confidence, Selfrespect, Self-esteem	3
Week 9	**Skits**	

	Week 10	False prestige towards removal of Identity crisis	6
	Week 11	Components of self (mind, body, spirit), Idea of self (Which of the three am I?),	5
	Week 12	Mind and conscience, Psychosomatic (mind over matter) effect and dis-ease,	5
	Week 13	Music with invocation of thought process, Decoding success: Skill or a trait or both?	3
	Week 14	**Seminar**	
	Week 15	**Introspection Report**	