Department of Electrical and Electronics Engineering

Faculty and students are aware of the stated Programme and course outcomes of the Programmes

To create awareness about **Programme and course outcomes** of the department, it has been published and disseminated among the stake holders.

The extent of student awareness about the POs and COs and their actual performance reflecting these would be the real indicators of success or outcome of the programme. In this regard our Institution has taken certain measures to educate and to create the awareness about the program outcomes and course outcomes among the faculty members and students.

Stakeholder	Purpose
Faculty	Implementer (Contributor) of Policies. Key contributor in developing/implementing growth Plan. Responsible for producing competent graduates/product of the Institution.
Student	Product of the Institution, responsible for creating Image of the institution while serving the society.

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Dept. of Electrical & Electronics Engineering
ATME College of Engineering, Mysuru

Department of Electrical and Electronics Engineering

Programme and Course Outcomes Dissemination

SL.No.	Particulars	Programme Outcomes	Course Outcomes
1.	College Website	✓	✓
2.	Corridors	✓	✓
3.	Notes & Lab Manual	✓	✓
4.	Course Module, Lesson Plan	--	✓
5.	IA Question Paper	--	✓
6.	Classroom, Seminar Hall, Laboratory	✓	--
7.	Faculty Office, Dept. Office	✓	--
8.	Magazine	✓	--
9.	College Enterprise Resource Planning(CERP) Portal	✓	--
10.	Student Handbook	✓	✓
11.	Faculty Handbook	✓	✓
12.	Flipped Classroom(Mail) through CERP/MS Teams	--	✓

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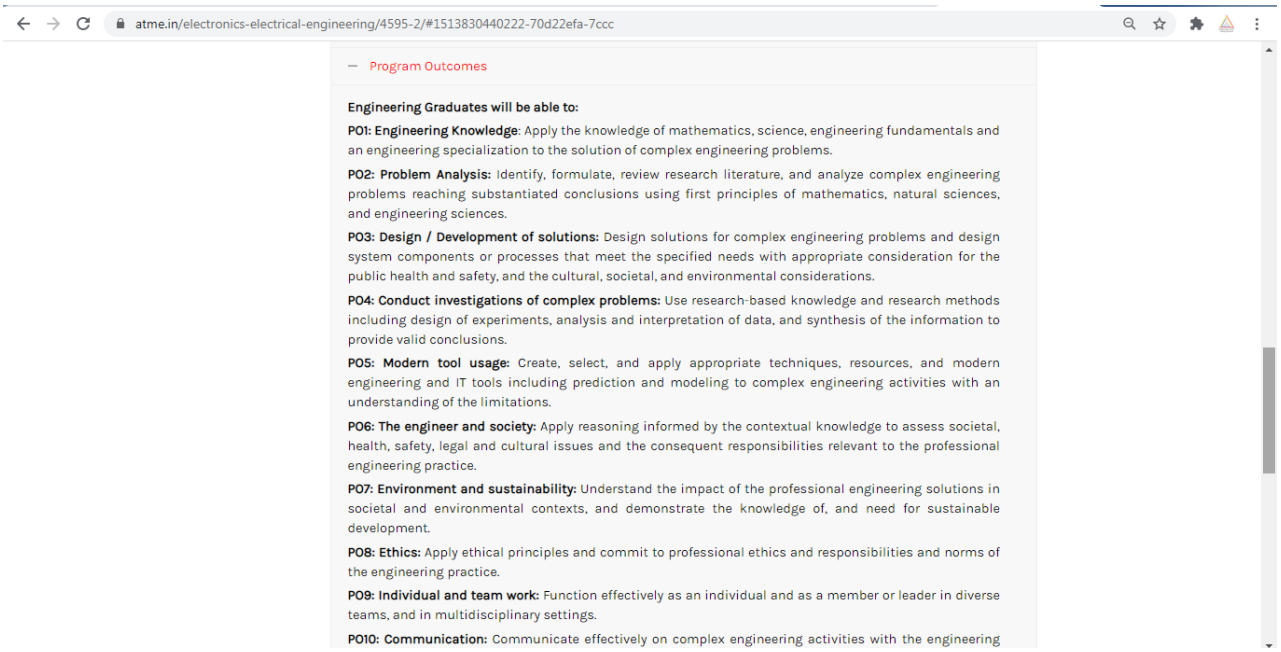
A. College Website Dissemination

Link : https://atme.in/electronics-electrical-engineering/4595-2/#1513830440222-70d22efa-7ccc



http://atme.in/electronics-electrical-engineering/resources/

Academic Year - 2020-2021

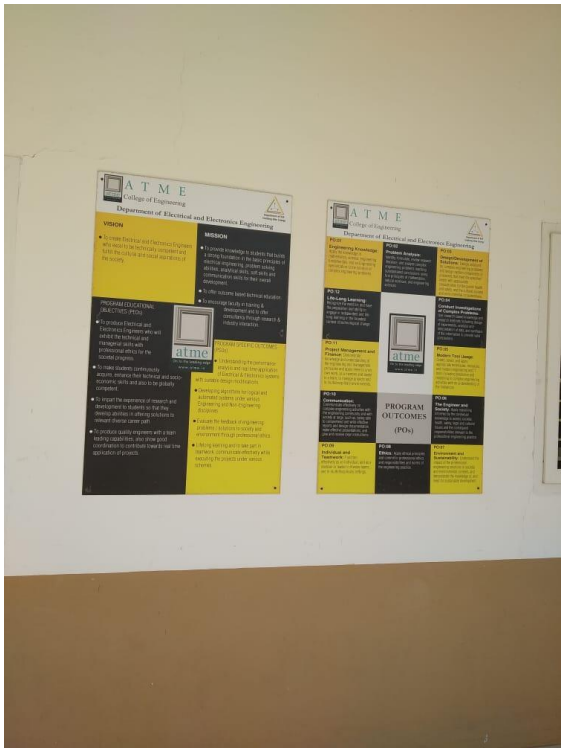
List of Subjects-EEE			
		3RD SEMESTER SUBJECTS	
Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator
1	18MAT31	TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	Mrs Divya K
2	18EE32	ELECTRIC CIRCUIT ANALYSIS	Mrs Lakshmi K
3	18EE33	TRANSFORMERS AND GENERATORS	Mrs Maria Sushma
4	18EE34	ANALOG ELECTRONIC CIRCUITS	Mr Rajesh K S
5	18EE35	DIGITAL SYSTEM DESIGN	Ms Swapna H
6	18EE36	ELECTRICAL AND ELECTRONIC MEASUREMENTS	Mr Sathish K R
7	18 EE L37	ELECTRICAL MACHINES LABORATORY -1	Mrs Maria Sushma
8	18 EE L38	ELECTRONICS LABORATORY	Mr Rajesh K S
9	18KVK39/49	VYAVAHARIKA KANNADA (KANNADA FOR COMMUNICATION)/	Mr Nandeesh
		5TH SEMESTER SUBJECTS	
Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator
1	18 EE51	MANAGEMENT AND ENTREPRENEURSHIP	Mr Vinod Kumar P
2	18 EE52	MICROCONTROLLER	Mr Shreeshayana R
3	18 EE53	POWER ELECTRONICS	Mr Sathish K R
4	18 EE54	SIGNALS AND SYSTEMS	Ms Swapna H
5	18 EE55	ELECTRICAL MACHINE DESIGN	Dr Parthasarathy L
6	18 EE56	HIGH VOLTAGE ENGINEERING	Mr Praveen Kumar
7	18 EEL57	MICROCONTROLLER LABORATORY	Mr Shreeshayana R
8	18 EEL58	POWER ELECTRONICS LABORATORY	Mr Sathish K R

Department of Electrical and Electronics Engineering

atme.in/electronics-electrical-engineering/resources/

Course Details & Content								
3rd Semester								
Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
1	18MAT31	TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	Mrs Divya K	CLICK	CLICK	CLICK	CLICK	CLICK
2	18EE32	ELECTRIC CIRCUIT ANALYSIS	Mrs Lakshmi K	CLICK	CLICK	CLICK	CLICK	CLICK
3	18EE33	TRANSFORMERS AND GENERATORS	Mrs Maria Sushma	CLICK	CLICK	CLICK	CLICK	CLICK
4	18EE34	ANALOG ELECTRONIC CIRCUITS	Mr Rajesh K S	CLICK	CLICK	CLICK	CLICK	CLICK
5	18EE35	DIGITAL SYSTEM DESIGN	Ms Swapna H	CLICK	CLICK	CLICK	CLICK	CLICK
6	18EE36	ELECTRICAL AND ELECTRONIC MEASUREMENTS	Mr Sathish K R	CLICK	CLICK	CLICK	CLICK	CLICK
7	18 EE L37	ELECTRICAL MACHINES LABORATORY -1	Mrs Maria Sushma	CLICK	CLICK	CLICK	CLICK	CLICK
8	18 EE L38	ELECTRONICS LABORATORY	Mr Rajesh K S	CLICK	CLICK	CLICK	CLICK	CLICK
5th Semester								
Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
1	18 EE51	MANAGEMENT AND ENTREPRENEURSHIP	Mr Vinod Kumar P	CLICK	CLICK	CLICK	CLICK	CLICK
2	18 EE52	MICROCONTROLLER	Mr Shreeshayana R	CLICK	CLICK	CLICK	CLICK	CLICK
3	18 EE53	POWER ELECTRONICS	Mr Sathish K R	CLICK	CLICK	CLICK	CLICK	CLICK
4	18 EE54	SIGNALS AND SYSTEMS	Ms Swapna H	CLICK	CLICK	CLICK	CLICK	CLICK
5	18 EE55	ELECTRICAL MACHINE DESIGN	Dr Parthasarathy L	CLICK	CLICK	CLICK	CLICK	CLICK
6	18 EE56	HIGH VOLTAGE ENGINEERING	Mr Praveen Kumar	CLICK	CLICK	CLICK	CLICK	CLICK

B. Department Corridor



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C. Notes, Lab Manual, Course Module, Lesson Plan

NOTES SAMPLE

ATME COLLEGE OF ENGINEERING

13th KM Stone,Mysuru- Kanakapura-Bengaluru Road, Mysuru- 560 028

ATME College of Engineering

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

(ACADEMIC YEAR 2020-2021)

NOTES

Prepared By: Mr.Shreeshayana R
Assistant Professor

COURSE: HIGH VOLTAGE ENGINEERING
COURSE CODE: 17EE73
SEMESTER: VII

Vision & Mission of ATME College of Engineering

Vision

Development of academically excellent, culturally vibrant, socially responsible and globally competent human resources.

Mission

- To keep pace with advancements in knowledge and make the students competitive and capable at the global level.
- To create an environment for the students to acquire the right physical, intellectual, emotional and moral foundations and shine as torchbearers of tomorrow's society.
- To strive to attain ever-higher benchmarks of educational excellence.

Vision & Mission of Department of Electrical & Electronics Engineering

Vision of the Department

To create Electrical and Electronics Engineers who excel to be technically competent and fulfill the cultural and social aspirations of the society.

Mission of the Department

- To provide knowledge to students that builds a strong foundation in the basic principles of electrical engineering, problem solving abilities, analytical skills, soft skills and communication skills for their overall development.
- To offer outcome based technical education.
- To encourage faculty in training & development and to offer consultancy through research & industry interaction.

Course Outcomes:

At the end of the course the student will be able to:

CO-1: Interpret the conduction and breakdown phenomenon in dielectrics. (L2) **Module 1**
CO-2: Apply the principles of generation of high voltage, currents and Impulse voltages. (L2) **Module 2**
CO-3: Apply measurement techniques for High Voltage, current and Impulse voltages. (L3) Module 3
CO-4: Interpret overvoltage phenomenon and insulation coordination in electric power systems. (L2) **Module 4**
CO-5: Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear. (L3) **Module 5**

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

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.

Program Specific Outcomes (PSO's)

Graduates will develop the abilities to:

PSO1: Apply the concepts of Electrical & Electronics Engineering to evaluate the performance of power systems and also to control industrial drives using power electronics.

PSO2: Demonstrate the concepts of process control for Industrial Automation, design models for environmental and social concerns and also exhibit continuous self- learning.

Department of Electrical and Electronics Engineering

LAB MANUAL SAMPLE

ATME COLLEGE OF ENGINEERING

13th KM Stone,Mysuru- Kanakapura-Bengaluru Road, Mysuru- 560 028

A T M E
College of Engineering

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

(ACADEMIC YEAR 2020-2021)

LABORATORY MANUAL

Prepared By: Mr.Shreeshayana R
Assistant Professor
Instructor: Mr.Somashekar M

SUBJECT: MICROCONTROLLERS LABORATORY
SUB CODE: 18EEL57
SEMESTER: V

Course Outcomes:

At the end of the course the student will be able to:

CO-1: Evaluate the output for data transfer, arithmetic, Boolean, logical instructions using Assembly Language Programming. **L5 Expt. 1, 2, 4**

CO-2: Evaluate the output for code conversions using Assembly Language Programming **L5 Expt 6**

CO-3: Evaluate the output for subroutines for generation of delays, counters, configuration of SFRs, serial communication and timers using Assembly Language Programming. **L5 Expt 3,5,7**

CO-4: Evaluate the interfacing of PMDC motors using C programming. **L5 Expt.8,9**

CO-5: Evaluate the interfacing of ADC, Elevator(Board Simulator) and LCD using C Programming. **L5 Expt.10,12,13**

CO-6: Evaluate different waveforms using DAC interface. **L5 Expt.11**

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

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.

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COURSE MODULE

ATME College of Engineering

Department of Electrical &Electronics Engineering

COURSE MODULE OF THECOURSE TAUGHT FOR THE SESSION SEP-DEC 2020-2021(ODD SEM)

Course Syllabi with CO's

Faculty Member: **SHREESHAYANA R**			Academic Year: 2020-2021				
Department: Electrical & Electronics Engineering							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
17EE73	**High Voltage Engineering**	**Core**	Basic Electrical, Physics, Measuring Instruments	4	-	-	**50**
Objectives	1. To discuss conduction and breakdown in gases, liquid dielectrics. 2. To discuss breakdown in solid dielectrics. 3. To discuss generation of high voltages and currents and their measurement. 4. To discuss overvoltage phenomenon and insulation coordination in electric power systems. 5. To discuss non-destructive testing of materials and electric apparatus. 6. To discuss high-voltage testing of electric apparatus						

Topics Covered as per Syllabus

Module-1
Conduction and Breakdown in Gases: Gases as Insulating Media, Collision Process, Ionization Processes, Townsend's Current Growth Equation, Current Growth in the Presence of Secondary Processes, Townsend's Criterion for Breakdown, Experimental Determination of Coefficients α and γ, Breakdown in Electronegative Gases, Time Lags for Breakdown, Streamer Theory of Breakdown in Gases, Paschen's Law, Breakdown in Non-Uniform Fields and Corona Discharges. Conduction and Breakdown in Liquid Dielectrics: Liquids as Insulators, Pure Liquids and Commercial Liquids, Conduction and Breakdown in Pure Liquids, Conduction and Breakdown in Commercial Liquids. Breakdown in Solid Dielectrics: Introduction, Intrinsic Breakdown, Electromechanical Breakdown, Thermal Breakdown. **10Hours**

L1 – Remembering, L2 – Understanding

Module-2
Generation of High Voltages and Currents: Generation of High Direct Current Voltages, Generation of High Alternating Voltages, Generation of Impulse Voltages, Generation of Impulse Currents, Tripping and Control of Impulse Generators. **10Hours**

L1 – Remembering, L2 – Understanding, L3 – Applying

Module-3
Measurement of High Voltages and Currents: Measurement of High Direct Current Voltages, Measurement of High AC and Impulse Voltages, Measurement of High Currents – Direct, Alternating and Impulse, Cathode Ray Oscillographs for Impulse Voltage and Current Measurements. **10Hours**
L1 – Remembering, L2 – Understanding, L3 – Applying

Module-4:
Overvoltage Phenomenon and Insulation Coordination in Electric Power Systems: National Causes for Over voltages - Lightning Phenomenon, Overvoltage due to Switching Surges, System Faults and Other Abnormal, Principles of Insulation Coordination on High Voltage and Extra High Voltage Power Systems. **10Hours**
L1 – Remembering, L2 – Understanding

Module- 5:
Non-Destructive Testing of Materials and Electrical Apparatus: Introduction, Measurement of Dielectric Constant and Loss Factor, Partial Discharge Measurements.

High Voltage Testing of Electrical Apparatus: Testing of Insulators and Bushings, Testing of Isolators and Circuit Breakers, Testing of Cables, Testing of Transformers, Testing of Surge Arrestors, Radio Interference Measurements, Testing of HVDC Valves and Equipment. **10Hours**
L1 – Remembering, L2 – Understanding

List of Text Books

TEXT BOOKS:
1. High Voltage Engineering, M.S. Naidu, V. Kamaraju, McGraw Hill, 5th Edition, 2013

List of Reference Books

1. High Voltage Engineering Fundamentals, E. Kuffel, W.S. Zaengl, J. Kuffel, Newnes, 2 nd Edition, 2000
2. High Voltage Engineering, Wadhwa C.L., New Age International, 3 rd Edition, 2012.
3. High-Voltage Test and Measuring Techniques, Wolfgang Hauschild • Eberhard Lemke, Springer, 1st Edition 2014.
4. High Voltage Engineering, Farouk A.M. Rizk, CRC Press, 1st Edition2014

List of URLs, Text Books, Notes, Multimedia Content, etc

1. http://electrical-engineering-portal.com
2. http://nptel.ac.in/courses/108104048/
3. Fundamentals of High Voltage Engineering By S.K.Singh, Dhanpat Rai& Co.

Graduate Attributes (As per NBA)
Engineering Knowledge, Problem Analysis, Design/ Development of Solutions, Modern Tool Usage, Ethics, Individual and Team Work, Communication, Life-long Learning

Course Outcomes	At the end of the course the student will be able to: **CO-1:** Interpret the conduction and breakdown phenomenon in dielectrics. (L2) **Module 1** **CO-2:** Apply the principles of generation of high voltage, currents and Impulse voltages. (L2) **Module 2** **CO-3:** Apply measurement techniques for High Voltage, current and Impulse voltages. (L3) **Module 3** **CO-4:** Interpret overvoltage phenomenon and insulation coordination in electric power systems. (L2) **Module 4** **CO-5:** Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear. (L3) **Module 5**

Internal Assessment Marks: 30 (3 Session Tests are conducted during the semester and marks allotted based on average of all three performances) + 10 Marks for Assignment.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Course Code:	17EE73	TITLE: High Voltage Engineering										Faculty Member: SHREESHAYANA R
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2	-	-	-	2	-	-	-	-	-	2
CO-2	3	2	-	-	-	2	-	-	-	-	-	2
CO-3	3	2	-	-	-	2	-	-	-	-	-	2
CO-4	3	2	-	-	-	2	-	-	-	-	-	2
CO-5	3	2	-	-	-	2	-	-	-	-	-	2

Note: 3 = Strong Contribution 2 = Average Contribution 1= Weak Contribution - = No Contribution

Course Code:	17EE73	TITLE: HIGH VOLTAGE ENGINEERING
List of Course Outcomes	Program Specific Outcomes	
	PSO1	PSO2
CO-1	3	-
CO-2	3	-
CO-3	3	-
CO-4	3	-
CO-5	3	-

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D. IA QP and Scheme

SAMPLE IA QP & SCHEME

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Department of Electrical & Electronics Engineering

FIRST INTERNAL ASSESSMENT TEST

COURSE CODE	:	17EE73	TIME	10AM to 11.30AM
COURSE	:	HIGH VOLTAGE ENGINEERING	DATE	09.10.2020
SEM	:	VII	MAX.MARKS	50

Q. No.	PART-A (Each Question carries 10 Marks) Answer any Three Full Questions	Marks	CO's	BTL
1.	a. **Interpret** Streamers theory is applicable for pd value (1Mark) a. >1000mmHg-cm b. <1000mmHg-cm c. >1mmHg-cm & <2mmHg-cm d. >1mmHg-cm b. **Interpret** the Time Lag for Breakdown is composed of: (1Mark) a. Positve and Negative b.Statistical & Formative c. Statistical & Affirmative d. Statistical & Paschen	2M	CO1	L2
	c. What is Ionization process. **Explain** how ionization occurs due to collision and photo-ionization with suitable diagram.	8M	CO1	L2
2.	a. **Interpret** Paschen found that Voltage is a function only of: (1Mark) a. Product of the pressure & temperature b. Product of the pressure & voltage c. Product of the pressure & current d. Product of the pressure & gap length b.**Interpret** Cavitations theory states that dielectric strength of liquid dielectric material depends on: (1Mark) a. Temperature b. Electrodes c. Hydrostatic pressure d. Voltage	2M	CO1	L2
	c. **Explain** the current growth expression for Townsends primary and secondary ionization process with suitable diagram.	8M	CO1	L2
3.	a. **Solve,** What will be the breakdown strength of air for a small gap of 20cm under uniform field condition and standard atmospheric condition: (1Mark) a. 25.57kV/cm b. 24kV/cm c. 20kV/cm d. 27kV/cm b. **Interpret,** which is not a type of breakdown mechanism in Solid dielectric: (1Mark) a. Intrinsic breakdown b. Cavitation breakdown c. Avalanche breakdown d. Treeing & Tracking	2M	CO1	L2 L2
	c. **Explain** the following methods of breakdown in liquid dielectrics i. Suspended Particle theory ii. Bubbles theory	8M	CO1	L2
4.	a. In an experiment with certain gas, it was found that the steady state current is 5.5×10^{-8} A at 8kV at a gap distance of 0.4cm between the electrode plates. Keeping the field constant and reducing the distance by 0.1cm results in a current of 5.5×10^{-9}A. Solve for Townsend's primary ionization co-efficient. (1Mark) a. 5/cm-torr b. 7.676/ cm-torr c. 6.99/cm-torr d. 7/cm-torr b.**Interpret,** In thermal breakdown,heat generated under d.c. stress (1Mark) a. $W_{dc} = E^2\sigma$ b. $Wdc = E\sigma$ b. $W_{dc} = E^2\sigma f$ d. $Wdc = E^2\sigma f d$	2M	CO1	L2 L2
	c.**Explain** Streamers theory with relevant diagram.	8M	CO1	L2

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Department of EEE Emitting Elite Energy

Department of Electrical & Electronics Engineering

Q. No.	PART-B (Each Question carries 10 Marks) Answer any TwoFull Questions	Marks	CO's	BTL
5.	a. **Interpret**, in Cock croft- Walton type high voltage DC set, Output voltage is: **(1Mark)** a.2n b. 2nVmax c.Vmax d. 2nVmaxI b.In cascaded transformers, **interpret** which statements are correct: **(1Mark)** i. Natural cooling is sufficient; ii. star or delta connection are possible iii. More space requirement ; iv. Meter winding is used a. i,ii b. i,ii,iv c.i,ii,iii,iv d.i,ii,iii	2M	CO2	L2
	c. A 8stage Walton Circuit has a capacitance of 0.05μF. The secondary voltage of supply transformer is 125kV at a frequency of 150Hz.If the load current is 5mA, Solve for: **i)** % Voltage Regulation **ii)** % Ripple **iii)** Optimum number of stages for maximum output **iv)** Maximum output voltage	8M	CO2	L3
6.	a. **Interpret** in Tesla coil, output frequency range is: **(1Mark)** a. 5kHz to 10MHz b. 50kHz to 1MHz c. 100Hz to 1KHz d. 1MHz to 10MHz b. **Interpret,** in Series resonant transformer Q factor of the circuit gives themagnitude of the voltage multiplication across the test object under **(1Mark)** a. Standard room pressure b. Standard room temperature c. Both a & b d. Resonance	2M	CO2	L2
	c. With relevant circuit diagram, explain how transformers are connected in cascade for HVAC power generation	8M	CO2	L2
7.	a. **Interpret, Tesla Coil is:** **(1Mark)** a. high frequency resonant transformer circuit b. Doubly tuned resonant c. Both a&b d. Only a b. **Interpret,** The primary voltage rating is 10 kV and the secondary may be rated to as high as 500 to 1000kV.Is the statement correct: **(1Mark)** a. False b. True c. Neither d. Partially True	2M	CO2	L2
	c. With relevant circuit diagram, **Explain** i. Series Resonant Transformer ii. Parallel Resonant Transformer	8M	CO2	L2

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COURSE OUTCOMES

CO1	Interpret the conduction and breakdown phenomenon in dielectrics.
CO2	Apply the principles of generation of high voltage, currents and Impulse voltages.
CO3	Apply measurement techniques for High Voltage, current and Impulse voltages.
CO4	Interpret overvoltage phenomenon and insulation coordination in electric power systems.
CO5	Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear.

Bloom's Taxonomy Level	
L1	Remembering
L2	Understanding
L3	Applying
L4	Analyzing
L5	Evaluating
L6	Creating

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Solution and Scheme of valuation

Semester: VII
Course Title and Code: High voltage Engineering / 17EE73
Date: 09/10/2020
Max. Marks: 50.

Question No.	Solution	CO's	BTL	Marks Allocated
1	a) option a: >1000mHg-cm b) option b: Statistical & formative	CO1 CO1	L2 L2	1mark. 1 mark 2marks
	c) Ionisation is defined as a process of liberation of free electron from a gas molecule with continous generation of positive ion			1mark
	Ionisation by collision $e^- + A \xrightarrow{\mathcal{E} > V_i} e^- + A^+ + e^-$ A = atom, A^+ = +ve ion e^- : electron. In collision process, a free electron collides with a neutral gas molecule & gives rise to new electron & the ion. If the energy gained during the travel between collision in a low pressure gas column in which electric field E is applied across two parallel plates, becomes high then it causes a liberation of electron from its atomic shell			3mark
	Photo ionisation The ionisation caused by cosmic radiation or photons is called photo ionisation. It occurs when the amount of radiation energy			2marks

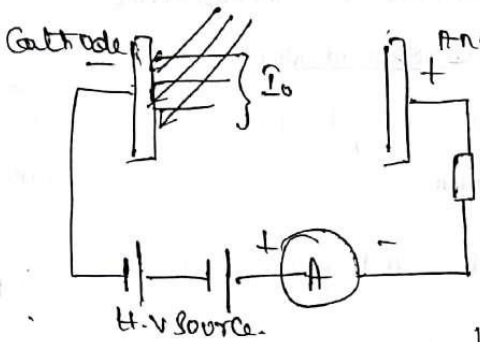
Key Word: BTL: Bloom's Taxonomy Level

SHREESHAYANA K
Course Coordinator Name and Signature

Dr. PARTHASARATHY L.
Professor and HOD
Dept. of Electrical & Electronics Engineering
ATME College of Engineering
Signature of HoD

Department of Electrical and Electronics Engineering

Question No.		CO's	BTL	Marks Allocated
	absorbed by an atom or molecule exceeds its ionisation potential			



2 marks

$h\nu + A \rightleftharpoons A^+ + e^-$ | $E > Ai$; condition for breakdown

3 marks

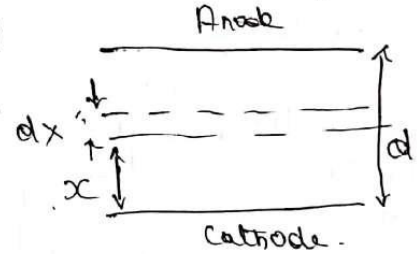
h → planks constant; C = velocity of light

$E = h\nu = hc/\lambda$

(2) a) Option d: Product of pressure & gap length — CO1 | L2 | 1 mark

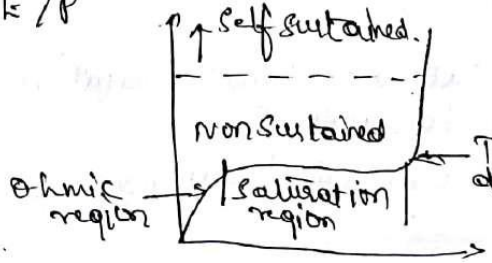
b) Option c: Hydrostatic pressure — CO1 | L2 | 1 mark

c)



i) Let us asume no electrons are emitted from cathode. Let α be Average no of ionising collisions made by electron/cm.

$\alpha = E/p$



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$dn_x = \alpha n_x dx$

$\frac{dn_x}{n} = \alpha dx$

$\ln n = \alpha x + A$ —(1)

$A = \ln n_0$ in (1)

$\therefore \ln n = \alpha x + \ln n_0$

$\ln n - \ln n_0 = \alpha x$

$\ln\left(\frac{n}{n_0}\right) = \alpha x \Rightarrow \frac{n}{n_0} = e^{\alpha d}$ at $x = d$

$\therefore n = n_0 e^{\alpha d}$

Avg current $\boxed{I = I_0 e^{\alpha d}}$

Let Total no of electron n reaching anode,

$n = (n_0 + n_+) e^{\alpha d}$

$n_+ = \gamma [n - (n_0 + n_+)]$

$n_+ = \gamma n - \gamma n_0 - \gamma n_+$

$n_+ = \frac{\gamma (n - n_0)}{1 + \gamma}$

Substituting, $n = \left[n_0 + \frac{\gamma (n - n_0)}{1 + \gamma}\right] e^{\alpha d}$.

$n\left[1 + \gamma\left(1 - e^{\alpha d}\right)\right] = n_0 e^{\alpha d}$.

$\therefore I = \frac{I_0 e^{\alpha d}}{\left[1 - \gamma\left(e^{\alpha d} - 1\right)\right]}$

(3) a) option a: 25.57 KV/cm } — CO1 L2 1mark

b) option B: cavitation breakdown — CO1 L2 1mark

2 marks

c) 1) Suspended particle theory

Commercial liquids will always contain solid impurities like fibres/dispersed solid particles & gaseous bubbles } CO1 L2 — 1mark

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2) $\varepsilon_{c2} > \varepsilon_1$

permittivity of liquid dielectrics ε_1 & ε_2 : permittivity of solid impurities.

$$F = \frac{1}{2r^3} \frac{(\varepsilon_{c2} - \varepsilon_1)}{2\varepsilon_1 + \varepsilon_2} \text{ grad } E^2.$$

3) If only gas bubbles are present $\varepsilon_2 < \varepsilon_1$ — 3mark.

r → spherical particles of radius r

E → applied field.

2) Bubbles theory

Theory states that dielectric strength of liquid dielectric material depends on hydrostatic pressure.

Here voltage drop along the length of bubble equals to minimum value of voltage in the paschen's curve. — 2mark

$$E_0 = \frac{1}{(\varepsilon_1 - \varepsilon_2)} \left[\frac{2\pi\sigma(2\varepsilon_1 + \varepsilon_2)}{r} \left\{ \frac{\pi}{4} \left(\frac{V_b}{2rE_0} \right) \right\}^{1/2} \right]^{1/2}$$ — 3mark

σ = Surface tension of liquid

ε_1 = permittivity of liquid, ε_2 = permittivity of gas bubble; r = inial radius of gas bubble. — 3marks

(4)

a) option b: 7.676/cm-torr } — Col L_2 1mark

b) option a: $W_{dc} = E_\sigma^2$ } — Col L_2 1mark

2marks

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(4)

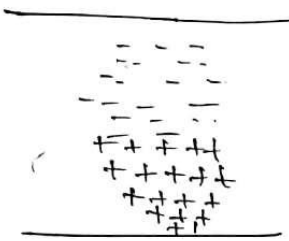
c) Streamers theory / Avalanche breakdown:

1) Streamer mechanism of B.D is also known as kanal mechanism of Breakdown. CO1 KL1 3marks

2) It is valid only if $E_0 = V/d$

3) It is a phenomenon that occurs in both insulating & semiconducting materials

A streamer discharge also known as filamentary discharge, is a type of transient electrical discharge. It is formed when exposed to large potential difference.



2marks

Step 1: Formation of avalanche.

Step 2: Formation of avalanche creates space charge which leads additional electric field.

Step 3: Electric field enhance growth of new avalanche. Ionized region grows quickly & expands & finally Breakdown occurs

3marks

2marks

Part B

(5) a) option b: $2nV_{max}$

b) option c: i, ii, iii, iv

CO2 L2 1mark.

CO1 L2 1 mark

2marks

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(5) c) a) ripple voltage $\delta V = \frac{I}{fC}\frac{n(n+1)}{2}$ — CO2 L3

$\delta V = \frac{5\times10^{-3}}{150\times0.05\times10^{-6}} \times \frac{8\times9}{2} = 24\,kV$ — 2 marks

b) Regulation: $\Delta V = \frac{I}{fC}\left[\frac{2n^3+n^2}{3}\frac{n}{2}-\frac{n}{6}\right]$ — 2 marks

$= 248\,kV$

$\therefore$ Regulation $= \frac{V}{2nV_{max}} = 12.4\%$ — 2 marks

c) Optimum stages

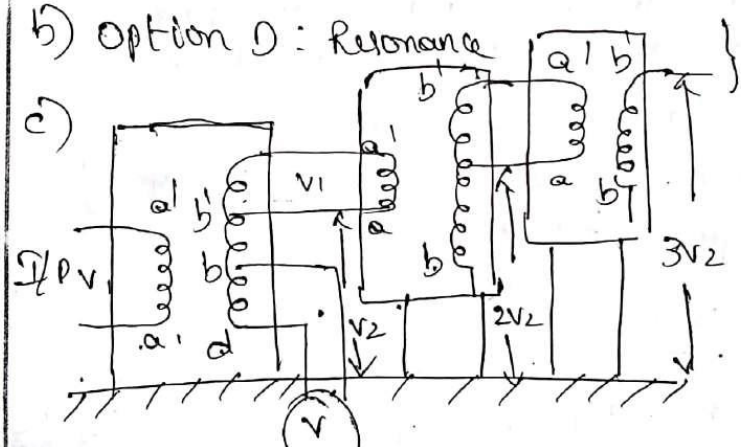
$n_{opti} = \sqrt{\frac{V_{max}fC}{I}}$ — 2 marks

$\therefore = 14$ stages — 1 mark

(6) a) Option B: 50kHz to 1MHz — CO2 L2 1 mark

b) Option D: Resonance — CO2 L2 1 mark.

c)



CO2 L2 — 4 marks.

V_1 → I/P voltage; V_2 = O/P voltage

aa' - LV primary winding; bb' - H.V secondary winding; cc' excitation winding; bcd - metal winding

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1) First transformer is at ground potential along with its tank
2) Second transformer is kept on insulators & maintained at a potential of V_2.
3) The H.V winding of the 1st unit is connected to the tank of second unit.
4) The L.V winding of this unit is supplied from the excitation winding of the first transformer which is in series with H.V winding of 1st transformer at its H-end.
5) Isolating transformers IS1, IS2 & IS3 are 1:1 ratio transformers — 3 mark

Need: when test voltage requirements are less than 300KV, a single transformer can be used. > 300KV cascaded transformer is used — 1 mark

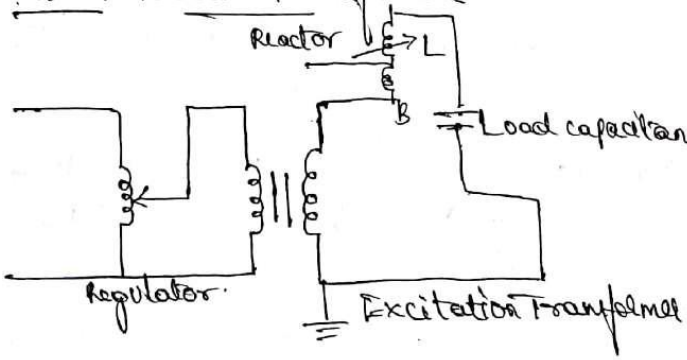
4 marks

7 a) option c: Both a & b — CO2 L2 1 mark

b) option b: True — CO2 L2 1 mark

2 marks

c) Series Resonant Transformer



CO2 L2 — 2 marks

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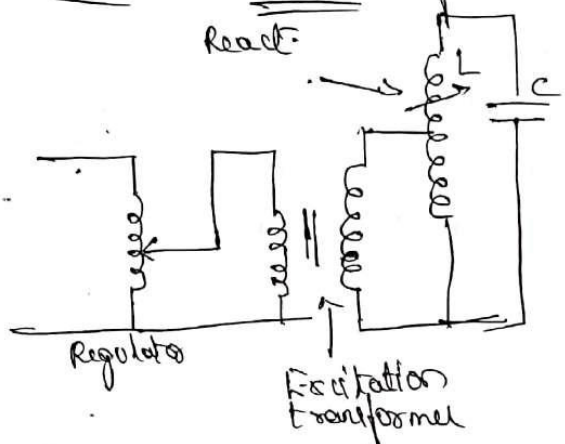
(1) A voltage regulator of either auto transformer type or the induction regulator type is connected to supply mains.
(2) Secondary winding of exciter transformer is connected across H.V reactor L & capacitive load C. — 2 marks
(3) Inductance of reactor L, ratio 10:1
(4) Q factor: order of 50

Parallel Resonant Transformer



2 marks

(1) In the parallel resonant mode the H.V reactor is connected as an auto transformer & the ckt is connected as a parallel resonant circuit. — 2 marks
(2) Independent of the degree of tuning & the Q-factor.
(3) Advantage: Parallel resonant ckt more stable o/p voltage with high rate of rise of test voltage. — 3 marks

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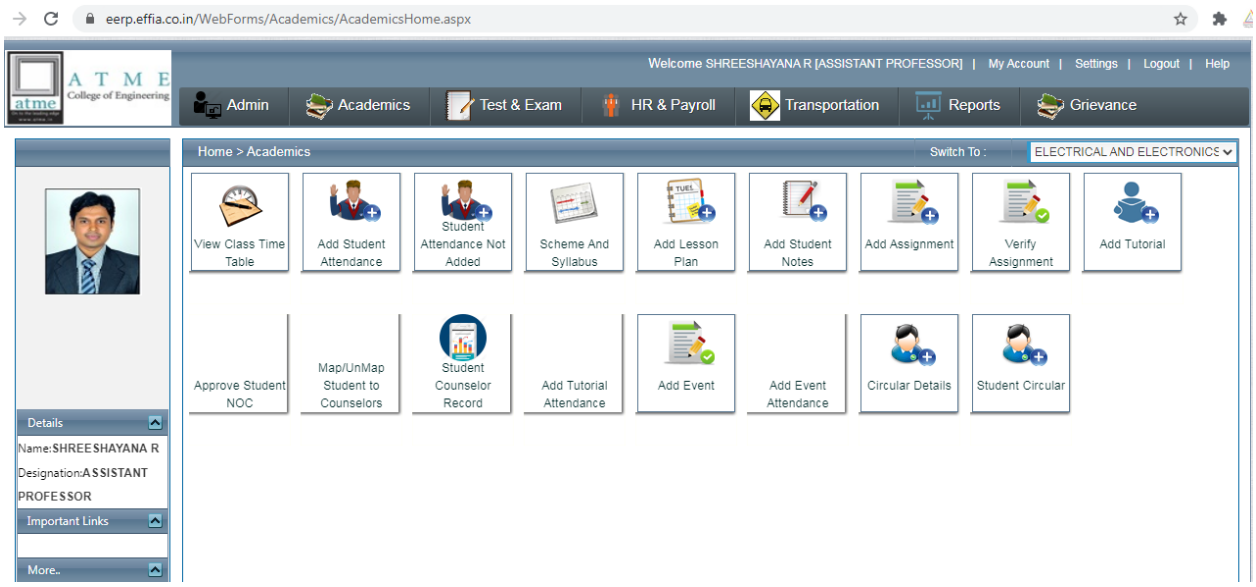
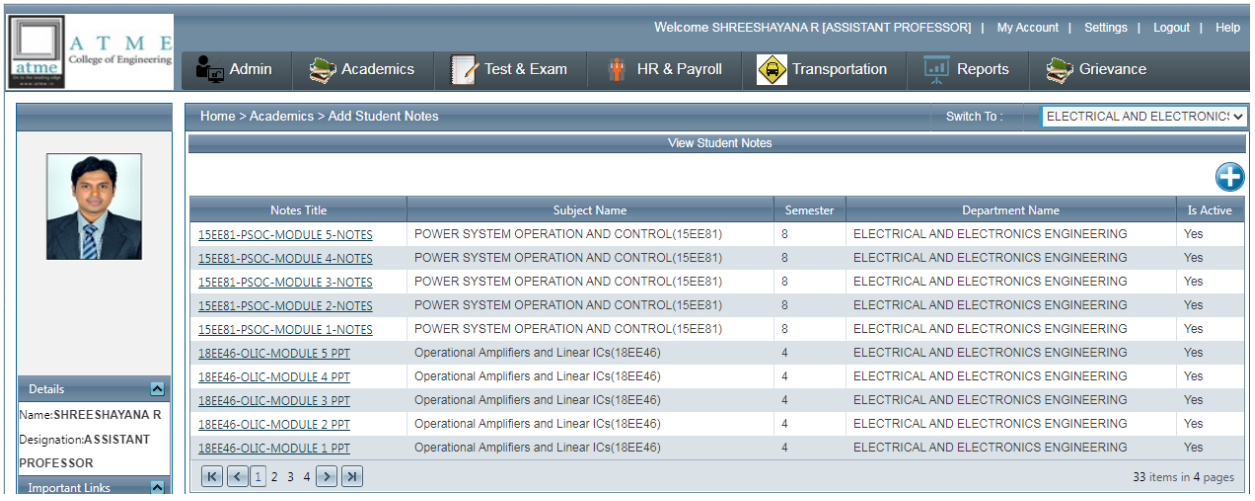
E. A-IMS Link : https://eerp.effia.co.in/Webforms/frmLogin.aspx

Note: Only authorised access





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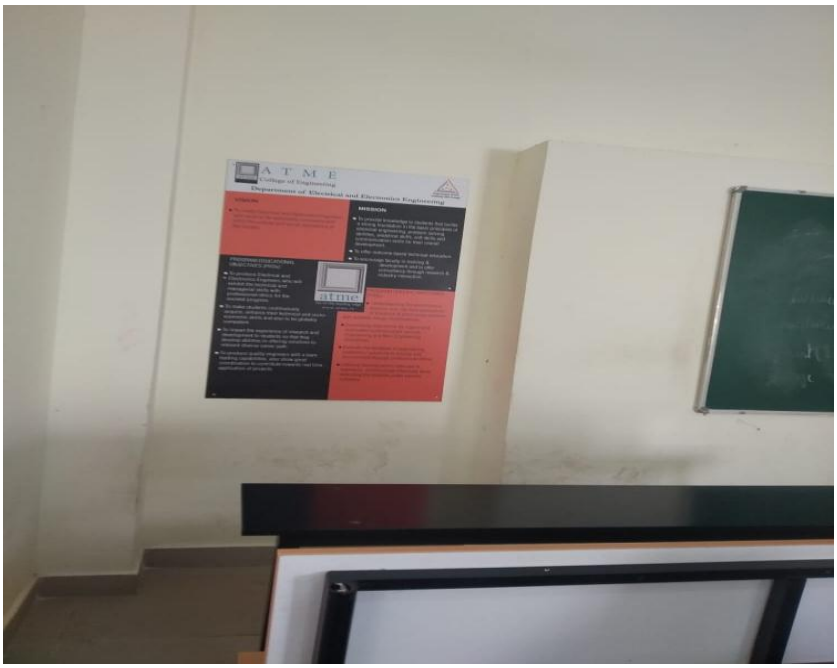
E. Classroom, Seminar Hall, Laboratory



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F. HoD and Department Office

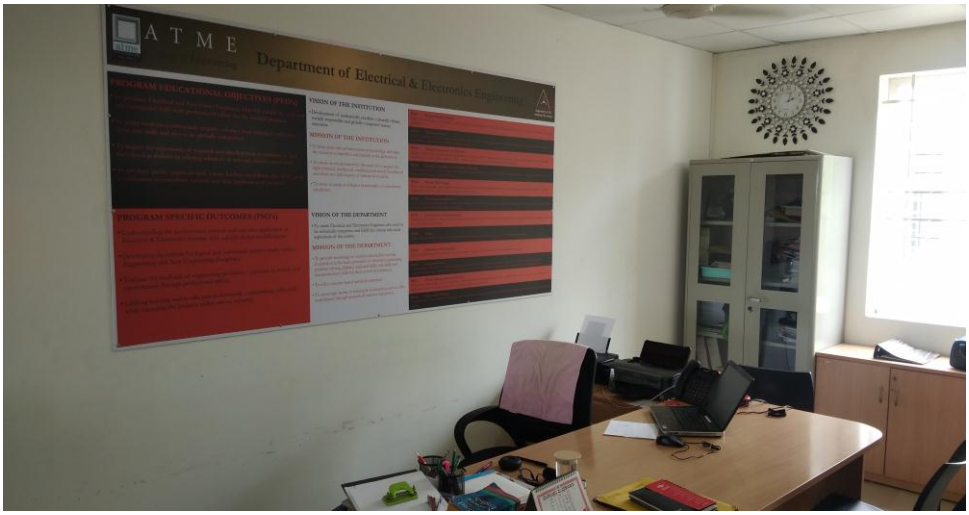

Fig: HoD Office

Fig: Department Office

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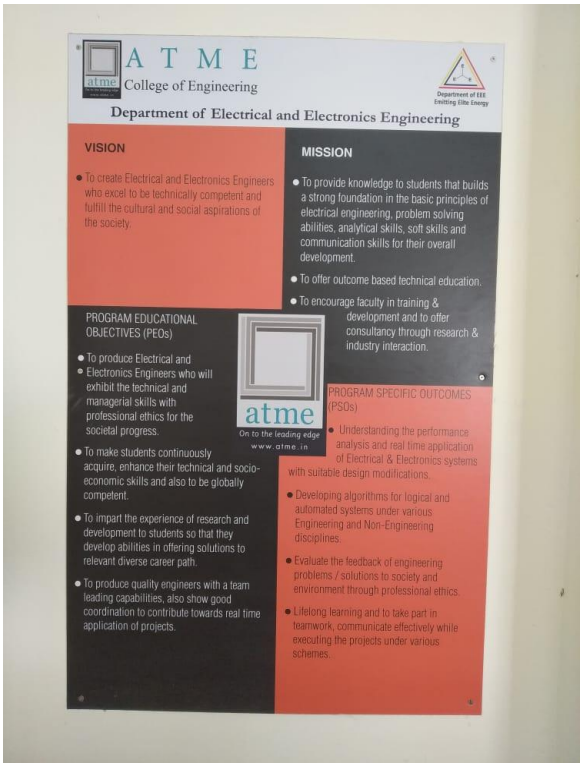

Fig: Department Office

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G. Magazine

Quantum Department Magazine

Chief Editor
Parthasarathy L
Professor & Head
Department of EEE
ATMECE, Mysuru

Co-editor
Mr. Sathish K R
Assistant Professor, Department of EEE
ATMECE, Mysuru

Student Representative
Mr. Navneet Prathad Tavagal, 7th Semester
Mr. Ranjith Kumar G 7th Semester
Mr. Rahul C M 5th Semester
Ms. Kausar Afreen 5th Semester

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Department of Electrical and Electronics Engineering

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A T M E
College of Engineering

Department of EEE Emitting Elite Energy

Department
of
Electrical & Electronics
Engineering

Staff Handbook

ATME College of Engineering, Mysuru

Program Outcomes (PO's)

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 lifelong learning in the broadest context of technological change.

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STUDENT HANDBOOK

Student Name:

USN:

Semester: VII

2020-2021

Department of Electrical & Electronics Engineering

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Department of Electrical and Electronics Engineering

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ATME College of Engineering

Department of Electrical & Electronics Engineering

COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION AUG-NOV 2018-19(ODD SEM)

Course Syllabi with CO's

Faculty Name : Dr.Parthasarathy L			**Academic Year**: 2018-2019 (Odd Semester)				
Department: Electrical & Electronics Engineering							
Course Code	**Course Title**	**Core/Elective**	**Prerequisite**	**Contact Hours**			**Total Hrs/ Sessions**
				L	T	P	
15EE71	**POWER SYSTEM ANALYSIS-2**	**Core**	**POWER SYSTEM ANALYSIS -1**	**4**	**-**	**-**	**50**
Objectives	This course will enable students to: 1. To explain formulation of network models and bus admittance matrix for solving load flow problems 2. To discuss solution of nonlinear static load flow equations by different numerical techniques and methods to control voltage profile 3. To discuss optimal operation of generators on a bus bar, optimal unit commitment, reliability considerations and optimum generation scheduling 4. To discuss optimal power flow solution, scheduling of hydro-thermal system, power system security and reliability 5. To explain formulation of bus impedance matrix for the use in short circuit studies on power systems. 6. To explain numerical solution of swing equation for multi-machine stability.						
Topics as per Syllabus							

PART – A

UNIT - 1
Load Flow Studies: Introduction, Network Model Formulation, Formation of Ybus by Singular Transformation, Load Flow Problem, Gauss-Seidel Method. **10 Hours**

UNIT - 2
Load Flow Studies (continued): Newton-Raphson Method, Decoupled Load Flow Methods, Comparison of Load Flow Methods, Control of Voltage Profile. **10 Hours**

UNIT - 3
Optimal System Operation: Introduction, Optimal Operation of Generators on a Bus Bar, Optimal Unit Commitment, Reliability Considerations, Optimum Generation Scheduling. **10 Hours**

UNIT -4
Optimal System Operation (continued): Optimal Load Flow Solution, Optimal Scheduling of Hydrothermal System, Power System Security, Maintenance Scheduling, Power System Reliability. **10 Hours**

UNIT-5 **Symmetrical Fault Analysis:** Algorithm for Short Circuit Studies, Zbus Formulation. **Power System Stability:** Numerical Solution of Swing Equation, Multi-machine Stability. **10 Hours**	
List of Text Books	
1. **Modern Power System Analysis,** Nagrath, I. J., and Kothari, D. P, TMH, 4th Edition, 2011.	
List of Reference Books:	
1. **Computer Methods in Power System Analysis,** Stagg, G. W., and El- Abiad, A. H.- McGraw Hill International Student Edition. 1968 2. **Computer Techniques in Power System Analysis**, Pai, M. A- TMH, 2nd edition, 2006. 3. **Power System Analysis,** Hiadi Sadat, TMH, 2nd Edition, 12th reprint, 2007	
List of URLs, Text Books, Notes, Multimedia Content, etc	
1.http://vtu.alloylabus.com/EEE/sem_7/Computer_Technics_in_Power_system_Analysis/COMPUTER_TECHNIQUES_IN_POWER_SYSTEM_ANALYSIS_NOTES.pdf	
Course Outcomes	After the completion the course, the students will be able to: CO1. Form the Y_{BUS} and analyse Power system fault using Zbus. CO2. Find power flow solution by Gauss Siedel, Newton Raphson, FDLF Method and Control voltage profile. CO3. Find optimal unit commitment and optimal generation scheduling. CO4. Find optimal scheduling of hydro-thermal systems, basics of Power system security and reliability. CO5. Find the solution to swing equation and basics of multi machine stability.
Internal Assessment test: 15marks (3 Session Tests are conducted during the semester and marks allotted based on average of two top performances). **Assignment/quiz/seminar:** 5 marks	

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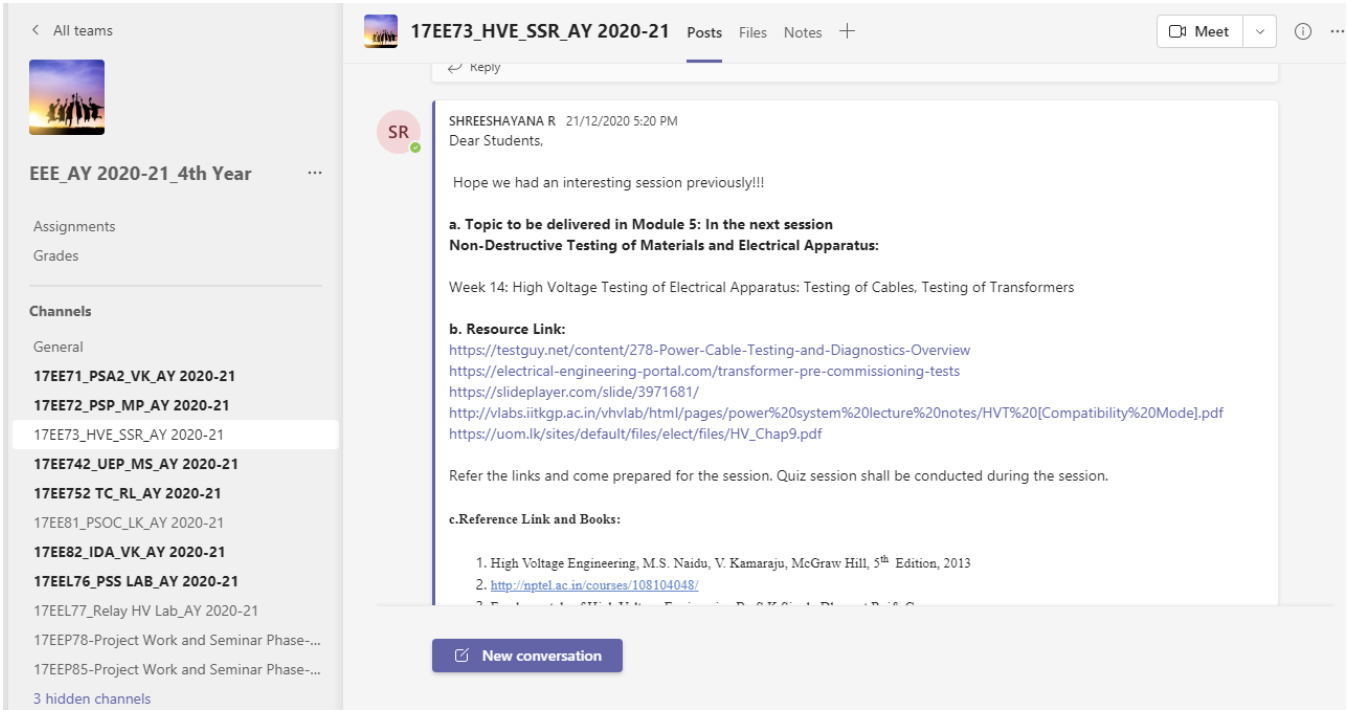
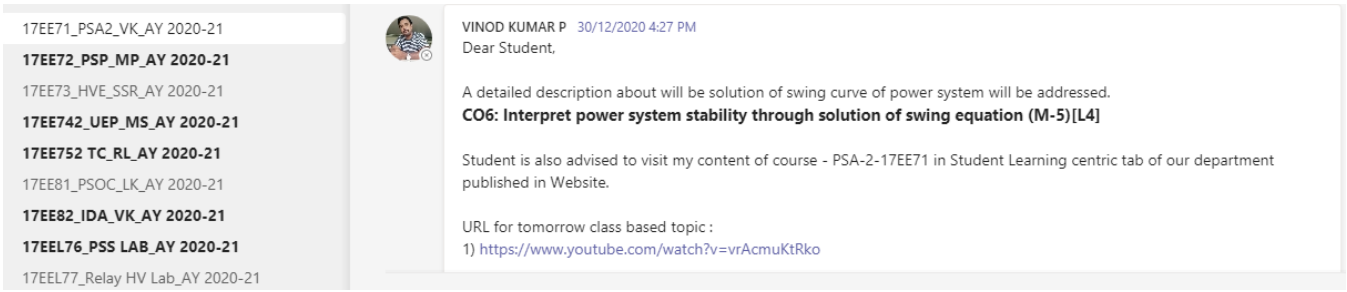
I. Flipped Classroom through Mail (A-IMS)

To enhance the learning ability and problem solving ability preface of the topic to be Delivered is sent to students through Microsoft Teams.





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CO STATEMENTS

Department of Electrical and Electronics Engineering

CO Statements All Courses

Course Name: Engineering Mathematics _ I(18MAT11/21)	
At the end of the course student will be able to	
1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
2	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.
3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
4	Solve first order linear/nonlinear differential equation analytically using standard methods.
5	Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vectors required for matrix diagonalization process.

Course Name: Engineering Physics(18PHY11/21)	
At the end of the course student will be able to	
1	Memorize the setup of differential equations for the types of oscillations and analyze the solutions and also to recognize the importance of shock waves and its applications.
2	Describe the Elastic properties and Electrical properties of the materials and identify their applications in Engineering.
3	Summarize the Basic theorems of Electricity and Magnetism, interrelation between time varying electric field and magnetic fields and the transverse nature of the EM waves .
4	Explain the principle, conditions , requisites and generation of laser and its different applications mainly optical fiber communication through the study of construction, working and types of optical fibers.
5	Discuss the basic principles and hypothesis in quantum mechanics and to Apply it to study the motion of particles in a potential well.

Course Name: Basic Electrical Engineering(18ELE13/23)	
At the end of the course student will be able to	
1	Analyze the DC Circuits to determine the power and to interpret the concepts of AC fundamentals.
2	Analyze the Single phase and 3-Phase AC circuits to determine active power, reactive power and power factor.
3	Estimate the losses and efficiency of a single phase transformer by understanding its operating principle.
4	Demonstrate the Domestic wiring by employing earthing and circuit protective devices.
5	Interpret the performance characteristics of DC generators and Motors by understanding its operating principles.
6	Apply the operating principles of a 3-phase synchronous generator (to determine its Emf induced) and 3-phase Induction motor (to find slip).

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Course Name:Civil Engineering(18CIV14)	
At the end of the course student will be able to	
1	Mention the applications of various fields of Civil Engineering.
2	Compute the resultant of given force system subjected to various loads.
3	Comprehend the action of Forces, Moments and other loads on systems of rigid bodies and compute the reactive forces that develop as a result of the external loads
4	Locate the Centroid and compute the Moment of Inertia of regular and built-up sections.
5	Express the relationship between the motions of bodies and analyze the bodies in motion

Course Name:Engineering Drawings(18EGDL15/25)	
At the end of the course student will be able to	
1	Mention the applications of various fields of Civil Engineering.
2	Compute the resultant of given force system subjected to various loads.
3	Comprehend the action of Forces, Moments and other loads on systems of rigid bodies and compute the reactive forces that develop as a result of the external loads
4	Locate the Centroid and compute the Moment of Inertia of regular and built-up sections.
5	Express the relationship between the motions of bodies and analyze the bodies in motion

Course Name:Engineering Physics Lab(18PHYL16/26)	
At the end of the course student will be able to	
1	Demonstrate the phenomenon of interference and diffraction using simple experiments
2	Interpret the characteristics of bipolar junction transistors and photo-diode and also to Analyze the resonance concept and its applications in electrical circuits.
3	Calculate the electrical properties like Dielectric Constant of the Dielectric material, Fermi energy of a metal through simple experiments and Compare the theoretical and experimental values of magnetic field set up by a circular coil.
4	Visualize laser source and application of laser in the optical fiber and diffraction experiments to calculate the related quantities.
5	Practice the measurement of quantities, honest recording, representing and analyzing the data and expressing the final results.

Course Name:Basic Electrical Engineering Lab(18ELEL17/27)	
At the end of the course student will be able to	
1	Identify the common electrical components and measuring instruments used for conducting experiments in the electrical laboratory.
2	Apply KVL, KCL and interpret the effect of open and short circuit in simple circuits.
3	Measurement of current, power and comparison of power factor of lamps.
4	Measurement of resistance, inductance of a choke coil and measurement of earth resistance.
5	Determine impedance of an electrical circuit and power consumed in a 3 phase load.
6	Analyze two way and three way control of lamps.

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Course Name: Technical Englsih (18EGH18/28)	
At the end of the course student will be able to	
1	Use grammatical English and essential of language skills and identify the nuances of phonetics , intonation and flawless pronunciation.
2	Implement English vocabulary at command and language proficiency
3	Identify common errors in spoken and written communication
4	Understand and improve the non verbal communication and kinesics
5	Perform well in campus recruitment, engineering and all other general competitive examinations.

Course Name: Engineering Mathematics _ II (18MAT21)	
At the end of the course student will be able to	
1	Illustrate the application of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
3	Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.
4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
5	Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.

Course Name: Engineering Chemistry (18CHE12/22)	
At the end of the course student will be able to	
1	Apply the knowledge of thermodynamic function in electrochemical systems.
2	Interpretation on metallic corrosion, control & the surface modification.
3	Utilization of chemical fuels & renewable source for the production and consumption of energy
4	Apply the knowledge on facts & techniques related to environmental pollution waste management & water chemistry.
5	Explain the basic principles involved in different Analytical/Instrumentation techniques & Nanoscience.

Course Name: Computer Programming Structure (18CPS13/23)	
At the end of the course student will be able to	
1	Illustrate simple algorithms from the different domains such as mathematics,physics etc
2	Construct a programming solution to the given problem using C.
3	Identify and correct the syntax and logical errors in C programs.
4	Modularize the given problem using functions and structures.

Department of Electrical and Electronics Engineering

Course Name: Basic Electronics Engineering (18ELN14/24)	
At the end of the course student will be able to	
1	Describe the operation of diodes, BJT, FET and Operational Amplifiers.
2	Design and explain the construction of rectifiers, regulators, amplifiers and oscillators.
3	Describe general operating principles of SCRs and its application.
4	Explain the working and design of Fixed voltage IC regulator using 7805 and Astable oscillator using Timer IC 555.
5	Explain the different number system and their conversions and construct simple combinational and sequential logic circuits using Flip-Flops.
6	Describe the basic principle of operation of communication system and mobile phones.

Course Name: Elements of Mechanical Engineering (18ME15/25)	
At the end of the course student will be able to	
1	Identify different sources of energy, their conversion process and also describe the basic concepts thermodynamics and solving simple numerical problems on steam.
2	Explain the working principle of boilers, Turbines, Pumps, IC Engines and Refrigeration.
3	Demonstrate the working principles of an I.C Engine, Refrigeration, air conditioning and also calculate the performance parameters of an IC engine.
4	Recognize & Classify the various engineering materials, metal joining processes and power transmission elements. Also solve simple numerical on power transmission elements.
5	Describe the working of conventional machine Tools, Machining processes and the advanced manufacturing system.

Course Name: Engineering Chemsistry Lab (18ME15/25)	
At the end of the course student will be able to	
1	Analyse materials quantatively using different analytical techniques & instruments to enhance the sensitivity & acuracy.
2	Analyse various materials quantatively by classical volumetric method.

Course Name: Computer Programming Lab (18ME15/25)	
At the end of the course student will be able to	
1	Write algorithms, flowcharts and program for simple problems.
2	Correct syntax and logical errors to execute a program.
3	Correct syntax and logical errors to execute a program.
4	Demonstrate use of functions, arrays, strings, structures and pointers in problem solving.

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Course Name: Technical English (18EGH28)	
At the end of the course student will be able to	
1	Identify common errors in spoken and written communication
2	Get familiarized with English vocabulary and language proficiency
3	Improve nature and style of ssensible writing and acquire employment and workplace communication skills.
4	Improve their Technical Communication Skills through Technical Reading and writing practices
5	Perform well in campus recruitment, engineering and all other general competitive examinations.

Course Name:Engineering Mathematics _ II (18MAT31)	
At the end of the course student will be able to	
1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
2	Know the use of periodic signals and Fourier series to analyze circuits and system communications. beams. Finding series of function.
3	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform
4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis

Course Name:Electric Circuit Analysis (18EE32)	
At the end of the course student will be able to	
1	Analyse the source transformation, source shifting, super mesh, super node and network reduction techniques on DC and AC Circuits.
2	Examine the complex electric circuits using network theorems.
3	Examine the resonant frequency, quality factor and selectivity in series and parallel resonance circuits.
4	Analyse the switching behaviour of RL & RC circuits.
5	Dissect typical waveforms using Laplace transformation.
6	Analyse unbalanced three phase systems and also the performance of two port networks.

Department of Electrical and Electronics Engineering

Course Name: Transformers & Generators (18EE33)	
At the end of the course student will be able to	
1	Analyze the voltage regulation, commercial and all day efficiency of single phase transformer. Explain the operation of 3-Phase transformers, on-load tap-changers and Autotransformer
2	Analyze the performance of transformers by Sumpner's Test, phase conversion, 3-phase connections and parallel operation
3	Analyze the effect of excitation of non-salient pole synchronous generator and determine the ATD, ATC in DC Generators
4	Analyze the regulation of Synchronous Generator by Slip test, EMF, MMF, and ZPF Methods
5	Analyze the performance of the salient pole Synchronous Generators on infinite bus and parallel operation

Course Name: Analog Electronics Circuit (18EE34)	
At the end of the course student will be able to	
1	Analyse the output response of clipper and clamper circuits and produce the preliminary design of the transistor biasing circuits and switching circuits.
2	Develop the model of transistor amplifiers for their h-parameters at low frequencies.
3	Analyse and produce the preliminary design of the multistage and feedback amplifiers.
4	Analyse and produce the preliminary design of the power amplifier circuits and oscillators for different frequencies.
5	Analyse and produce the preliminary design of the FET and MOSFET amplifiers.

Course Name: Digital System Design (18EE35)	
At the end of the course student will be able to	
1	Develop simplified switching equation using Karnaugh Maps and Quine McClusky techniques.
2	Apply the design procedures for Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital combinational control circuits.
3	Illustrate the design of flip flops and development of its characteristic equation.
4	Apply the design procedures for counters and shift registers as sequential control circuits.
5	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits and Interpret the functioning of different programmable memory

Course Name: Electrical & Electronics Measurements (18EE36)	
At the end of the course student will be able to	
1	Apply relevant bridges to find the resistance, inductance and capacitance and also find earth resistance
2	Apply relevant meters to find power and energy and explain the operation of power factor meter, frequency meter and energy meter.
3	Apply methods of extending the range of ammeters and voltmeters & operation of instrument transformers and magnetic permeameters.
4	Illustrate the operation of Electronic multimeters. Electronic and digital voltmeters, Q meter and electronic energy meter.
5	Illustrate the operation of various display and recording devices (electronic & digital).

Department of Electrical and Electronics Engineering

Course Name: Electrical Machines lab-1 (18EEL37)	
At the end of the course student will be able to	
1	Assess the equivalent circuit, voltage regulation and efficiency of transformers.
2	Evaluate the performance of two single phase transformers of different KVA rating connected in parallel.
3	Analyze the performance of 3 single phase transformers connected in star-delta, delta – delta and V – V (open delta) for three phase operation and phase conversion.
4	Assess the voltage regulation and efficiency of salient pole and non-salient pole synchronous generator by direct & indirect methods.
5	Practically demonstrate the synchronization of synchronous generator to infinite bus.

Course Name: Electronics Lab (18EEL38)	
At the end of the course student will be able to	
1	Design and test rectifier circuits with and without capacitor filters.
2	Determine h-parameter models of transistor for all modes.
3	Design and test BJT and FET amplifier.[
4	Design and test RC phase shift oscillator circuit
5	Realize Boolean expressions, adders, subtractors and code conversion using gates and ICs.
6	Design and test Ring counter/Johnson counter, Sequence generator and 3 bit counters.

Course Name: Mathematics-IV (18MAT41)	
At the end of the course student will be able to	
1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory
2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Course Name: Power Generation, Economics (18EE42)	
At the end of the course student will be able to	
1	Explain the working of hydroelectric power plant and state functions of major equipment of the power plants
2	Explain the working of steam, Diesel and Gas power plants and state functions of major equipment of the power plants
3	Explain the working of nuclear power plants and state functions of major equipment of the power plants
4	Classify various substations and explain the importance of grounding.
5	Apply the economic aspects of power system operation and its effects and explain the importance of power factor improvement

Department of Electrical and Electronics Engineering

Course Name: Transmission & Distribution (18EE43)	
At the end of the course student will be able to	
1	Explain transmission and distribution scheme, identify the importance of different transmission systems and types of insulators
2	Analyze and compute the parameters of the transmission line for different configurations
3	Assess the performance of overhead lines
4	Interpret corona and explain the use of underground cables
5	Classify different types of distribution systems; examine its quality & reliability

Course Name: Electric Motors (18EE44)	
At the end of the course student will be able to	
1	Explain the constructional features of Motors and select a suitable drive for specific application.
2	Analyze and assess the performance characteristics of DC motors by conducting suitable tests and control the speed by suitable method.
3	Explain the constructional features of Three Phase and Single phase induction Motors and assess their performance.
4	Control the speed of induction motor by a suitable method and Explain the operation of Synchronous motor and special motors

Course Name: Electromagentic Field Theory (18EE45)	
At the end of the course student will be able to	
1	Apply different coordinate systems , Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations.
2	Calculate the energy and potential due to a system of charges & Explain the behavior of electric field across a boundary conditions.
3	Explain the Poisson's, Laplace equations and behavior of steady magnetic fields.
4	Explain the behavior of magnetic fields and magnetic materials.
5	Analyze time varying fields and propagation of waves in different media.

Course Name: Operational amps & Linears Ics (18EE46)	
At the end of the course student will be able to	
1	Interpret the characteristics of ideal and practical op-amp.
2	Analyse filters, signal generators and voltage regulators using linear Ics
3	Analyse the application of Linear ICs as comparators and converters.
4	Analyse rectifiers, A/D & D/A converters using op-amp
5	Interpret the basics of PLL and timers

Course Name: Electrical Machines Lab-II (18EEL47)	
At the end of the course student will be able to	
1	Test dc machines to determine their characteristics and control the speed of DC motors.
2	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
3	Perform load test on single phase and three phase induction motor to assess its performance.
4	Conduct test on induction motor to pre-determine the performance characteristics
5	Conduct test on synchronous motor to draw the performance curves

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Course Name: Operational amps & Linears ICs Lab (18EEL48)	
At the end of the course student will be able to	
1	Analyze the characteristic parameters of OP-Amp
2	Design and analyse the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.
3	Evaluate the OP-Amp as oscillators and filters.
4	Analyse the Linear IC's as regulators and waveform generators.
5	Design and analyse the Linear IC's as timer and Schmitt trigger circuit

Course Name: Management and Entrepreneurship (18EE51)	
At the end of the course student will be able to	
1	Apply the principles and concepts of management, planning for decision making.
2	Interpret the concepts of organizing, staffing, directing and controlling.
3	Interpret the concepts and characteristics of entrepreneur and business for capacity building and corporate Governance.
4	Extend the concepts of small-scale industries and receive institutional supports for industries.
5	Apply the ideas in the development and execution of the project by considering Technical, Economical, Administrative and relevant aspects.

Course Name: Microcontroller (18EE52)	
At the end of the course student will be able to	
1	Interpret the architectural features of 8051 microcontroller and its peripherals, Memory Organization, memory interfacing and looping instructions.
2	Develop 8051 programs in assembly language to solve arithmetic and logical programs.
3	Analyse different I/O devices (Serial), interrupts and develop programs to configure 8051 Microcontroller.
4	Analyse Interfacing of 8051 Microcontroller for different I/O devices and 8255 Microcontroller.
5	Evaluate software delays, timer delays and timer programming using both Assembly and C language.

Course Name: Power Electronics (18EE53)	
At the end of the course student will be able to	
1	Analyse and design single phase diode rectifier circuits with the characteristics of power diodes.
2	Analyse the steady state, switching characteristics and gate control requirements of power transistors.
3	Analyse the gate characteristics and gate control requirements of power thyristors.
4	Analyse and design of controlled rectifiers and AC voltage controllers.
5	Analyse and design of DC-DC converters and DC-AC Converters.

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Course Name: Signal & Systems (18EE54)	
At the end of the course student will be able to	
1	Analyse the classification of the signals, and illustrate its operations and properties.
2	Apply convolution in both continuous and discrete domain for the impulse response of an LTI system.
3	Apply continuous time Fourier transform representation and to analyze its properties and applications (frequency response and solutions of differential equations) for LTI systems.
4	Apply discrete time Fourier transform representation and to analyze its properties and applications (frequency response and solutions of difference equations) for LTI systems.
5	Apply Z-transform and properties of ROC for the analysis of discrete time systems.

Course Name: Electrical Machine Design (18EE55)	
At the end of the course student will be able to	
1	Apply the knowledge of engineering materials for the design of electrical machines.
2	Apply design procedures for preliminary design of Transformers.
3	Apply design procedures for preliminary design preliminary design of DC machines.
4	Apply design procedures for preliminary design preliminary design of the stator of Induction Motors and Synchronous machines.
5	Apply design procedures for preliminary design preliminary design of the rotor of Induction Motors.
6	Apply design procedures for preliminary design preliminary design of the rotor of Synchronous machines.

Course Name: High Voltage Engineering (18EE56)	
At the end of the course student will be able to	
1	Interpret the conduction and breakdown phenomenon in dielectrics.
2	Apply the principles of generation of high voltage, currents and Impulse voltages.
3	Apply measurement techniques for High Voltage, current and Impulse voltages.
4	Interpret overvoltage phenomenon and insulation coordination in electric power systems.
5	Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear.

Course Name: Microcontrollers Laboratory(18EEL57)	
At the end of the course student will be able to	
1	Evaluate the output for data transfer, arithmetic, Boolean, logical instructions using Assembly Language Programming.
2	Evaluate the output for code conversions using Assembly Language Programming.
3	Evaluate the output for subroutines for generation of delays, counters, configuration of SFRs, serial communication and timers using Assembly Language Programming.
4	Evaluate the interfacing of PMDC motors using C programming.
5	Evaluate the interfacing of DAC, Elevator (Board Simulator) and LCD using C Programming.

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Department of Electrical and Electronics Engineering

Course Name: Power Electronics Lab (18EEL58)	
At the end of the course student will be able to	
1	Analyse the static characteristics of SCR, MOSFET, IGBT and TRIAC and compare their performances.
2	Demonstrate UJT relaxation oscillator and digital firing circuit to turn-on SCR.
3	Analyse the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
4	Control the speed of a DC motor, universal motor and stepper motor by using SCR, MOSFET and TRIAC.
5	Analyse and design of snubber circuit.

Course Name: Control System (18EE61)	
At the end of the course student will be able to	
1	Analyse the modelling of mechanical and electrical systems and develop the transfer functions of the control systems.
2	Analyse and develop the transfer function of the system by using block diagram reduction technique and signal flow graph.
3	Analyse the time response of first order and second order system and determine the stability of system using RH criteria.
4	Analyse the stability of the system using Root Locus and Bode plot.
5	Analyse the stability of the system using nyquist plot and design the controllers and compensators.

Course Name: Power System Analysis and Stability (18EE62)	
At the end of the course student will be able to	
1	Apply the per unit system for one line diagram of power systems.
2	Analyze the selection of circuit breaker through short circuit analysis for synchronous machines.
3	Develop un-balanced power system network using symmetrical components.
4	Analyze unsymmetrical fault currents using symmetrical components.
5	Analyze the dynamics of synchronous machine and transient stability

Course Name: Digital Signal Processing (18EE63)	
At the end of the course student will be able to	
1	Apply Discrete Fourier transform of various signals and circular convolution using various methods.
2	Apply Fast Fourier Transforms Algorithm for computing DFT and inverse DFT of a given sequence
3	Analyse and Design IIR Filters using various techniques (impulse invariant transformation, bilinear transformation and Frequency transformations)
4	Analyse and Design FIR Filters using various techniques(Window functions and frequency sampling techniques)
5	Realize and develop digital IIR and FIR system by various methods.

Department of Electrical and Electronics Engineering

Course Name: Electrical Machine Design (18EE643)	
At the end of the course student will be able to	
1	Develop armature winding diagram for DC and AC machines and explain their terminologies
2	Develop a layout for substation using the standard symbols for substation equipment.
3	Analyse and draw the sectional views of core and shell types transformers using the design data
4	Analyse and draw sectional views of assembled DC machine or its parts using the design data or the sketches
5	Analyse and draw sectional views of assembled alternator or its parts using the design data or the sketches.

Course Name: OBJECT ORIENTED CONCEPTS(18CS653)	
At the end of the course student will be able to	
1	Explain the object-oriented concepts and JAVA.
2	Develop computer programs to solve real world problems in Java.
3	Develop simple GUI interfaces for a computer program to interact with users.

Course Name: Control Systems Laboratory (18EEL66)	
At the end of the course student will be able to	
1	Analyse the performance characteristics of AC servomotor, DC servomotors and sychro-transmitter receiver pair.
2	Determine the time response and frequency response of a second order system using software package and discrete components.
3	Design and Analyse the Lead, Lag and Lag-Lead compensators for the given specifications.
4	Analyse the effect of P, PI, PD, PID and DC position controllers on the step response of the second order system.
5	Evaluate the stability of the system using root locus, bode plot and nyquist plot.

Course Name: Digital Signal processing Lab (18EEL67)	
At the end of the course student will be able to	
1	Explain the physical interpretation of sampling theorem in time and frequency domain.
2	Evaluate the impulse response of systems.
3	Perform Convolution of given sequences to evaluate the response of systems.
4	Construct DFT and IDFT of a given sequences using basic definition
5	Construct a solution for a given difference equation and implement IIR & FIR filters

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Course Name: Mini Project (18EEMP68)	
At the end of the course student will be able to	
1	Develop the mini-project and be able to defend it.
2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
3	Habituated to critical thinking and use problem solving skills.
4	Communicate effectively and apply ideas clearly and coherently in both the written and oral forms.
5	Take part in team work to achieve common goal.
6	Learn on their own, reflect on their learning and recommend appropriate actions to improve it.

Course Name: Power Systems Analysis -II (17EE71)	
At the end of the course student will be able to	
1	Develop the Ybus of power system using rule of inspection and graph theory
2	Perform load flow analysis of power system networks using Gauss-Seidel, Newton-Raphson and Fast decoupled iterative methods.
3	Solve the Unit Commitment problem with various constraints using optimization techniques.
4	Analyze optimal scheduling of hydro-thermal systems, Power system security and reliability.
5	Analyze short circuit faults in power system networks using Zbus
6	Interpret power system stability through solution of swing equation

Course Name: Power System Protection (17EE72))	
At the end of the course student will be able to	
1	Interpret performance of protective relays, components of protection scheme and relay terminology.
2	Interpret over current protection, working and characteristics of distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays.
3	Interpret pilot protection; wire pilot relaying and carrier pilot relaying, Interpret construction, operating principles and performance of differential relays for differential protection & interpret protection of generators, motors, Transformer and Bus Zone Protection
4	Interpret the principle of circuit interruption in different types of circuit breakers.
5	Interpret the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse and Discuss protection against Overvoltages and Gas Insulated Substation

Course Name: HV Engineering (17EE73)	
At the end of the course student will be able to	
1	Interpret the conduction and breakdown phenomenon in dielectrics.
2	Apply the principles of generation of high voltage, currents and Impulse voltages.
3	Apply measurement techniques for High Voltage, current and Impulse voltages.
4	Interpret overvoltage phenomenon and insulation coordination in electric power systems.
5	Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear.

Department of Electrical and Electronics Engineering

Course Name: Utilisation Of Electrical Power (17EE742)	
At the end of the course student will be able to	
1	Illustrate electric heating, air-conditioning and electric welding. Explain laws of electrolysis, extraction and refining of metals and electro deposition.
2	Explain the terminology of illumination, laws of illumination, construction and working of electric lamps. Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting-street lighting.
3	Illustrate systems of electric traction, speed time curves and mechanics of train movement. Explain the motors used for electric traction and their control.
4	Illustrate braking of electric motors, traction systems and power supply and other traction systems.

Course Name: Testing & Commission of Electrical Apparatus (17EE752)	
At the end of the course student will be able to	
1	Interpret the conduction and breakdown phenomenon in dielectrics.
2	Apply the principles of generation of high voltage, currents and Impulse voltages.
3	Apply measurement techniques for High Voltage, current and Impulse voltages.
4	Interpret overvoltage phenomenon and insulation coordination in electric power systems.
5	Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear.

Course Name: Power System Simulation Laboratory (17EEL76)	
At the end of the course student will be able to	
1	Develop a program in power system toolbox to assess the performance of medium and long transmission lines and to solve bus admittance and bus impedance matrices of interconnected power systems.
2	Develop a program to obtain the power angle characteristics of salient and non-salient pole alternator and to assess the transient stability under three phase fault at different locations in a of radial power systems
3	Solve power flow problem for simple power systems using Mi-power Tool.
4	Interpret the unsymmetrical faults in radial power systems at different locations.
5	Analyse optimal generation scheduling problems for thermal power plants using Mi-power tool.

Course Name: Relay & High Voltage Lab (17EEL77)	
At the end of the course student will be able to	
1	Ability to set Plug Setting Multiplier, Time Setting Multiplier for Electromagnetic over Current Relay, Over Voltage Relay for a given actuating quantity and verify the characteristics of negative sequence relays
2	Ability to set Plug Setting Multiplier, Time Setting Multiplier for a given actuating quantity for numerical relay
3	Ability to estimate asymmetric fault current for protection of generator and Motor
4	Analyze the spark over characteristics for air for both uniform and non-uniform configurations using High AC and DC voltages and measure high AC and DC voltages and breakdown strength of transformer oil.
5	Estimate electric field and measure the capacitance of different electrode configuration models

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Course Name: PROJECT PHASE – I AND SEMINAR (17EEP78)	
At the end of the course student will be able to	
1	Demonstrate a sound technical knowledge of their selected project topic.
2	Undertake problem identification, formulation and solution.
3	Design engineering solutions to complex problems utilizing a systems approach.
4	Demonstrate the knowledge, skills and attitudes of a professional engineer and Communicate with engineers,community at large in written and oral forms and .
5	Demonstrate the engineering principles in a team to manage projects in multidisciplinary field.

Course Name: Power System Operation & Control (17EE81)	
At the end of the course student will be able to	
1	Analyze various levels of controls in Power systems, SCADA and Solve unit commitment problems
2	Apply the issues concerning hydrothermal scheduling and its solutions to hydro thermal problems
3	Analyze the basic generator control loops, mathematical models of ALFC and functions of Automatic generation control
4	Analyze automatic generation control in an interconnected power system and the methods of voltage and reactive power control
5	Analyze reliability, security, contingency analysis and state estimation of power systems.

Course Name: Industrial Drives And Applications (17EE82)	
At the end of the course student will be able to	
1	Explain the advantages of Electric drives and its dynamics and different modes of operatio
2	Illustrate a motor for a drive and control of dc motor using controlled rectifiers
3	Analyze the performance of induction motor drives under different conditions
4	Control induction motor, synchronous motor and stepper motor drives.
5	Illustrate a suitable electrical drive for specific application in the industry.

Course Name: INTEGRATION OF DISTRIBUTED GENERATION (17EE833)	
At the end of the course student will be able to	
1	Explain energy generation by wind power and solar power and discuss the variation in production capacity at different timescales, the size of individual units, and the flexibility in choosing locations with respect to wind and solar systems.
2	Explain the performance of the system when distributed generation is integrated to the system.
3	Discuss effects of the integration of DG: Due to the increased risk of overload & increased losses.
4	Discuss effects of the integration of DG: Increased risk of overvoltage's, increased levels of power quality disturbances

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Course Name: Internship/Professional Practice (17EE84)	
At the end of the course student will be able to	
1	Gain Practical experience and acquire knowledge within industry in which the internship is done.
2	Develop a greater understanding about career options while more clearly defining personal career goals and experience the activities and functions of professionals.
3	Develop and refine oral and written communication skills and identify areas for future knowledge and skill development.
4	Acquire the knowledge of administration, marketing, finance and economics and expand intellectual capacity, credibility, judgement intution.

Course Name: Project Work - Phase-II(17EEP85)	
At the end of the course student will be able to	
1	Apply Present the project and be able to defend it.
2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
3	Habituated to critical thinking and use problem solving skills
4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
5	Learn on their own, reflect on their learning and take appropriate actions to improve it and Work in a team to achieve common goal

Course Name: Seminar (17EES86)	
At the end of the course student will be able to	
1	Attain use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning
2	Identify, understand and discuss current, real time issues
3	Improve oral and written communication skills
4	Explore an appreciation of the self in relation to its large diverse social and acdemic contexts and apply priciples of ethics and respect in interaction with others.

HoD
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Professor and HOD
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ATME College of Engineering, Mysuru

Department of Electrical and Electronics Engineering

CO Statements, CO-PO and CO-PSO Matrix for AY 2020-2021

Course Name: Transform Calculus, Numerical Methods & Fourier Series (18MAT31)																	
C201	C200.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.															
	C200.2	Know the use of periodic signals and Fourier series to analyze circuits and system communications. beams. Finding series of function.															
	C200.3	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform															
	C200.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.															
	C200.5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis															
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**		
	C200.1	3	3	-	-	-	-	-	-	-	-	-	1				
	C200.2	2	2	-	-	-	-	-	-	-	-	-	1				
	C200.3	2	2	-	-	-	-	-	-	-	-	-	2				
	C200.4	1	1	-	-	-	-	-	-	-	-	-	1				
	C200.5	1	1	-	-	-	-	-	-	-	-	-	1				
Course Name: Electric Circuit Analysis (18EE32)																	
C202	C201.1	Analyse the source transformation, source shifting, super mesh, super node and network reduction techniques on DC and AC Circuits.															
	C201.2	Examine the complex electric circuits using network theorems.															
	C201.3	Examine the resonant frequency, quality factor and selectivity in series and parallel resonance circuits.															
	C201.4	Analyse the switching behaviour of RL & RC circuits.															
	C201.5	Dissect typical waveforms using Laplace transformation.															
	C201.6	Analyse unbalanced three phase systems and also the performance of two port networks.															
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**		
	C201.1	3	3	0	0	0	0	0	0	0	0	0	3	0	3		
	C201.2	3	3	0	0	0	0	0	0	0	0	0	3	0	3		
	C201.3	3	3	0	0	0	0	0	0	0	0	0	3	0	2		
	C201.4	2	2	0	0	0	0	0	0	0	0	0	3	0	2		
	C201.5	3	2	0	0	0	0	0	0	0	0	0	3	0	2		
	C201.6	3	3	0	0	0	0	0	0	0	0	0	3	0	3		

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Course Name: Transformers & Generators (18EE33)		
	C202.1	Analyze the voltage regulation, commercial and all day efficiency of single phase transformer. Explain the operation of 3-Phase transformers, on-load tap-changers and Autotransformer
	C202.2	Analyze the performance of transformers by Sumpner's Test, phase conversion, 3-phase connections and parallel operation
	C202.3	Analyze the effect of excitation of non-salient pole synchronous generator and determine the ATD, ATC in DC Generators
	C202.4	Analyze the regulation of Synchronous Generator by Slip test, EMF, MMF, and ZPF Methods
	C202.5	Analyze the performance of the salient pole Synchronous Generators on infinite bus and parallel operation

C203		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C202.1	3	3	0	0	0	0	0	0	0	0	0	2	0	3		
	C202.2	3	3	0	0	0	0	0	0	0	0	0	2	0	3		
	C202.3	3	3	0	0	0	0	0	0	0	0	0	2	0	3		
	C202.4	3	3	0	0	0	0	0	0	0	0	0	2	0	3		
	C202.5	3	3	0	0	0	0	0	0	0	0	0	2	0	3		

Course Name: Analog Electronics Circuit (18EE34)		
	C203.1	CO1: Analyse the output response of clipper and clamper circuits and produce the preliminary design of the transistor biasing circuits and switching circuits.
	C203.2	CO2: Develop the model of transistor amplifiers for their h-parameters at low frequencies.
	C203.3	CO3: Analyse and produce the preliminary design of the multistage and feedback amplifiers.
	C203.4	CO4: Analyse and produce the preliminary design of the power amplifier circuits and oscillators for different frequencies.
	C203.5	CO5: Analyse and produce the preliminary design of the FET and MOSFET amplifiers.

C204		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C203.1	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C203.2	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C203.3	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C203.4	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C203.5	3	3	0	0	0	0	0	0	0	0	0	3	2	1		

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Course Name: Digital System Design (18EE35)																
C205	C204.1	CO1. Develop simplified switching equation using Karnaugh Maps and Quine McClusky techniques.[L4]														
	C204.2	CO2:Apply the design procedures for Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital combinational control circuits.[L3]														
	C204.3	CO3: Illustrate the design of flip flops and development of its characteristic equation.[L3]														
	C204.4	CO4:Apply the design procedures for counters and shift registers as sequential control circuits.[L3]														
	C204.5	CO5: Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits and Interpret the functioning of different programmable memory[L4]														
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**		
	C204.1	3	2	2	0	0	0	0	0	0	0	0	0	0	3		
	C204.2	3	3	3	0	0	0	0	0	0	0	0	0	0	3		
	C204.3	2	2	3	0	0	0	0	0	0	0	0	0	0	3		
	C204.4	2	2	3	0	0	0	0	0	0	0	0	0	0	3		
	C204.5	2	2	3	0	0	0	0	0	0	0	0	0	0	3		
Course Name: Electrical & Electronics Measurements (18EE36)																
	C205.1	CO1:Apply relevant bridges to find the resistance, inductance and capacitance and also find earth resistance														

C206	C205.2	CO2:Apply relevant meters to find power and energy and explain the operation of power factor meter, frequency meter and energy meter.														
	C205.3	CO3:Apply methods of extending the range of ammeters and voltmeters & operation of instrument transformers and magnetic permeameters.														
	C205.4	CO4:Illustrate the operation of Electronic multimeters. Electronic and digital voltmeters, Q meter and electronic energy meter.														
	C205.5	CO5:Illustrate the operation of various display and recording devices (electronic & digital).														
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**		
	C205.1	3	0	0	0	0	0	0	0	0	0	0	0	1	0		
	C205.2	2	2	0	0	0	0	0	0	0	0	0	0	2	0		
	C205.3	3	2	0	0	0	2	0	0	0	0	0	0	2	0		
	C205.4	3	2	0	0	0	2	0	0	0	0	0	0	2	0		
	C205.5	2	0	0	0	0	2	0	0	0	0	0	0	1	0		

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Course Name: Electrical Machines lab-1 (18EEL37)		
C207	C206.1	CO1: Assess the equivalent circuit, voltage regulation and efficiency of transformers.
	C206.2	CO2: Evaluate the performance of two single phase transformers of different KVA rating connected in parallel.
	C206.3	CO3: Analyze the performance of 3 single phase transformers connected in star-delta, delta – delta and V – V (open delta) for three phase operation and phase conversion.
	C206.4	CO4: Assess the voltage regulation and efficiency of salient pole and non-salient pole synchronous generator by direct & indirect methods.
	C206.5	CO5: Practically demonstrate the synchronization of synchronous generator to infinite bus.

C207		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C206.1	3	3	0	0	0	0	0	0	3	3	0	3	0	3		
	C206.2	3	3	0	0	0	0	0	0	3	3	0	3	0	3		
	C206.3	3	3	0	0	0	0	0	0	3	3	0	3	0	3		
	C206.4	3	3	0	0	0	0	0	0	3	3	0	3	0	3		
	C206.5	3	3	0	0	0	0	0	0	3	3	0	3	0	3		

Course Name: Electronics Lab (18EEL38)		
C208	C207.1	Design and test rectifier circuits with and without capacitor filters.
	C207.2	Determine h-parameter models of transistor for all modes.
	C207.3	Design and test BJT and FET amplifier.[
	C207.4	Design and test RC phase shift oscillator circuit
	C207.5	Realize Boolean expressions, adders, subtractors and code conversion using gates and ICs.
	C207.6	Design and test Ring counter/Johnson counter, Sequence generator and 3 bit counters.

C208		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C207.1	3	3	0	0	0	0	0	0	3	3	0	2	2	1		

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	C207.2	3	3	0	0	0	0	0	0	3	3	0	2	2	1		
	C207.3	3	3	0	0	0	0	0	0	3	3	0	2	2	1		
	C207.4	3	3	0	0	0	0	0	0	3	3	0	2	2	1		
	C207.5	3	3	0	0	0	0	0	0	3	3	0	2	2	1		
	C207.6	3	3	0	0	0	0	0	0	3	3	0	2	2	1		

Course Name: Mathematics-IV (18MAT41)

	C208.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory
	C208.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
	C208.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
	C208.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
	C208.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

C209		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C208.1	2	2	0	0	0	0	0	0	0	0	0	1				
	C208.2	2	2	0	0	0	0	0	0	0	0	0	1				
	C208.3	2	2	0	0	0	0	0	0	0	0	0	1				
	C208.4	1	1	0	0	0	0	0	0	0	0	0	0				
	C208.5	2	2	0	0	0	0	0	0	0	0	0	1				

Course Name: Power Generation, Economics (18EE42)

	C209.1	Explain the working of hydroelectric power plant and state functions of major equipment of the power plants [L2]
	C209.2	Explain the working of steam, Diesel and Gas power plants and state functions of major equipment of the power plants [L2]
	C209.3	Explain the working of nuclear power plants and state functions of major equipment of the power plants [L2]
	C209.4	Classify various substations and explain the importance of grounding [L2]
	C209.5	Apply the economic aspects of power system operation and its effects and explain the importance of power factor improvement [L3]

C210		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C209.1	2	0	0	0	0	0	0	0	0	0	0	0	3	0		
	C209.2	2	0	0	0	0	2	0	0	0	0	0	0	3	0		
	C209.3	2	0	0	0	0	2	0	0	0	0	0	0	3	0		
	C209.4	2	2	0	0	0	0	0	0	0	0	0	2	3	0		
	C209.5	2	2	0	0	0	0	0	0	0	0	0	2	3	0		

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Course Name: Transmission & Distribution (18EE43)																
	C210.1	Explain transmission and distribution scheme, identify the importance of different transmission systems and types of insulators														
	C210.2	Analyze and compute the parameters of the transmission line for different configurations														
	C210.3	Assess the performance of overhead lines														
	C210.4	Interpret corona and explain the use of underground cables														
	C210.5	Classify different types of distribution systems; examine its quality & reliability														
C211		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C210.1	3	2	0	0	0	2	2	0	0	0	0	2	3	0		
	C210.2	3	2	0	0	0	0	0	0	0	0	0	2	3	0		
	C210.3	3	2	0	0	0	0	0	0	0	0	0	0	3	0		
	C210.4	3	2	0	0	0	2	0	0	0	0	0	2	3	0		
	C210.5	3	2	0	0	0	2	0	0	0	0	0	2	3	0		
Course Name: Electric Motors (18EE44)																	
	C211.1	CO-1:Explain the constructional features of Motors and select a suitable drive for specific application.[L2]															
	C211.2	CO-2: Analyze and assess the performance characteristics of DC motors by conducting suitable tests and control the speed by suitable method.[L4]															
	C211.3	CO-3:Explain the constructional features of Three Phase and Single phase Induction Motors and assess their performance.[L4]															
	C211.4	CO-4:Control the speed of induction motor by a suitable method and Explain the operation of Synchronous motor and special motors.[L4]															
C212		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C211.1	3	0	0	0	0	0	0	0	0	0	0	2	0	2		
	C211.2	3	3	0	0	0	0	0	0	0	0	0	2	0	2		
	C211.3	3	3	0	0	0	0	0	0	0	0	0	2	0	2		
	C211.4	3	3	0	0	0	0	0	0	0	0	0	2	0	2		

Course Name: Electromagentic Field Theory (18EE45)																	
	C212.1	Apply different coordinate systems , Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations.[L3]															
	C212.2	Calculate the energy and potential due to a system of charges & Explain the behavior of electric field across a boundary conditions.[L4]															
	C212.3	Explain the Poisson's, Laplace equations and behavior of steady magnetic fields.[L2]															
	C212.4	Explain the behavior of magnetic fields and magnetic materials.[L2]															
	C212.5	Analyze time varying fields and propagation of waves in different media.[L4]															
C213		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C212.1	3	0	0	0	0	0	0	0	0	0	0	0	2	0		
	C212.2	3	2	0	0	0	0	0	0	0	0	0	0	2	0		
	C212.3	3	0	0	0	0	0	0	0	0	0	0	0	2	0		
	C212.4	3	0	0	0	0	0	0	0	0	0	0	0	2	0		
	C212.5	3	2	0	0	0	0	0	0	0	0	0	0	2	0		
Course Name: Operational amps & Linears Ics (18EE46)																	
	C213.1	Interpret the characteristics of ideal and practical op-amp.[L2]															
	C213.2	Analyse filters, signal generators and voltage regulators using linear ICs.[L4]															
	C213.3	Analyse the application of Linear ICs as comparators and converters.[L4]															
	C213.4	Analyse rectifiers, A/D & D/A converters using op-amp[L4]															
	C213.5	Interpret the basics of PLL and timers [L2]															
C214		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C213.1	3	2	0	0	0	0	0	0	0	0	0	2	2	1		
	C213.2	3	2	0	0	0	2	0	0	0	0	0	2	2	1		
	C213.3	3	2	0	0	0	0	0	0	0	0	0	2	2	1		
	C213.4	3	2	0	0	0	0	0	0	0	0	0	2	2	1		
	C213.5	3	2	0	0	0	0	0	0	0	0	0	2	2	1		

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Course Name: Electrical Machines Lab-II (18EEL47)		
C215	C214.1	Test dc machines to determine their characteristics and control the speed of DC motors.
	C214.2	Pre-determine the performance characteristics of dc machines by conducting suitable tests.
	C214.3	Perform load test on single phase and three phase induction motor to assess its performance.
	C214.4	Conduct test on induction motor to pre-determine the performance characteristics
	C214.5	Conduct test on synchronous motor to draw the performance curves

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C214.1	3	3	0	2	0	0	0	0	3	3	0	0	0	2		
C214.2	3	3	0	2	0	0	0	0	3	3	0	0	0	2		
C214.3	3	3	0	2	0	0	0	0	3	3	0	0	0	2		
C214.4	3	3	0	2	0	0	0	0	3	3	0	0	0	2		
C214.5	3	3	0	2	0	0	0	0	3	3	0	0	0	2		

Course Name: Operational amps & Linears ICs Lab (18EEL48)		
C216	C215.1	Analyze the characteristic parameters of OP-Amp [L4]
	C215.2	Design and analyse the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.
	C215.3	Evaluate the OP-Amp as oscillators and filters. [L5]
	C215.4	Analyse the Linear IC's as regulators and waveform generators. [L4]
	C215.5	Design and analyse the Linear IC's as timer and Schmitt trigger circuit [L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C215.1	3	2	0	0	0	0	0	0	2	2	0	2	2	1		
C215.2	3	2	0	0	0	0	0	0	2	2	0	2	2	1		
C215.3	3	2	0	0	0	0	0	0	2	2	0	2	2	1		
C215.4	3	2	0	0	0	0	0	0	2	2	0	2	2	1		
C215.5	3	2	0	0	0	0	0	0	2	2	0	2	2	1		

Course Name: Management and Entrepreneurship (18EE51)		
C301	C300.1	CO.1. Apply the principles and concepts of management, planning for decision making. [M1][L2]
	C300.2	CO.2. Interpret the concepts of organizing, staffing, directing and controlling. [M2][L2]
	C300.3	CO.3. Interpret the concepts and characteristics of entrepreneur and business for capacity building and corporate Governance. [M3][L3]
	C300.4	CO.4. Extend the concepts of small-scale industries and receive institutional supports for industries. [M4] [L3]
	C300.5	CO.5. Apply the ideas in the development and execution of the project by considering Technical, Economical, Administrative and relevant aspects. [M5][L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C300.1	2	0	0	0	0	2	0	0	0	0	0	0	1	0		
C300.2	2	0	0	0	0	2	0	0	0	0	0	0	1	0		
C300.3	2	0	0	0	0	2	0	0	0	0	0	0	2	0		
C300.4	2	0	0	0	0	2	0	0	0	0	0	0	1	0		
C300.5	2	0	0	0	0	2	0	0	0	0	3	0	2	0		

Course Name: Microcntroller (18EE52)		
C302	C301.1	CO.1. Interpret the architectural features of 8051 microcontroller and its peripherals, Memory Organization, memory
	C301.2	CO.2. Develop 8051 programs in assembly language to solve arithmetic and logical programs.[L4]
	C301.3	CO.3. Analyse different I/O devices (Serial), interrupts and develop programs to configure 8051 Microcontroller.[L4]
	C301.4	CO.4. Analyse Interfacing of 8051 Microcontroller for different I/O devices and 8255 Microcontroller.[L4]
	C301.5	CO5 Evaluate softw are delays, timer delays and timer programming using both Assembly and C language.[L5]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C301.1	0	3	0	0	2	0	0	0	0	0	0	3	0	3		
C301.2	0	3	0	0	2	0	0	0	0	0	0	3	0	3		
C301.3	0	3	0	0	2	0	0	0	0	0	0	3	0	3		
C301.4	0	3	0	0	2	0	0	0	0	0	0	3	0	3		
C301.5	0	3	0	0	2	0	0	0	0	0	0	3	0	3		

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Course Name: Power Electronics (18EE53)

C303	C302.1	CO.1. Analyse and design single phase diode rectifier circuits with the characteristics of power diodes.[L4]
	C302.2	CO.2. Analyse the steady state, switching characteristics and gate control requirements of power transistors.[L3]
	C302.3	CO.3. Analyse the gate characteristics and gate control requirements of power thyristors.[L3]
	C302.4	CO.4. Analyse and design of controlled rectifiers and AC voltage controllers.[L4]
	C302.5	CO.5 Analyse and design of DC-DC converters and DC-AC Converters.[L4]

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C302.1	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C302.2	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C302.3	3	3	0	0	0	0	0	0	0	0	0	3	2	1		
	C302.4	3	3	0	0	0	0	0	0	0	0	0	3	3	2		
	C302.5	3	3	0	0	0	0	0	0	0	0	0	3	3	2		

Course Name: Signal & Systems (18EE54)

C304	C303.1	CO.1. Analyse the classification of the signals, and illustrate its operations and properties.[L4]
	C303.2	CO.2. Apply convolution in both continuous and discrete domain for the impulse response of an LTI system.[L3]
	C303.3	CO.3. Apply continuous time Fourier transform representation and to analyze its properties and applications (frequency response and solutions of differential equations) for LTI systems.[L3]
	C303.4	CO.4. Apply discrete time Fourier transform representation and to analyze its properties and applications (frequency response and solutions of difference equations) for LTI systems.[L3]
	C303.5	CO.5 Apply Z-transform and properties of ROC for the analysis of discrete time systems.[L4]

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C303.1	2	2	0	0	0	0	0	0	0	0	0	1	0	3		
	C303.2	2	2	0	0	0	0	0	0	0	0	0	2	0	3		
	C303.3	2	2	0	0	0	0	0	0	0	0	0	2	0	3		
	C303.4	2	2	0	0	0	0	0	0	0	0	0	2	0	3		
	C303.5	1	2	0	0	0	0	0	0	0	0	0	2	0	3		

Course Name: Electrical Machine Design (18EE55)

C305	C304.1	Apply the knowledge of engineering materials for the design of electrical machines.
	C304.2	Apply design procedures for preliminary design of Transformers.
	C304.3	Apply design procedures for preliminary design preliminary design of DC machines.
	C304.4	Apply design procedures for preliminary design preliminary design of the stator of Induction Motors and Synchronous machines.
	C304.5	Apply design procedures for preliminary design preliminary design of the rotor of Induction Motors.
	C304.6	Apply design procedures for preliminary design preliminary design of the rotor of Synchronous machines.

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C304.1	3	-	-	-	-	3	2	2	-	-	-	3	-	2		
	C304.2	3	3	3	-	-	3	2	2	-	-	-	3	-	-		
	C304.3	3	3	3	-	-	3	2	2	-	-	-	3	2	2		
	C304.4	3	3	3	-	-	3	2	2	-	-	-	3	-	-		
	C304.5	3	3	3	-	-	3	2	2	-	-	-	3	-	-		
	C304.6	3	3	3	-	-	3	2	2	-	-	-	3	-	-		

Course Name: High Voltage Engineering (18EE56)

C306	C305.1	Interpret the conduction and breakdown phenomenon in dielectrics. (L2)
	C305.2	Apply the principles of generation of high voltage, currents and Impulse voltages. (L2)
	C305.3	Apply measurement techniques for High Voltage, current and Impulse voltages. (L3)
	C305.4	Interpret overvoltage phenomenon and insulation coordination in electric power systems. (L2)
	C305.5	Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear. (L3)

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C305.1	3	2	-	-	-	2	-	-	-	-	-	-	3	0		
	C305.2	3	2	-	-	-	2	-	-	-	-	-	-	3	0		
	C305.3	3	2	-	-	-	2	-	-	-	-	-	-	3	0		
	C305.4	3	2	-	-	-	2	-	-	-	-	-	-	3	0		
	C305.5	3	2	-	-	-	2	-	-	-	-	-	-	3	0		

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Course Name: Microcontrollers Laboratory(18EEL57)

C307	C306.1	CO.1. Evaluate the output for data transfer, arithmetic, Boolean, logical instructions using Assembly Language Programming.[L5]
	C306.2	CO.2. Evaluate the output for code conversions using Assembly Language Programming.[L5]
	C306.3	CO.3. Evaluate the output for subroutines for generation of delays, counters, configuration of SFRs, serial communication and timers using Assembly Language Programming.[L5]
	C306.4	CO.4. Evaluate the interfacing of PMDC motors using C programming.[L5]
	C306.5	CO.5. Evaluate the interfacing of DAC, Elevator (Board Simulator) and LCD using C Programming.[L5]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C306.1	0	0	0	0	3	0	0	0	0	0	0	3	0	3
C306.2	0	0	0	0	3	0	0	0	0	0	0	3	0	3
C306.3	0	0	0	0	3	0	0	0	0	0	0	3	0	3
C306.4	0	0	0	0	3	0	0	0	0	0	0	3	0	3
C306.5	0	0	0	0	3	0	0	0	0	0	0	3	0	3

Course Name: Power Electronics Lab (18EEL58)

C308	C307.1	CO.1. Analyse the static characteristics of SCR, MOSFET, IGBT and TRIAC and compare their performances.[L3]
	C307.2	CO.2. Demonstrate UJT relaxation oscillator and digital firing circuit to turn-on SCR.[L3]
	C307.3	CO.3. Analyse the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.[L3]
	C307.4	CO.4. Control the speed of a DC motor, universal motor and stepper motor by using SCR, MOSFET and TRIAC.[L3]
	C307.5	CO.5 Analyse and design of snubber circuit.[L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C307.1	3	-	-	-	-	-	-	-	3	3	-	2	1	
C307.2	3	-	-	-	-	-	-	-	3	3	-	2	1	
C307.3	3	-	-	-	-	-	-	-	3	3	-	2	1	
C307.4	3	-	-	-	-	-	-	-	3	3	-	2	1	
C307.5	3	2	-	-	-	-	-	1	3	3	-	2	2	

Course Name: Control System (18EE61)

C309	C308.1	Analyse the modelling of mechanical and electrical systems and develop the transfer functions of the control systems. [L4]
	C308.2	Analyse and develop the transfer function of the system by using block diagram reduction technique and signal flow graph. [L4]
	C308.3	Analyse the time response of first order and second order system and determine the stability of system using RH criteria. [L4]
	C308.4	Analyse the stability of the system using Root Locus and Bode plot. [L4]
	C308.5	Analyse the stability of the system using nyquist plot and design the controllers and compensators.[L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C308.1	3	3	0	0	0	0	0	0	0	0	0	3	0	2
C308.2	3	3	0	0	0	0	0	0	0	0	0	3	0	2
C308.3	3	3	2	0	3	0	0	0	0	0	0	3	0	2
C308.4	3	3	2	0	3	0	0	0	0	0	0	3	0	2
C308.5	3	3	2	0	3	0	0	0	0	0	0	3	0	2

Course Name: Power System Analysis and Stability (18EE62)

C310	C309.1	CO1.Apply the per unit system for one line diagram of power systems. [L2]
	C309.2	CO2. Analyze the selection of circuit breaker through short circuit analysis for synchronous machines. [L3]
	C309.3	CO3. Develop un-balanced power system network using symmetrical components.[L3]
	C309.4	CO4. Analyze unsymmetrical fault currents using symmetrical components. [L3]
	C309.5	CO5. Analyze the dynamics of synchronous machine and transient stability [L3]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C309.1	3	2	0	0	0	0	0	0	0	0	0	0	3	0
C309.2	3	2	0	0	0	0	0	0	0	0	0	0	3	0
C309.3	3	2	0	0	0	0	0	0	0	0	0	0	3	0
C309.4	3	2	0	0	0	0	0	0	0	0	0	0	3	0
C309.5	3	2	0	0	0	0	0	0	0	0	0	0	3	0

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Course Name: Digital Signal Processing (18EE63)

C311	C310.1	CO1: Apply Discrete Fourier transform of various signals and circular convolution using various methods. [L3]
	C310.2	CO2: Apply Fast Fourier Transforms Algorithm for computing DFT and inverse DFT of a given sequence [L3]
	C310.3	CO3: Analyse and Design IIR Filters using various techniques (impulse invariant transformation, bilinear transformation and
	C310.4	CO4: Analyse and Design FIR Filters using various techniques(Window functions and frequency sampling techniques) [L4]
	C310.5	CO5: Realize and develop digital IIR and FIR system by various methods.[L3]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C310.1	2	3	0	0	2	0	0	0	0	0	0	2	0	3
C310.2	2	3	0	0	2	0	0	0	0	0	0	2	0	3
C310.3	2	3	2	0	2	0	0	0	0	0	0	2	0	3
C310.4	2	3	2	0	2	0	0	0	0	0	0	2	0	3
C310.5	0	2	0	0	0	0	0	0	0	0	0	0	0	3

Course Name: Electrical Machine Design (18EE643)

C312	C311.1	Develop armature winding diagram for DC and AC machines and explain their terminologies[L3]
	C311.2	Develop a layout for substation using the standard symbols for substation equipment.[L3]
	C311.3	Analyse and draw the sectional views of core and shell types transformers using the design data [L4]
	C311.4	Analyse and draw sectional views of assembled DC machine or its parts using the design data or the sketches[L4]
	C311.5	Analyse and draw sectional views of assembled alternator or its parts using the design data or the sketches.[L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C311.1	3	-	-		3	-	-	-	-	-	-	-	0	2
C311.2	3	-	-		3	3	-	-	-	-	-	-	0	2
C311.3	3	3	-		3	-	-	-	-	-	-	-	0	2
C311.4	3	3	-		3	-	-	-	-	-	-	-	0	2
C311.5	3	3	-		3	-	-	-	-	-	-	-	0	2

Course Name: Control Systems Laboratory (18EEL66)

C315	C313.1	Analyse the performance characteristics of AC servomotor, DC servomotors and sychro-transmitter receiver pair. [L4]
	C313.2	Determine the time response and frequency response of a second order system using software package and discrete components [L5]
	C313.3	Design and Analyse the Lead, Lag and Lag-Lead compensators for the given specifications.[L4]
	C313.4	Analyse the effect of P, PI, PD, PID and DC position controllers on the step response of the second order system.[L4]
	C313.5	Evaluate the stability of the system using root locus, bode plot and nyquist plot.[L5]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C313.1	3	1	0	0	0	0	0	0	2	2	2	2	2	1
C313.2	3	2	0	0	3	0	0	0	2	2	2	2	2	2
C313.3	3	2	0	0	0	0	0	0	2	2	2	2	2	1
C313.4	3	2	0	0	3	0	0	0	2	0	2	2	2	1
C313.5	3	2	0	0	3	0	0	0	2	0	2	2	2	1

Course Name: Digital Signal processing Lab (18EEL67)

C316	C314.1	Explain the physical interpretation of sampling theorem in time and frequency domain.[L2]
	C314.2	Evaluate the impulse response of systems.[L3]
	C314.3	Perform Convolution of given sequences to evaluate the response of systems.[L3]
	C314.4	Construct DFT and IDFT of a given sequences using basic definition.[L3]
	C314.5	Construct a solution for a given difference equation and implement IIR & FIR filters [L3]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C314.1	3	0	0	0	3	0	0	0	3	3	0	0	0	1
C314.2	3	0	0	0	3	0	0	0	3	3	0	0	0	1
C314.3	3	0	0	0	3	0	0	0	3	3	0	0	0	1
C314.4	3	0	0	0	3	0	0	0	3	3	0	0	0	1
C314.5	3	0	3	0	3	0	0	0	3	3	0	0	0	1

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Course Name: Mini Project (18EEMP68)

C317	C315.1	Develop the mini-project and be able to defend it. [L6]
	C315.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as
	C315.3	Habituated to critical thinking and use problem solving skills.[L4]
	C315.4	Communicate effectively and apply ideas clearly and coherently in both the written and oral forms.[L3]
	C315.5	Take part in team work to achieve common goal. [L4]
	C315.6	Learn on their own, reflect on their learning and recommend appropriate actions to improve it. [L5]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C315.1	0	0	3	3	2	0	0	0	3	3	3	3	3	3
C315.2	0	0	3	3	2	0	0	0	3	3	3	3	3	3
C315.3	0	0	3	3	2	0	0	0	3	3	3	3	3	3
C315.4	0	0	2	2	2	0	0	0	3	3	3	3	3	3
C315.5	0	0	2	2	2	0	0	0	3	3	3	3	3	3
C315.6	0	0	2	2	2	0	0	0	3	3	3	3	3	3

Course Name: Power Systems Analysis -II (17EE71)

C401	C400.1	Develop the Ybus of power system using rule of inspection and graph theory[L3]
	C400.2	Perform load flow analysis of power system networks using Gauss-Seidel, Newton-Raphson and Fast decoupled iterative methods.[L4]
	C400.3	Solve the Unit Commitment problem with various constraints using optimization techniques.[L4]
	C400.4	Analyze optimal scheduling of hydro-thermal systems, Power system security and reliability.[L4]
	C400.5	Analyze short circuit faults in power system networks using ZBus[L4]
	C400.6	Interpret power system stability through solution of swing equation [L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C400.1	3	0	0	0	3	0	0	0	0	0	0	2	2	0
C400.2	3	3	0	0	3	0	0	0	0	0	0	3	2	0
C400.3	3	3	1	0	3	0	0	0	0	0	0	2	2	0
C400.4	3	3	1	0	1	0	0	0	0	0	0	2	2	0
C400.5	3	0	0	0	3	0	0	0	0	0	0	2	2	0
C400.6	3	3	0	0	1	0	0	0	0	0	0	2	2	0

Course Name: Power System Protection (17EE72)

C402	C401.1	Interpret performance of protective relays, components of protection scheme and relay terminology.[L4]
	C401.2	Interpret over current protection, working and characteristics of distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays.[L4]
	C401.3	Interpret pilot protection; wire pilot relaying and carrier pilot relaying, Interpret construction, operating principles and performance of differential relays for differential protection & interpret protection of generators, motors, Transformer and Bus
	C401.4	Interpret the principle of circuit interruption in different types of circuit breakers. [L4].
	C401.5	Interpret the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse and Discuss protection against Overvoltages and Gas Insulated Substation[L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C401.1	3	0	1	0	0	0	0	1	0	0	0	2	1	0
C401.2	3	2	1	0	0	0	0	1	0	0	0	2	2	0
C401.3	3	2	1	0	0	0	0	1	0	0	0	2	2	0
C401.4	3	2	1	0	0	0	0	1	0	0	0	2	2	0
C401.5	3	1	1	0	0	0	0	1	0	0	0	2	1	0

Course Name: HV Engineering (17EE73)

C403	C402.1	Interpret the conduction and breakdown phenomenon in dielectrics. [L2]
	C402.2	Apply the principles of generation of high voltage, currents and Impulse voltages. [L2]
	C402.3	Apply measurement techniques for High Voltage, current and Impulse voltages. [L3]
	C402.4	Interpret overvoltage phenomenon and insulation coordination in electric power systems.[L2]
	C402.5	Solve the dielectric properties and interpret the testing methods of surge arrestors and switchgear.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C402.1	3	2	0	0	0	2	0	0	0	0	0	2	0	2
C402.2	3	2	0	0	0	2	0	0	0	0	0	2	0	2
C402.3	3	2	0	0	0	2	0	0	0	0	0	2	0	2
C402.4	3	2	0	0	0	2	0	0	0	0	0	2	0	2
C402.5	3	2	0	0	0	2	0	0	0	0	0	2	0	2

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Course Name: Utilisation Of Electrical Power (17EE742)																
C404	C403.1	Illustrate electric heating, air-conditioning and electric welding. Explain laws of electrolysis, extraction and refining of metals														
	C403.2	Explain the terminology of illumination, laws of illumination, construction and working of electric lamps. Design interior and														
	C403.3	Illustrate systems of electric traction, speed time curves and mechanics of train movement. Explain the motors used for														
	C403.4	Illustrate braking of electric motors, traction systems and power supply and other traction systems. [L2]														
	C403.5	Explain the working of electric and hybrid electric vehicles [L2]														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C403.1	3	0	0	0	0	2	0	0	0	0	0	0	3	0		
	C403.2	3	0	0	0	0	2	0	0	0	0	0	0	3	0		
	C403.3	3	3	0	0	0	3	0	0	0	0	0	0	3	0		
	C403.4	2	0	0	0	0	2	0	0	0	0	0	0	3	0		
	C403.5	2	0	0	0	0	3	0	0	0	0	0	0	3	0		
Course Name: Testing & Commission of Electrical Apparatus (17EE752)																
C405	C404.1	Describe the process to plan, testing, operation, control and implement commissioning of Transformers and Practice														
	C404.2	Demonstrate the performance specifications, testing, operation and commissioning of synchronous machines.														
	C404.3	Explain the performance specifications, testing, operation and commissioning of Induction motor.														
	C404.4	Describe the process of operation, handling, testing and commissioning of Underground Cables.														
	C404.5	Explain the performance specifications, testing, operation and commissioning of Switchgear Devices and Domestic Installation														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C404.1	3	0	0	0	0	0	0	2	0	0	0	3	2	0		
	C404.2	3	0	0	0	0	0	0	0	0	0	0	0	2	0		
	C404.3	3	0	0	0	0	0	0	0	0	0	0	0	2	0		
	C404.4	3	0	0	0	0	0	0	2	0	0	0	2	2	0		
	C404.5	3	0	0	0	0	0	0	0	0	0	0	0	2	0		

Course Name: Power System Simulation Laboratory (17EEL76)																
C406	C405.1	Develop a program in power system toolbox to assess the performance of medium and long transmission lines and to solve														
	C405.2	Develop a program to obtain the power angle characteristics of salient and non-salient pole alternator and to assess the transient stability under three phase fault at different locations in a of radial power systems														
	C405.3	Solve power flow problem for simple power systems using Mi-power Tool.														
	C405.4	Interpret the unsymmetrical faults in radial power systems at different locations.														
	C405.5	Analyse optimal generation scheduling problems for thermal power plants using Mi-power tool.														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C405.1	3	0	0	0	3	0	0	0	3	3	0	2	2	0		
	C405.2	3	0	0	0	3	0	0	0	3	3	0	2	2	0		
	C405.3	3	3	0	0	3	0	0	0	3	3	0	3	2	0		
	C405.4	3	3	0	0	3	0	0	0	3	3	0	2	2	0		
	C405.5	3	3	0	0	3	0	0	0	3	3	0	2	2	0		
Course Name: Relay & High Voltage Lab (17EEL77)																
C407	C406.1	Ability to set Plug Setting Multiplier, Time Setting Multiplier for Electromagnetic over Current Relay, Over Voltage Relay for a given actuating quantity and verify the characteristics of negative sequence relays [L5]														
	C406.2	Ability to set Plug Setting Multiplier, Time Setting Multiplier for a given actuating quantity for numerical relay[L5]														
	C406.3	Ability to estimate asymmetric fault current for protection of generator and Motor [L4]														
	C406.4	Analyze the spark over characteristics for air for both uniform and non-uniform configurations using High AC and DC voltages and measure high AC and DC voltages and breakdown strength of transformer oil [L5]														
	C406.5	Estimate electric field and measure the capacitance of different electrode configuration models[L5]														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
	C406.1	2	0	0	0	0	0	0	0	2	0	0	0	2	0		
	C406.2	2	0	0	0	0	0	0	0	2	0	0	0	2	0		
	C406.3	2	0	0	0	0	0	0	0	2	1	0	0	2	0		
	C406.4	2	0	0	0	0	0	0	0	2	0	0	0	2	0		
	C406.5	1	0	0	0	0	0	0	0	2	0	0	0	0	0		

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Course Name: PROJECT PHASE – I AND SEMINAR (17EEP78)		
C408	C407.1	CO1. Demonstrate a sound technical knowledge of their selected project topic. [L4]
	C407.2	CO2. Undertake problem identification, formulation and solution. [L4]
	C407.3	CO3. Design engineering solutions to complex problems utilizing a systems approach. [L5]
	C407.4	CO4. Demonstrate the knowledge, skills and attitudes of a professional engineer and Communicate with engineers community at large in written and oral forms and. [L5]
	C407.5	CO5. Demonstrate the engineering principles in a team to manage projects in multidisciplinary field. [L6]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C407.1	0	0	3	3	2	0	0	0	3	3	3	3	3	3
C407.2	0	0	3	3	2	0	0	0	3	3	3	3	3	3
C407.3	0	0	3	3	2	0	0	0	3	3	3	3	3	3
C407.4	0	0	2	2	2	0	0	0	3	3	3	3	3	3
C407.5	0	0	2	2	2	0	0	0	3	3	3	3	3	3

Course Name: Power System Operation & Control (17EE81)		
C409	C408.1	Analyze various levels of controls in Power systems, SCADA and Solve unit commitment problems
	C408.2	Apply the issues concerning hydrothermal scheduling and its solutions to hydro thermal problems
	C408.3	Analyze the basic generator control loops, mathematical models of ALFC and functions of Automatic generation control
	C408.4	Analyze automatic generation control in an interconnected power system and the methods of voltage and reactive power control
	C408.5	Analyze reliability, security, contingency analysis and state estimation of power systems.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C408.1	3	3	0	0	0	0	0	0	0	0	0	2	3	0
C408.2	3	3	0	0	0	0	0	0	0	0	0	2	3	0
C408.3	3	3	0	0	0	0	0	0	0	0	0	2	3	0
C408.4	3	3	0	0	0	0	0	0	0	0	0	2	3	0
C408.5	3	3	0	0	0	0	0	0	0	0	0	2	3	0

Course Name: Industrial Drives And Applications (17EE82)		
C410	C409.1	Explain the advantages of Electric drives and its dynamics and different modes of operation [L4] M1
	C409.2	Illustrate a motor for a drive and control of dc motor using controlled rectifiers. [L4] M2
	C409.3	Analyze the performance of induction motor drives under different conditions. [L4], M3
	C409.4	Control induction motor, synchronous motor and stepper motor drives. [L4] M4&M5
	C409.5	Illustrate a suitable electrical drive for specific application in the industry. [L4] M5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C409.1	3	0	0	0	0	0	0	0	0	0	0	0	1	0
C409.2	3	1	1	0	0	0	0	0	0	0	0	0	3	0
C409.3	2	1	0	0	0	0	0	0	0	0	0	0	1	0
C409.4	2	1	1	0	0	0	0	0	0	0	0	0	2	0
C409.5	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Course Name: INTEGRATION OF DISTRIBUTED GENERATION (17EE833)		
C411	C410.1	Explain energy generation by wind power and solar power and discuss the variation in production capacity at different
	C410.2	Explain the performance of the system when distributed generation is integrated to the system.
	C410.3	Discuss effects of the integration of DG: Due to the increased risk of overload & increased losses.
	C410.4	Discuss effects of the integration of DG: Increased risk of overvoltage's, increased levels of power quality disturbances

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C410.1	2	0	0	0	0	0	2	0	0	0	0	3	2	0
C410.2	2	0	2	0	0	0	0	0	0	0	0	0	1	0
C410.3	2	0	2	0	0	0	0	0	0	0	0	0	1	0
C410.4	2	0	2	0	0	0	0	0	0	0	0	0	1	0

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ATME College of Engineering, Mysuru

Department of Electrical and Electronics Engineering

Course Name: Intership/Professional Practice (17EE84)

C412	C411.1	Gain Practical experience and acquire knowledge within industry in which the internship is done.
	C411.2	Develop a greater understanding about career options while more clearly defining personal career goals and experience the activities and functions of professionals
	C411.3	Develop and refine oral and written communication skills and identify areas for future knowledge and skill development.
	C411.4	Acquire the knowledge of administration, marketing, finance and economics and expand intellectual capacity, credibility, judgement intution

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C411.1	0	0	3	3	2	0	0	0	3	3	3	3	3	3		
C411.2	0	0	3	3	2	0	0	0	3	3	3	3	3	3		
C411.3	0	0	3	3	2	0	0	0	3	3	3	3	3	3		
C411.4	0	0	3	3	2	0	0	0	3	3	3	3	3	3		

Course Name: Project Work – Phase-II(17EEP85)

C413	C412.1	Apply Present the project and be able to defend it.
	C412.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
	C412.3	Habituated to critical thinking and use problem solving skills
	C412.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
	C412.5	Learn on their own, reflect on their learning and take appropriate actions to improve it and work in a team to achieve common goal

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C412.1	0	0	3	3	2	0	0	0	3	3	3	3	3	3		
C412.2	0	0	3	3	2	0	0	0	3	3	3	3	3	3		
C412.3	0	0	3	3	2	0	0	0	3	3	3	3	3	3		
C412.4	0	0	2	2	2	0	0	0	3	3	3	3	3	3		
C412.5	0	0	2	2	2	0	0	0	3	3	3	3	3	3		

Course Name: Seminar (17EES86)

C414	C413.1	Attain use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning
	C413.2	Identify, understand and discuss current, real time issues
	C413.3	Improve oral and written communication skills
	C413.4	Explore an appreciation of the self in relation to its large diverse social and academic contexts and apply priciples of ethics and respect in interaction with others

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
C413.1	0	0	3	3	0	0	1	0	3	3	0	0	2	3		
C413.2	0	0	3	3	2	0	1	0	3	3	0	0	2	3		
C413.3	0	0	3	3	0	0	1	0	3	3	0	0	2	3		
C413.4	0	0	3	3	0	0	1	3	3	3	0	0	2	3		

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OBE, Curricular Gap & Activities

Department of Electrical and Electronics Engineering

The institution follows **Outcome Based education**. Outcome-Based Education (OBE) is a student-centric teaching and learning methodology in which the course delivery, assessment are planned to achieve stated objectives and outcomes.

It focuses on measuring student performance i.e. outcomes at different levels.

Some important aspects of the Outcome Based Education

1. Course is defined as a theory, practical or theory cum practical subject studied in a semester.

2. Course Outcome (CO) Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally, three or more course outcomes may be specified for each course based on its weightage.

3. Programme is defined as the specialization or discipline of a Degree. It is the interconnected arrangement of courses, co-curricular and extracurricular activities to accomplish predetermined objectives leading to the awarding of a degree.

4. Programme Outcomes (POs) Program outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

5. Program Educational Objectives (PEOs) The Programme Educational Objectives of a program are the statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation.

6. Programme Specific Outcomes (PSO) Programme Specific Outcomes are what the students should be able to do at the time of graduation with reference to a specific discipline. Usually there are two to four PSOs for a programme.

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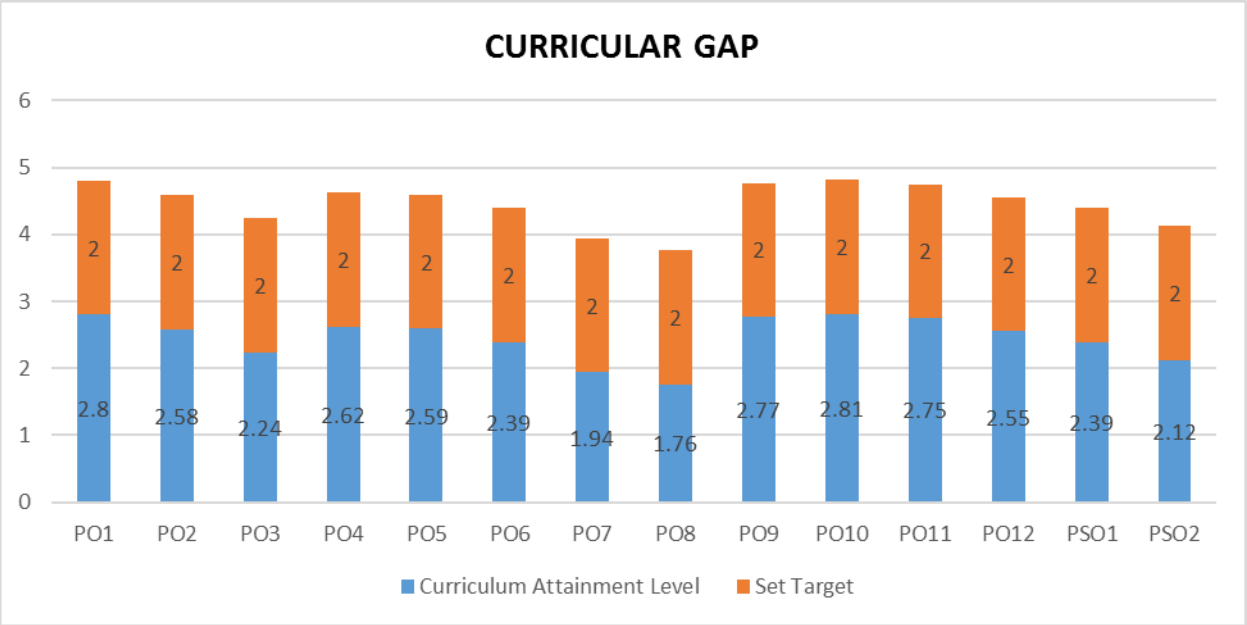
Curricular Gap for the attainment of PO and PSO

AY:2020-2021

2020-21	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Curriculum Attainment Level	**2.80**	**2.58**	**2.24**	**2.62**	**2.59**	**2.39**	**1.94**	**1.76**	**2.77**	**2.81**	**2.75**	**2.55**	**2.39**	**2.12**
Set Target	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**



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List of activities observed to reduce the curriculum gap during the Academic Year-2020-2021

SL. No.	Activity	Action taken	Relevance to POs	Relevance to PSOs
1	Webinar/ Technical Talk	Webinar on Role of Electric Vehicle in 21st century and relevance to India	PO3,PO6,PO7,PO8, PO10, PO12	PSO1,PSO2
2	Webinar/ Technical Talk	Clean Energy technologies & Technology aided Education as pillars for environmental sustainable rural Livelihoods	PO6,PO7,PO8,PO10, PO12	PSO1,PSO2
3	Workshop	Workshop on App development	PO1,PO4,PO6,PO7, PO9, PO10, PO12	PSO1,PSO2
4	Workshop	Workshop on C programming & puzzle	PO1,PO4,PO6,PO7, PO9, PO10, PO12	PSO1,PSO2
5	Virtual Technical Fest	Technical Quiz, IIC Event	PO1,PO4,PO6,PO7, PO9, PO10, PO12	PSO1,PSO2

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Sample Adherence for the ODD Sem - AY-2020-21

ATME College of Engineering

Department of Electrical and Electronics Engineering

Academic Calendar (ODD SEMESTER, 2020-21)

WEEK	MONTH	SUN	MON	TUE	WED	THU	FRI	SAT	No. of days/week	COLLEGE EVENTS/ Departement Events	Remarks
1	SEPTEMBER			1	2	3	4	5	4	3rd, 5th & 7th Sem: commencement of Online Classes / Induction program	As Planned for III and V and VII sem
2		6	7	8	9	10	11	12	6	State Level Quiz Competition	Preponed to 2nd Sep to 5th Sep 2020 due to other activity
3		13	14	15	16	17	18	19	4	Mahalaya Amavasya	
4		20	21	22	23	24	25	26	6	Webinar for 3rd and 5th sem	Postponed to 21st and 23rd October 2020 due to pre-occupied schedule of resource person
5		27	28	29	30				3	Final Year Project Synopsis Submission	As Planned
5	OCTOBER					1	2	3	1	Commencement of Offline Classes for 3,5 & 7 Sem, 2nd-Gandhi Jayanthi	Commencement of offline classes-Postponed to November as per VTU circular
6		4	5	6	7	8	9	10	6	First I A for 3rd , 5th and 7th Semester	IA-1: As Planned
7		11	12	13	14	15	16	17	5	Technical Talk/ workshop for 3rd Sem, Project Phase-1 Review	Technical Talk postponed due to pre-occupied schedule of resource person. Project phase-1 review postponed to 29th Oct, 2nd Nov to 7th Nov 2020 due to TCS technical drive
8		18	19	20	21	22	23	24	6	Workshop for 7th semester	Postponed to due Placement activities
9		25	26	27	28	29	30	31	3	Ayudha Pooja, Vijaya Dashami, Eid-Milad , Valmiki Jayanthi	
10	NOVEMBER	1	2	3	4	5	6	7	5	Kannada Rajyotsava, Technical Talk/ workshop for 3rd Sem, National Cancer Awareness day	Workshop on Tool usage postponed to 21st to 23rd Dec 2020 due to pre-occupied schedule of resource person
11		8	9	10	11	12	13	14	5	Second IA for 3rd , 5th and 7th Semester, 14th-Naraka Chaturdashi	Postponed by one day due to three FDP on NAAC was organised by College from 9th to 11th Nov 2020
12		15	16	17	18	19	20	21	4	Balipadyami	
13		22	23	24	25	26	27	28	6	Workshop for 5th sem	Workshop postponed to 24th and 26th Dec 2020 due to non availability of resource person, the event is conducted after a month
14		29	30						1		

WEEK	MONTH	SUN	MON	TUE	WED	THU	FRI	SAT	No. of days/week	COLLEGE EVENTS	Remarks
14	DECEMBER			1	2	3	4	5	3	Kanakadasa Jayanthi , Virtual Technical Fest (Hackathon)	Virtual Technical Fest (Hackathon): As planned: Conducted on 4th and 7th of Dec 2020
15		6	7	8	9	10	11	12	6		
16		13	14	15	16	17	18	19	4		
17		20	21	22	23	24	25	26	5	25th-Christmas	
18		27	28	29	30	31			4	Third I A for 3rd ,5th and 7th Semesters, World science day for peace and development	IA-3 as planned
18	JANUARY						1	2	2		
19		3	4	5	6	7	8	9	6	LAB Interenals for Semesters 3,5 and 7	Conducted for 5th and 7th sem on 13th, 15th and 16th of January due to hands on sessions were given in additional to online lab session
20		10	11	12	13	14	15	16	6	Improvement IA for Semesters 3,5 and 7, LAST working day for ODD Sem 2020-21, Makra Sankranthi	LWD for 5th and 7th sem- 16th Jan
21		17	18	19	20	21	22	23			
22		24	25	26	27	28	29	30		Republic Day, IA-1 week for III sem lateral in last week of Jan and 1st week of Feb	IA-1 for III sem lateral as planned (27th, 28th, 30th of Jan, 2nd, 3rd and 4th of Feb)
23		31									

Department of Electrical and Electronics Engineering

39	23	FEBRUARY		1	2	3	4	5	6		End of Odd Semester Practical Exams	25th, 27th, 28th and 30th of Jan - VTU Lab exam conducted for V and VII sem
40	24		7	8	9	10	11	12	13		Commencement of Odd Semester Theory Exams	
41	25		14	15	16	17	18	19	20		IA -2 for III sem lateral in week 3 and week 4	IA-2 for III sem lateral as planned (18th, 19th, 22nd to 24th of Feb)
42	26		21	22	23	24	25	26	27		IA-3 for III sem lateral in last week of Feb and 1st week of Mar	IA-3 for III sem lateral as planned (2tth, 27th, of Feb , 2nd and 3rd of Mar)
43	27		28									
44		March		1	2	3	4	5	6		Lab IA for III sem planned on 26th Feb and 1st Mar	Lab IA for III sem - As planned (26th of Feb and 1st of Mar)
45			7	8	9	10	11	12	13		Last working day for III sem	As planned
46			14	15	16	17	18	19	20			
47			21	22	23	24	25	26	27			
48			28	29	30	31						
49												

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Sample Activity

ATME College of Engineering

Department of Electrical and Electronics Engineering

Ref: AY-2020-21/Odd/08 — 22nd December 2020

To
The Principal
ATMECE, Mysuru.

Respected Sir,

Subject: Workshop on **"Android App Development"**

With reference to the above subject, the Department of Electrical and Electronics Engineering is organizing a Workshop titled **"Android App Development"** on 24th & 26th December 2020 from 10AM to 12 noon. Resource person for the event is Dr. Chethana R Murthy, Assistant Professor, Department of CSE, RV College of Engineering, Bengaluru. Target participants are for 5th Semester students from EEE,ECE,ME,CVE. Request your good office to kindly approve the budget proposed and do the needful.

Sl. No.	Particulars	Amount in Rs.
1	Honorarium to the Resource Person	4000
2	Registration charges (Rs 100/ participants)	4000

Thanking You Sir.

Approved
22/12/20

With Regards

Dr. Parthasarathy L
ATME IEEE Student Branch Counsellor
Professor & Head
Department of EEE
ATME CE,Mysuru

Dept. of Electrical & Electronics Engineering
ATME College of Engineering, Mysuru

Copy to:

1) ATME

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Report

The session address Android APP Development for students with hands on experience with android app with MIT inventor Developing Android Apps with App Inventor is to give students hands-on experience in developing Android applications. The online workshop is intended for students who are interested in computational thinking with App Inventor, and for anyone who would like to learn basic programming skills. It provides many interesting hands-on examples, including simple games and
practical tools, to make programming fun and easy even for beginners without any prior programming experience.

Department of Electrical and Electronics Engineering

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Resource Person Profile:

Dr. Chethana R Murthy
Assistant Professor,
Department of CSE, RV College of Engineering, Bengaluru

Experience: 15 Years

- Teaching experience of 12.5 years and industry experience of 2.5 Years
- Area of Interests: Wireless Cellular networks, Data Structures and Algorithms, Mobile Application Development
- Research Proposal : Fetched grants of 7.75 lakh from NSSO - Central Silk Board (2018-19), and 4.58 lakh from TE Connectivity (2013-14).
- Identifying her contributions in the field of mobile applications development, she was invited and sponsored by Google India for their annual event Google I/O 2019 at Mountain View, California, USA.
- The "e-Coocon mobile app and web pages" which she has developed for Central Silkboard usage was launched by late.Smt.Sushma Swaraj at Vigyan Bhavan - Delhi in the year 2019, and is now widely used throughout India by silkworm farmers and the inspection officials.

Resource Person: Dr. Chethana R Murthy

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Department of Electrical and Electronics Engineering

22.12..2020

To

Dr. Chethana R Murthy
Assistant Professor,
Department of CSE,
RV College of Engineering, Bangalore

Dear Madam,

Subject: Invitation as a Resource Person for Workshop "Android App Development"

ATME College of Engineering is one of the premium institute in Mysuru, established in the year 2010, affiliated to Visvesvaraya Technological University, Belagavi, Karnataka. The Department of Electrical and Electronics Engineering was started in the year 2010 with an intake of 60 students. Presently about 185 students are on rolls from second to the fourth year. The department is recognized as a research center by Visvesvaraya Technological University (VTU), Belagavi to offer Ph.D. and M Sc (Engg.) programs.

With reference to the above subject, The Department of Electrical & Electronics Engineering, ATMECE Mysuru, is pleased to invite you as a Resource person for **'Workshop "Android App Development"** on 24th & 26th December 2020 at 10 AM to 12 Noon.

Thanking you

Warm Regards

Dr. Parthasarathy L
Professor & Head, Dept. of EEE

HoD
Dr. PARTHASARATHY L
Professor and HOD
Dept. of Electrical & Electronics Engineering
ATME College of Engineering, Mysuru

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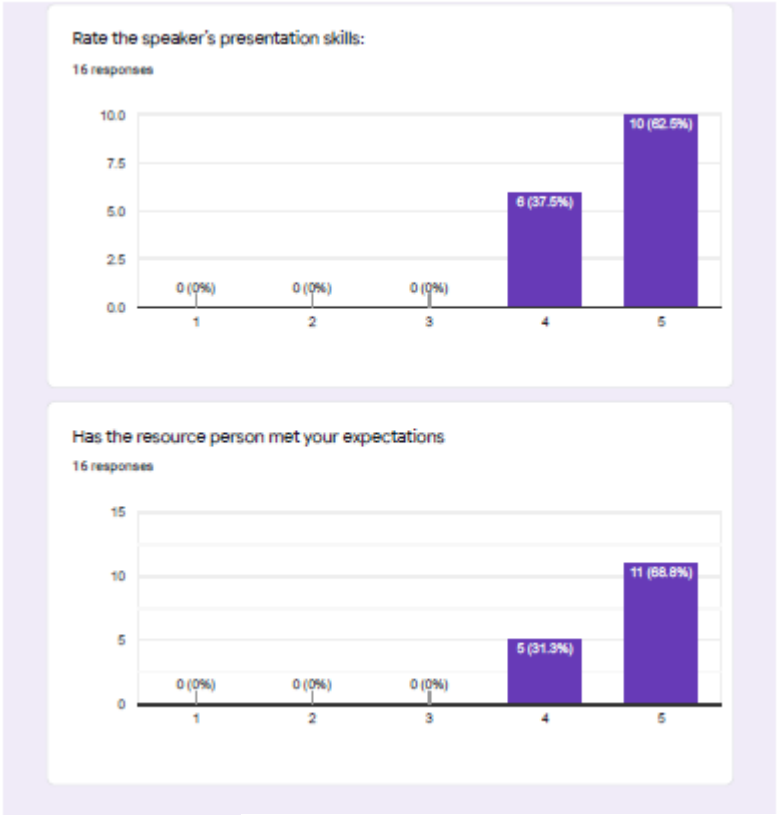
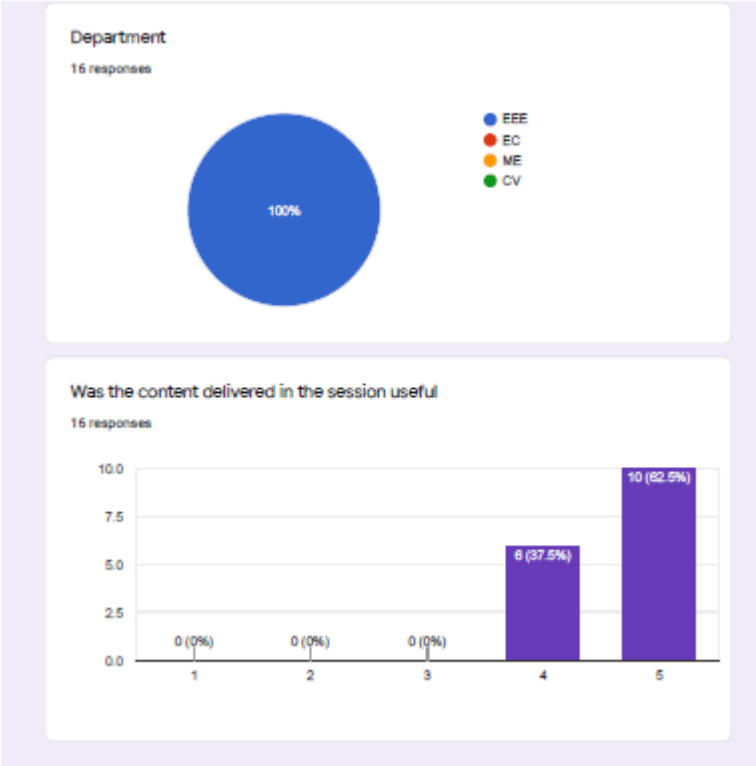
Outcome:Feedback





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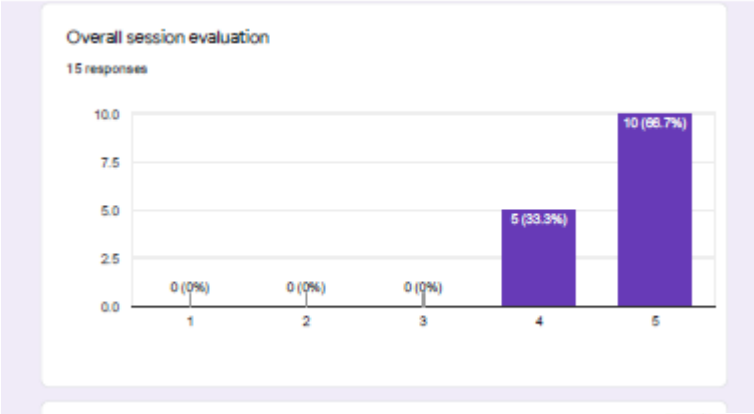

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Curricular Gap for the attainment of PO and PSO, Previous Years

Table 1: POs and PSOs attainment for the University Curriculum in the Academic Year: 2019-2020

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	**2.76**	**2.50**	**2.15**	**2.28**	**2.58**	**2.26**	**2.01**	**1.78**	**2.66**	**2.49**	**2.12**	**2.37**	**2.29**	**2.06**	**2.76**	**2.50**

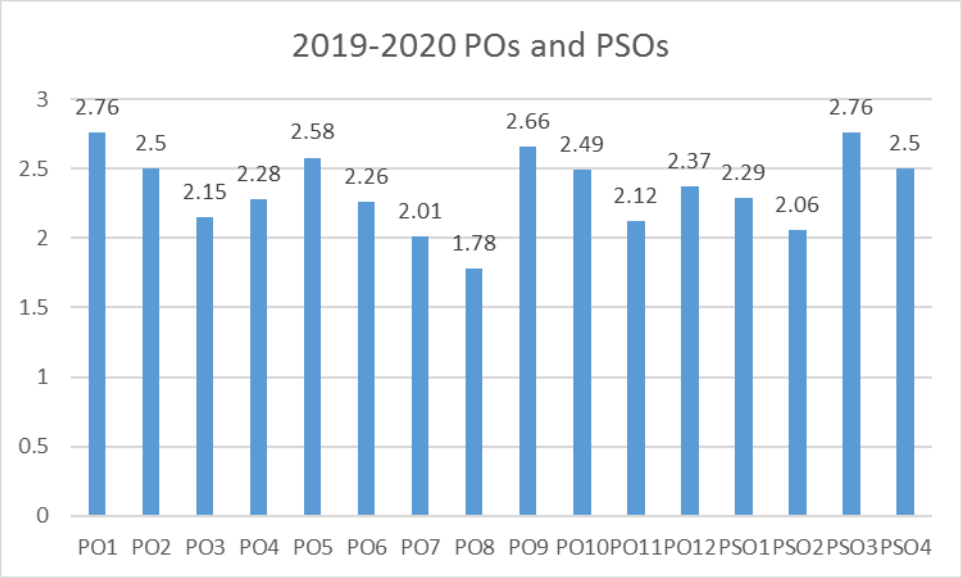

Table 1: POs and PSOs attainment for the University Curriculum in the Academic Year: 2018-19

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	2.70	2.34	1.73	1.68	2.18	1.87	1.80	1.92	1.98	1.94	1.99	1.96	2.46	1.87	1.74	2.01

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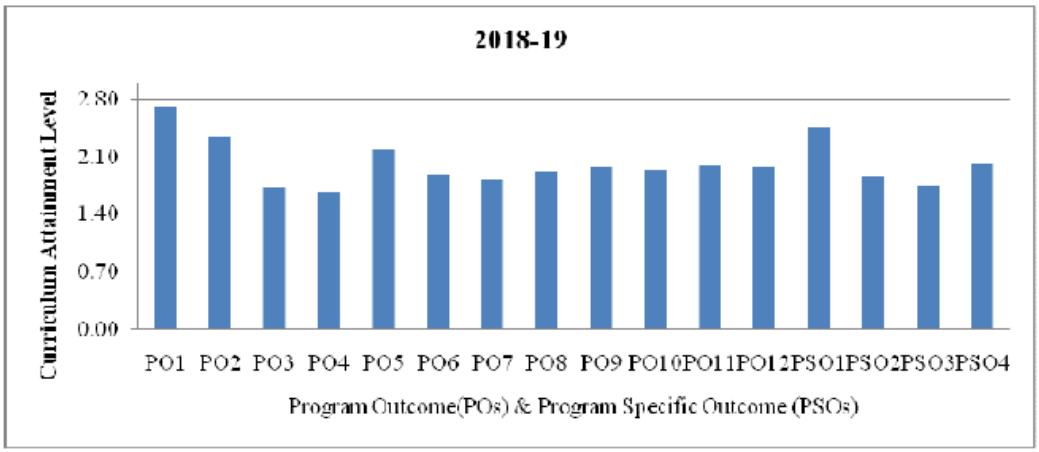

Table II: POs and PSOs attainment for the University Curriculum in the Academic Year: 2017-18

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	2.45	2.45	1.87	1.95	1.95	1.79	1.86	1.86	2.04	1.70	1.70	2.01	1.76	1.76	1.69	1.92

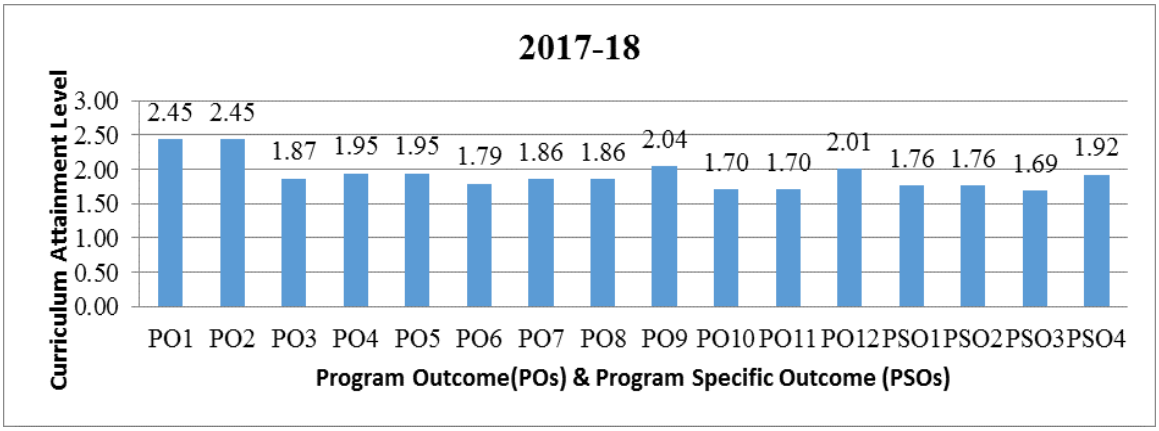

Table III: POs and PSOs attainment for the University Curriculum in the Academic Year:2016-17

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	2.30	2.30	1.83	1.92	1.92	1.58	1.72	1.72	1.75	1.52	1.52	1.95	1.49	1.49	1.39	1.73

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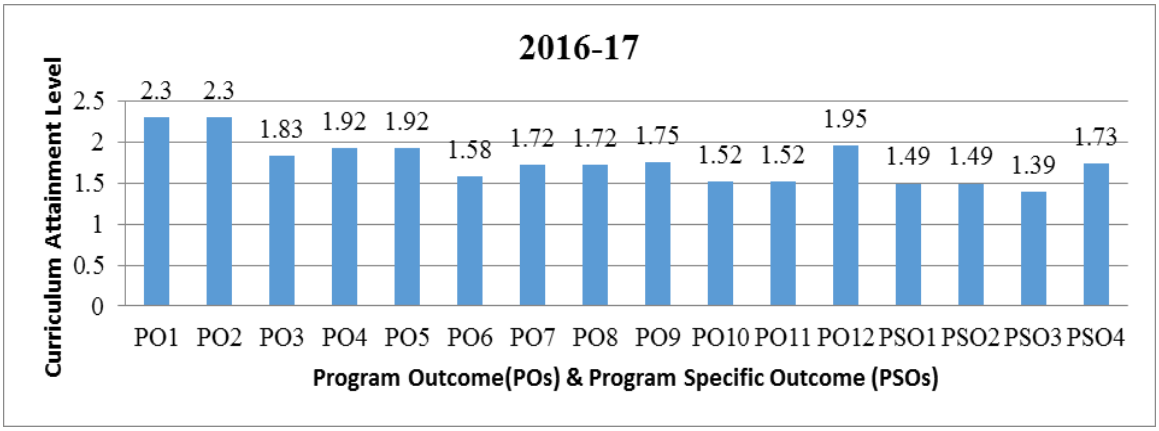
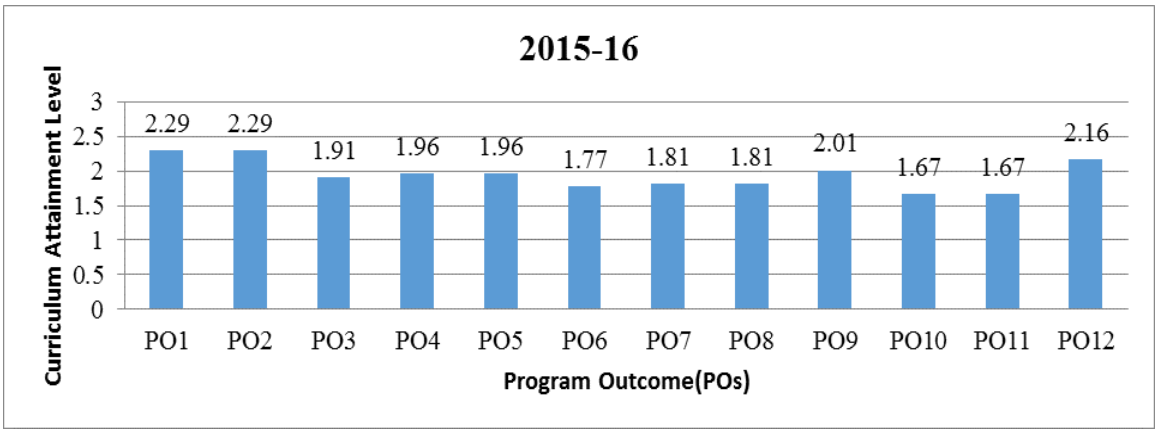


Table IV: POs attainment for the University Curriculum in the Academic Year: 2015-16

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PAM and Feedbacks from Stakeholders	2.29	2.29	1.91	1.96	1.96	1.77	1.81	1.81	2.01	1.67	1.67	2.16



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Dept. of Electrical & Electronics Engineering
ATME College of Engineering, Mysuru

Faculty and students are aware of the stated Programme and course outcomes of the Programmes

To create awareness about **Programme and course outcomes** of the department, it has been published and disseminated among the stake holders.

The extent of student awareness about the POs and COs and their actual performance reflecting these would be the real indicators of success or outcome of the programme. In this regard our Institution has taken certain measures to educate and to create the awareness about the program outcomes and course outcomes among the faculty members and students.

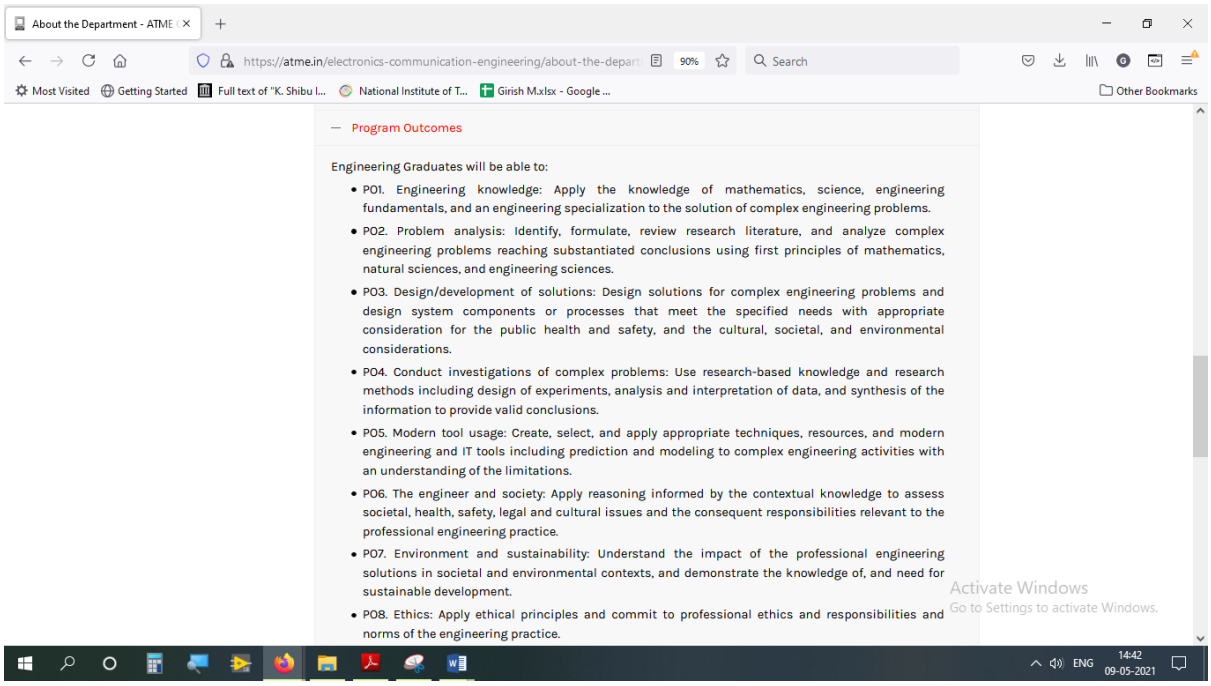
Stakeholder	**Purpose**
Faculty	Implementer (Contributor) of Policies. Key contributor in developing/implementing growth Plan. Responsible for producing competent graduates/product of the Institution.
Student	Product of the Institution, responsible for creating Image of the institution while serving the society

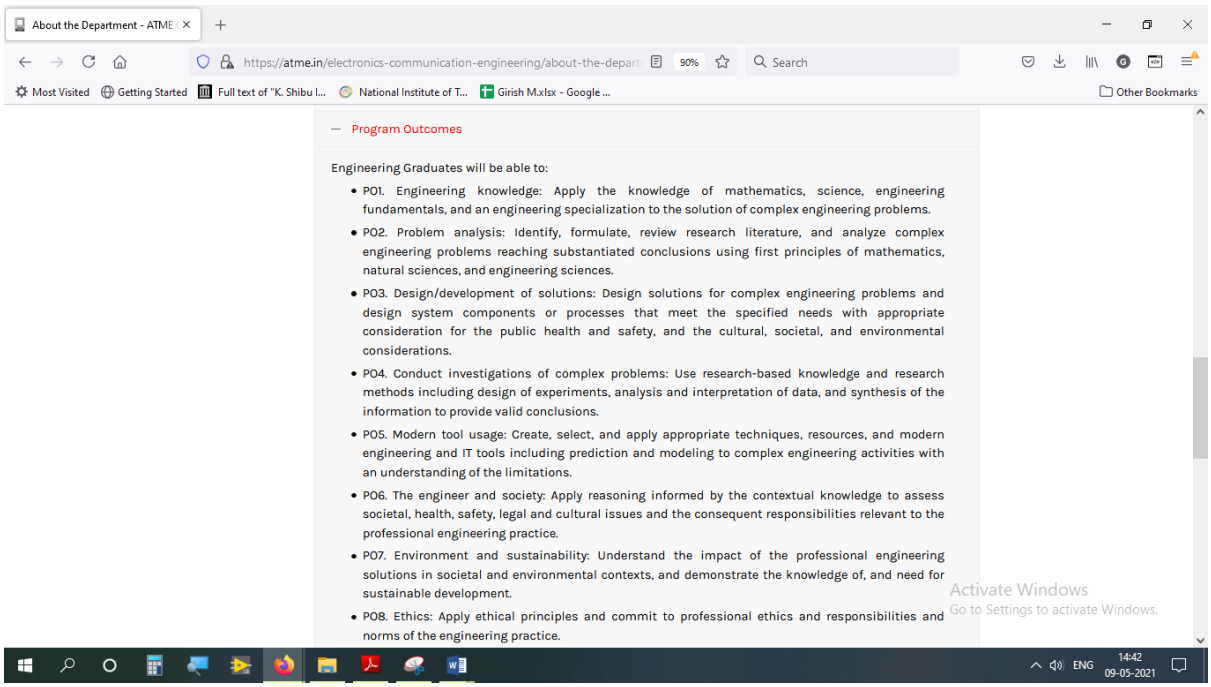
Programme Outcomes and Course Outcomes Dissemination

Sl. No	Particulars	Programme Outcomes	Course Outcomes
1	College Website	✓	✓
2	Corridors	✓	✓
3	Notes & Lab Manual	✓	✓
4	Course Module, Lesson Plan	--	✓
5	IA Question Paper	--	✓
6	Classroom, Seminar Hall, Laboratory	✓	--
7	Faculty Office, Dept. Office	✓	--
8	Magazine	✓	--
9	College Enterprise Resource Planning(CERP) Portal	✓	--
10	Student Handbook	✓	✓
11	Faculty Handbook	✓	✓
12	Flipped Classroom(Mail) through CERP/MS Teams	--	✓

1. College Website

URL:https://atme.in/electronics-communication-engineering/about-the-department/#1512155409961-e1adfb92-dff2





2. Department Corridors

Only Sample is attached here.

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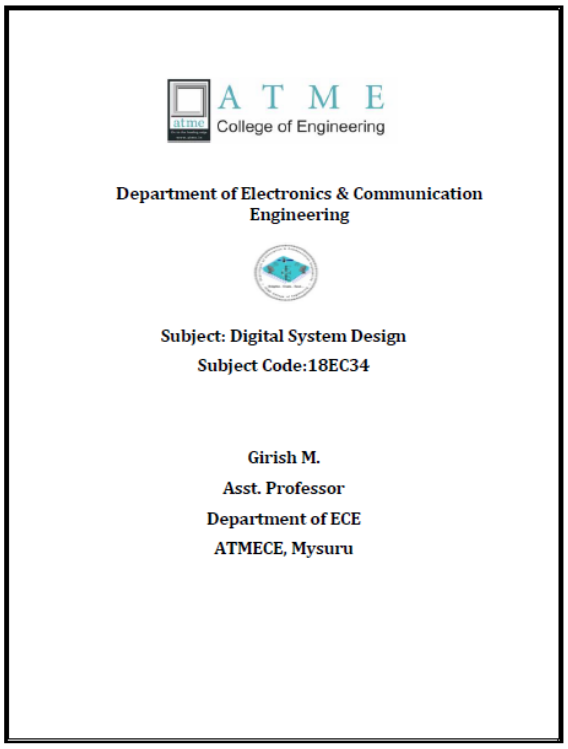
3. Notes & Lab Manual

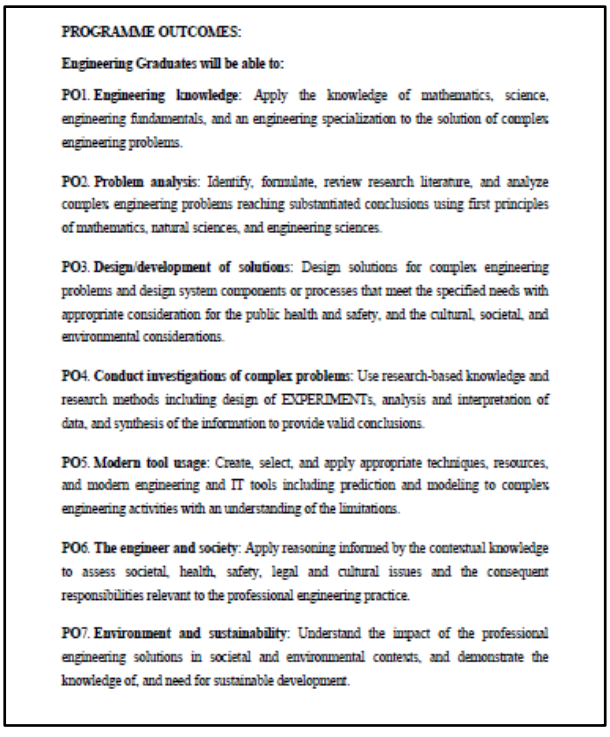


ATME College of Engineering

Department of Electronics & Communication Engineering

Subject: Digital System Design
Subject Code:18EC34

Girish M.
Asst. Professor
Department of ECE
ATMECE, Mysuru



PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

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.

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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.

ATME College of Engineering

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

ACADEMIC YEAR 2018-19

LABORATORY MANUAL

SUBJECT: DIGITAL SYSTEM DESIGN LAB

SUB CODE: 18ECL38

SEMESTER: III

ATME College of Engineering

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ATME COLLEGE OF ENGINEERING

Vision

To develop highly skilled and globally competent professionals in the field of Electronics and Communication Engineering to meet industrial and social requirements with ethical responsibility.

Mission

- To provide State-of-art technical education in Electronics and Communication at undergraduate and post-graduate levels, to meet the needs of the profession and society and achieve excellence in teaching-learning and research.
- To develop talented and committed human resource, by providing an opportunity for innovation, creativity and entrepreneurial leadership with high standards of professional ethics, transparency and accountability.
- To function collaboratively with technical Institutes/Universities/Industries, offer opportunities for interaction among faculty-students and promote networking with alumni, industries and other stake-holders.

Program outcomes (POs)

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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.

Program Specific Outcomes (PSOs)

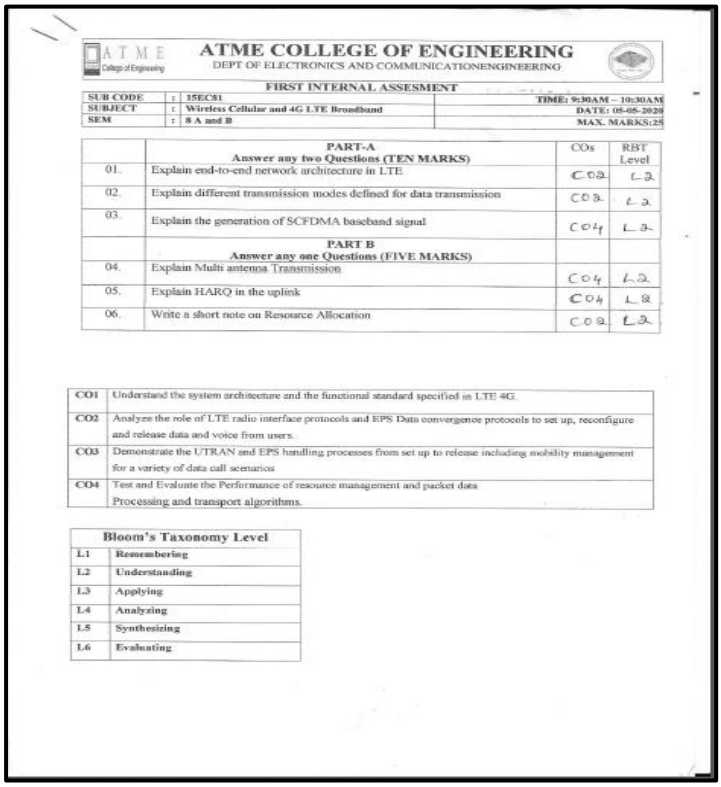
At the end of graduation the student will be able,

- To comprehend the fundamental ideas in Electronics and Communication Engineering and apply them to identify, formulate and effectively solve complex engineering problems using latest tools and techniques.
- To work successfully as an individual pioneer, team member and as a leader in assorted groups, having the capacity to grasp any requirement and compose viable solutions.
- To be articulate, write cogent reports and make proficient presentations while yearning for continuous self improvement.
- To exhibit honesty, integrity and conduct oneself responsibly, ethically and legally; holding the safety and welfare of the society paramount.

Program Educational Objectives (PEOs)

- Graduates will have a successful professional career and will be able to pursue higher education and research globally in the field of Electronics and Communication Engineering thereby engaging in lifelong learning.
- Graduates will be able to analyse, design and create innovative products by adapting to the current and emerging technologies while developing a conscience for environmental/ societal impact.
- Graduates with strong character backed with professional attitude and ethical values will have the ability to work as a member and as a leader in a team.
- Graduates with effective communication skills and multidisciplinary approach will be able to redefine problems beyond boundaries and develop solutions to complex problems of today's society.

4. IA Question Paper & Scheme



ATME COLLEGE OF ENGINEERING
DEPT OF ELECTRONICS AND COMMUNICATIONENGINEERING

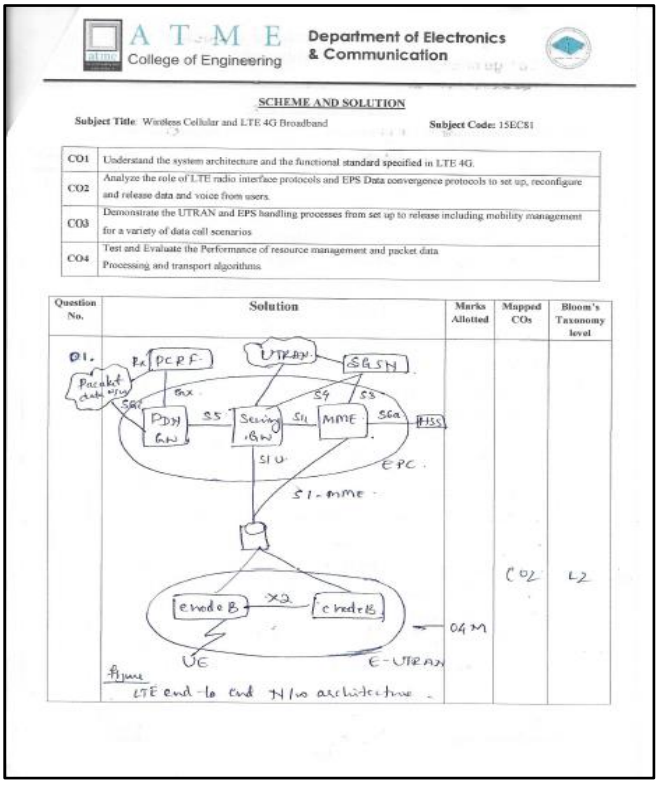
FIRST INTERNAL ASSESMENT

SUB CODE	:	15EC81	TIME: 9:30AM – 10:30AM
SUBJECT	:	Wireless Cellular and 4G LTE Broadband	DATE: 05-05-2020
SEM	:	8 A and B	MAX. MARKS:25

		COs	RBT Level
	PART-A Answer any two Questions (TEN MARKS)		
01.	Explain end-to-end network architecture in LTE	CO3	L3
02.	Explain different transmission modes defined for data transmission	CO3	L2
03.	Explain the generation of SCFDMA baseband signal	CO4	L3
	PART B Answer any one Questions (FIVE MARKS)		
04.	Explain Multi antenna Transmission	CO4	L2
05.	Explain HARQ in the uplink	CO4	L2
06.	Write a short note on Resource Allocation	CO3	L3

CO1	Understand the system architecture and the functional standard specified in LTE 4G.
CO2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
CO3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios
CO4	Test and Evaluate the Performance of resource management and packet data Processing and transport algorithms.

Bloom's Taxonomy Level	
L1	Remembering
L2	Understanding
L3	Applying
L4	Analyzing
L5	Synthesizing
L6	Evaluating



A T M E College of Engineering
Department of Electronics & Communication

SCHEME AND SOLUTION

Subject Title: Wireless Cellular and LTE 4G Broadband Subject Code: 15EC81

CO1	Understand the system architecture and the functional standard specified in LTE 4G.
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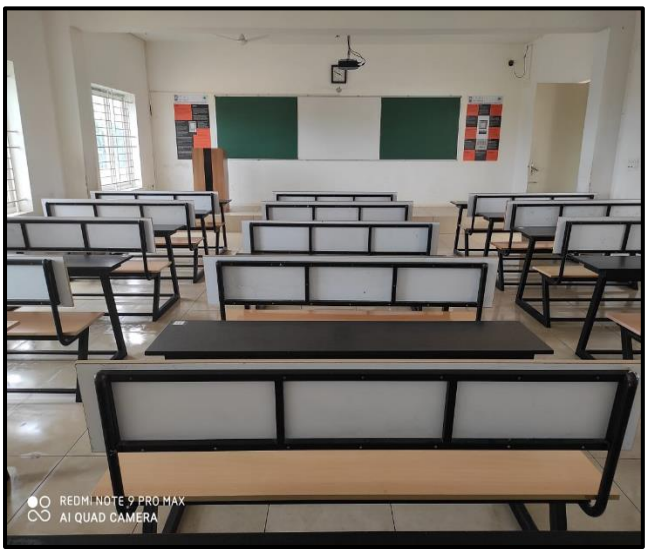
Question No.	Solution	Marks Allotted	Mapped COs	Bloom's Taxonomy level
01.			CO2	L2

Ajma
LTE end-to end N/w architecture

5. Classroom, Seminar Hall, Laboratory

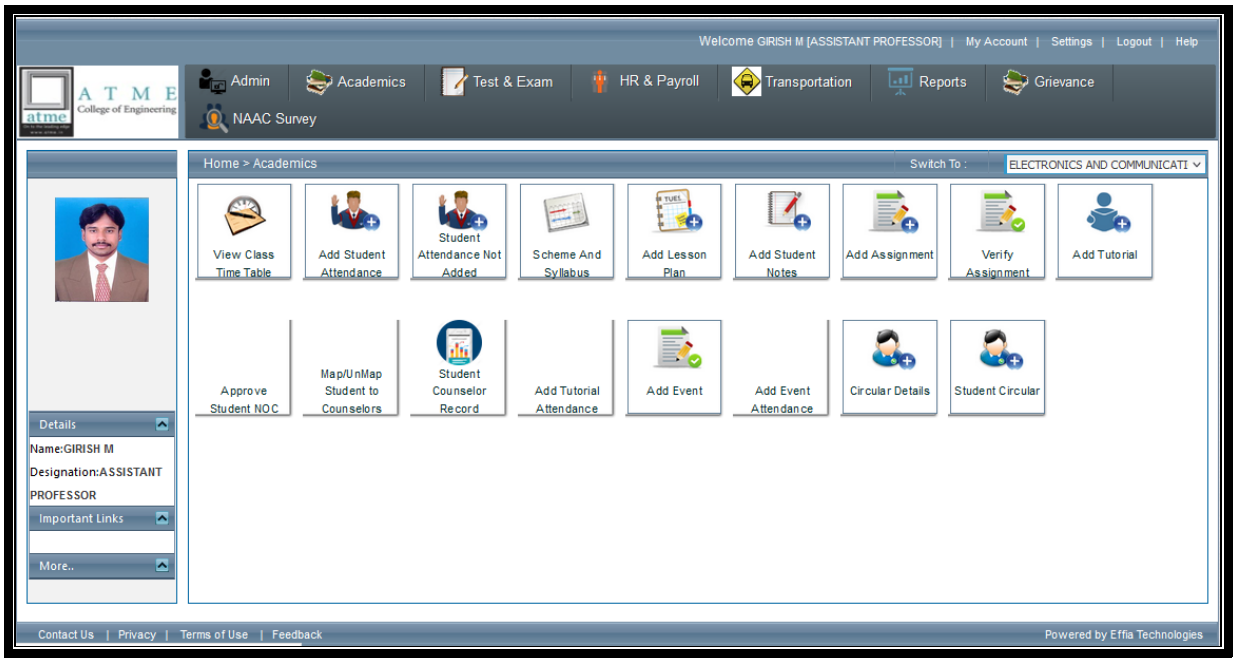


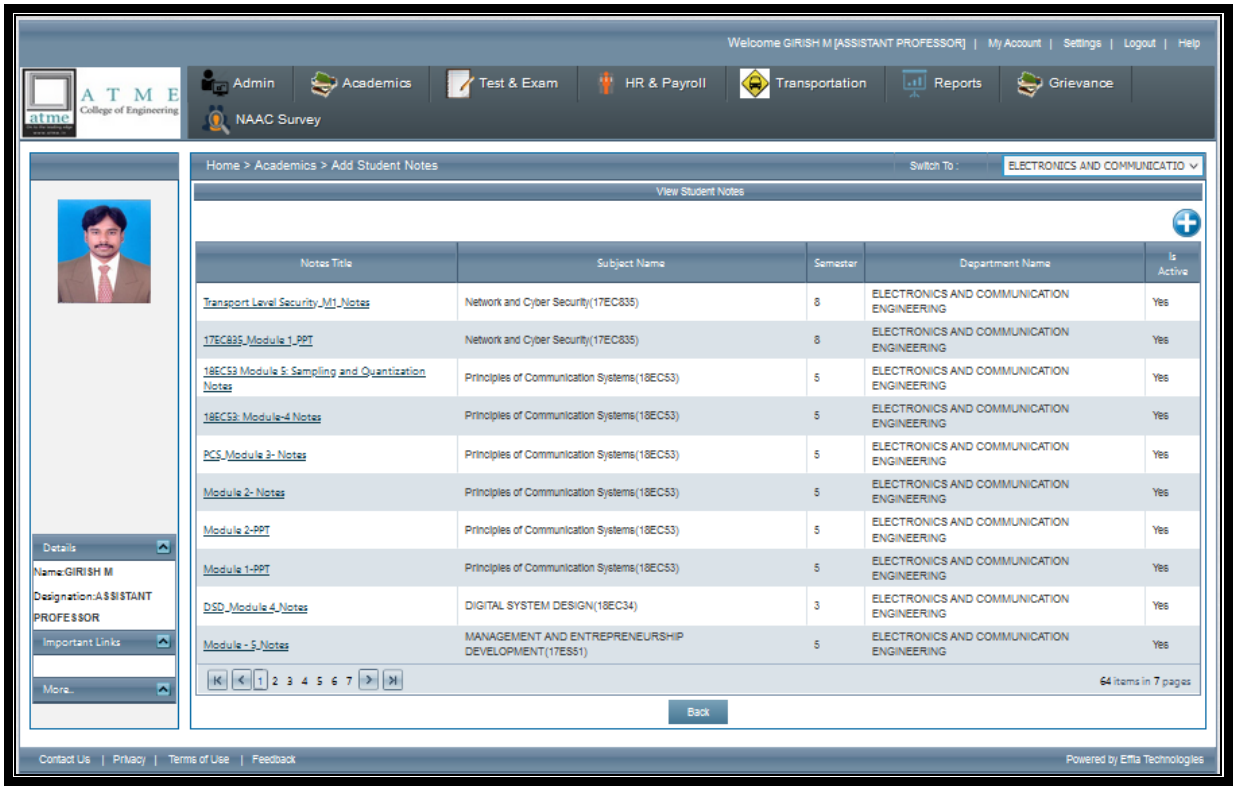
Only sample is attached here

6. **Faculty Office, Dept. Office**

7. College Enterprise Resource Planning(CERP) Portal

Link: https://eerp.effia.co.in/WebForms/Academics/AcademicsHome.aspx





8. Student Handbook

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THE ADVANTAGES OF ACCREDITATION FROM NBA:

- Students get quality education and better employment opportunity.
- Employer in industry/ academia/ public services get well grounded practice engineers with requisite technical and behavioural skills / graduate attributes.
- Continuous improvement towards excellence.
- Graduation from an accredited program is Educational Passport for engineers' mobility across good number of advanced nations and emerging economies.
- The graduates may get leadership positions and challenging technology development opportunities.
- Industry hire graduates from accredited institutions for innovation-intensive projects for higher profits.

NATIONAL BOARD OF ACCREDITATION

Accreditation of UG Engineering Programmes

Student Handout

Vision and Mission of the institute

Vision

Development of academically excellent, culturally vibrant, socially responsible and globally competent human resources.

Mission

- To keep pace with advancements in knowledge and make the students competitive and capable at the global level.
- To create an environment for the students to acquire the right physical, intellectual, emotional and moral foundations and shine as torch bearers of tomorrow's society.
- To strive to attain ever-higher benchmarks of educational excellence.

Vision and Mission of the Dept of Electronics and Communication Engineering

Vision

To develop highly skilled and globally competent professionals in the field of Electronics and Communication Engineering to meet industrial and social requirements with ethical responsibility.

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9. Faculty Handbook

ATME College of Engineering

Department of Electronics and Communication Engineering

Staff Handbook

ATME College of Engineering

13th KM Stone, Bannur Main Road, Mysuru-570028

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DEPARTMENT OF CIVIL ENGINEERING

Faculty and students are aware of the stated Programme and course outcomes of the Programmes

To create awareness about Programme and course outcomes of the department, it has been published and disseminated among the stake holders.

The extent of student awareness about the POs and COs and their actual performance reflecting these would be the real indicators of success or outcome of the programme. In this regard our Institution has taken certain measures to educate and to create the awareness about the program outcomes and course outcomes among the faculty members and students.

Stakeholder	Purpose
Faculty	• Implementer (Contributor) of Policies. • Key contributor in developing/implementing growth Plan. • Responsible for producing competent graduates/product of the Institution.
Students	• Product of the Institution, responsible for creating Image of the institution while serving the society

HOD

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Department of Civil Engineering
ATME College of Engineering
Mysore-570 023

DEPARTMENT OF CIVIL ENGINEERING

Programme and Course Outcomes Dissemination

Sl. No	Particulars	Program Outcomes	Course Outcomes
1	College Website	✓	✓
2	Notes & Lab Manual	✓	✓
3	Course Module, Lesson Plan	-	✓
4	IA Question Paper	-	✓
5	Classroom, Seminar Hall, Laboratory	✓	-
6	Faculty Office, Dept. Office	✓	-
7	Magazine	✓	-
8	College Enterprise Resource Planning(CERP) Portal	✓	✓
9	Flipped Classroom(Mail) through CERP/MS Teams	-	✓

HOD

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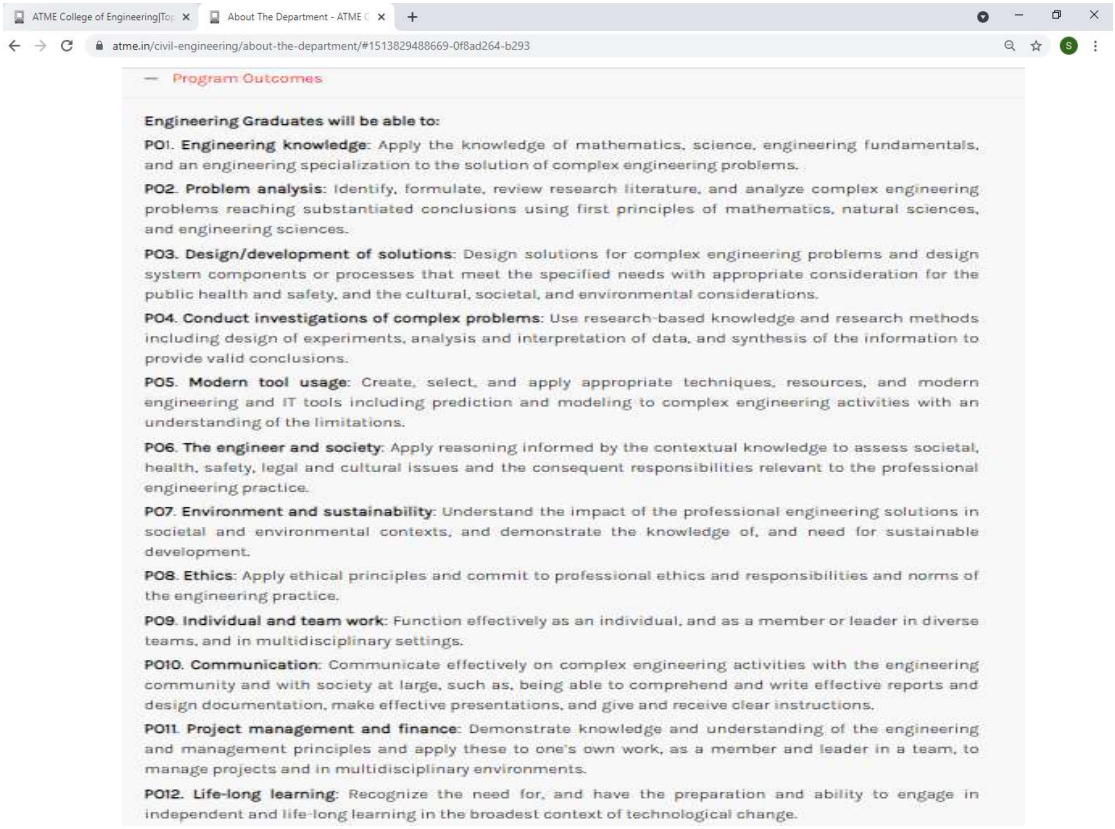
Department of Civil Engineering
ATME College of Engineering
Mysore-570 028

DEPARTMENT OF CIVIL ENGINEERING

A. College Website Dissemination

https://atme.in/civil-engineering/about-the-department/#1513829488669-0f8ad264-b293



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https://atme.in/civil-engineering/civil-resources/

Civil

- About The Department
- Infrastructure
- Faculty Details
- Student Learning Centric
- Achievements
- Research Initiatives
- Industry Interface
- Placement
- Co-curricular & extra curricular activities
- Teachers teaching analysis
- Counselling module
- E-News Letter

Academic Year – 2020-2021

Course Details & Content

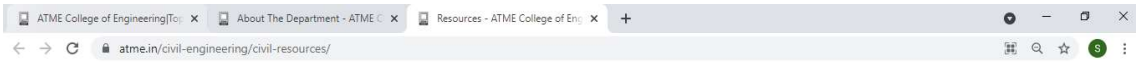
3rd Semester

Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
1	18MAT31	Transform Calculus, Fourier Series and Numerical Techniques	Madhusudhan K V	CLICK	CLICK	CLICK	CLICK	CLICK
2	18CV32	Strength of Materials	P Shashank	CLICK	CLICK	CLICK	CLICK	CLICK
3	18CV33	Fluid Mechanics	Dr Akshaya B J	CLICK	CLICK	CLICK	CLICK	CLICK
4	18CV34	Building Materials and Construction	Srivathsa H U	CLICK	CLICK	CLICK	CLICK	CLICK
5	18CV35	Basic Surveying	Rudresh A N	CLICK	CLICK	CLICK	CLICK	CLICK
6	18CV36	Engineering Geology	-	CLICK	CLICK	CLICK	CLICK	CLICK
7	18CVL37	Computer Aided Building Planning & Drawing	P Shashank	CLICK	CLICK	CLICK	CLICK	CLICK
8	18CVL38	Building Materials Testing Laboratory	Jyothi D N	CLICK	CLICK	CLICK	CLICK	CLICK
10	18MATDIP31	Additional Mathematics – I	Madhusudhan K V	CLICK	CLICK	CLICK	CLICK	CLICK

5th Semester

Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
11	18CV51	Construction Management & Entrepreneurship	Mandeep G	CLICK	CLICK	CLICK	CLICK	CLICK
12	18CV52	Analysis of Indeterminate Structures	Manu Vijay	CLICK	CLICK	CLICK	CLICK	CLICK
13	18CV53	Design of RC Structural Elements	Shruthi H G	CLICK	CLICK	CLICK	CLICK	CLICK
14	18CV54	Basic Geotechnical Engineering	Puneeth K	CLICK	CLICK	CLICK	CLICK	CLICK
15	18CV55	Municipal Wastewater Engineering	Dr Suneeth Kumar K M	CLICK	CLICK	CLICK	CLICK	CLICK
16	18CV56	Highway Engineering	Bharathi B	CLICK	CLICK	CLICK	CLICK	CLICK
17	18CVL57	Surveying Practice	Rudresh A N	CLICK	CLICK	CLICK	CLICK	CLICK
18	18CVL58	Concrete and Highway Materials Laboratory	Mandeep G	CLICK	CLICK	CLICK	CLICK	CLICK
19	18CIV59	Environmental Studies	-	CLICK	CLICK	CLICK	CLICK	CLICK

DEPARTMENT OF CIVIL ENGINEERING



7th Semester								
Sl. No.	Subject/ Lab Name	Subject/Lab Code	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
20	17CV71	Municipal and Industrial Waste Water Engineering	Jyothi D N	CLICK	CLICK	CLICK	CLICK	CLICK
21	17CV72	Design of RCC and Steel Structures	Srivathsa H U	CLICK	CLICK	CLICK	CLICK	CLICK
22	17CV73	Hydrology and Irrigation Engineering	Rudresh A N	CLICK	CLICK	CLICK	CLICK	CLICK
23	17CV742	Ground Water & Hydraulics	Dr Akshaya B J	CLICK	CLICK	CLICK	CLICK	CLICK
24	17CV753	Rehabilitation and Retrofitting of Structures	Manu Vijay	CLICK	CLICK	CLICK	CLICK	CLICK
25	17CVL76	Environmental Engineering Laboratory	Bharathi B	CLICK	CLICK	CLICK	CLICK	CLICK
26	17CVL77	Computer Aided Detailing of Structures	Srivathsa H U	CLICK	CLICK	CLICK	CLICK	CLICK

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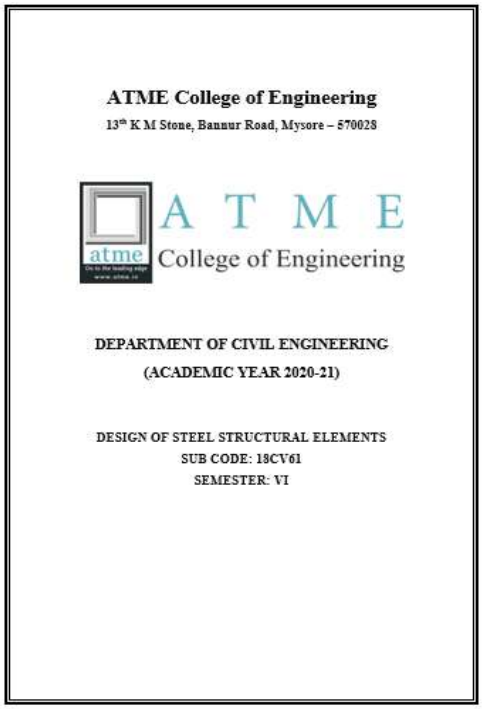
Department of Civil Engineering
ATME College of Engineering
Mysore-570 023

DEPARTMENT OF CIVIL ENGINEERING

B. Notes, Lab Manual, Course Module, Lesson Plan

NOTES SAMPLE



ATME College of Engineering

13th K M Stone, Bannur Road, Mysore – 570028

ATME College of Engineering

DEPARTMENT OF CIVIL ENGINEERING

(ACADEMIC YEAR 2020-21)

DESIGN OF STEEL STRUCTURAL ELEMENTS

SUB CODE: 18CV61

SEMESTER: VI

Vision of the Institute

Development of academically excellent, culturally vibrant, socially responsible and globally competent human resources

Mission of the Institute

To keep pace with advancements in knowledge and make the students competitive and capable at the global level

To create an environment for the students to acquire the right physical, intellectual, emotional and moral foundations and shine as torchbearers of tomorrow's society

To strive to attain ever-higher benchmarks of educational excellence

Vision of the Department

To develop globally competent civil engineers who excel in academics, research and are ethically responsible for the development of the society.

Mission of the Department

To provide quality education through faculty and state of the art infrastructure.

To identify current problems in the society pertaining to Civil Engineering disciplines and to address them effectively and efficiently

To inculcate the habit of research and entrepreneurship in our graduates to address current infrastructure needs of society

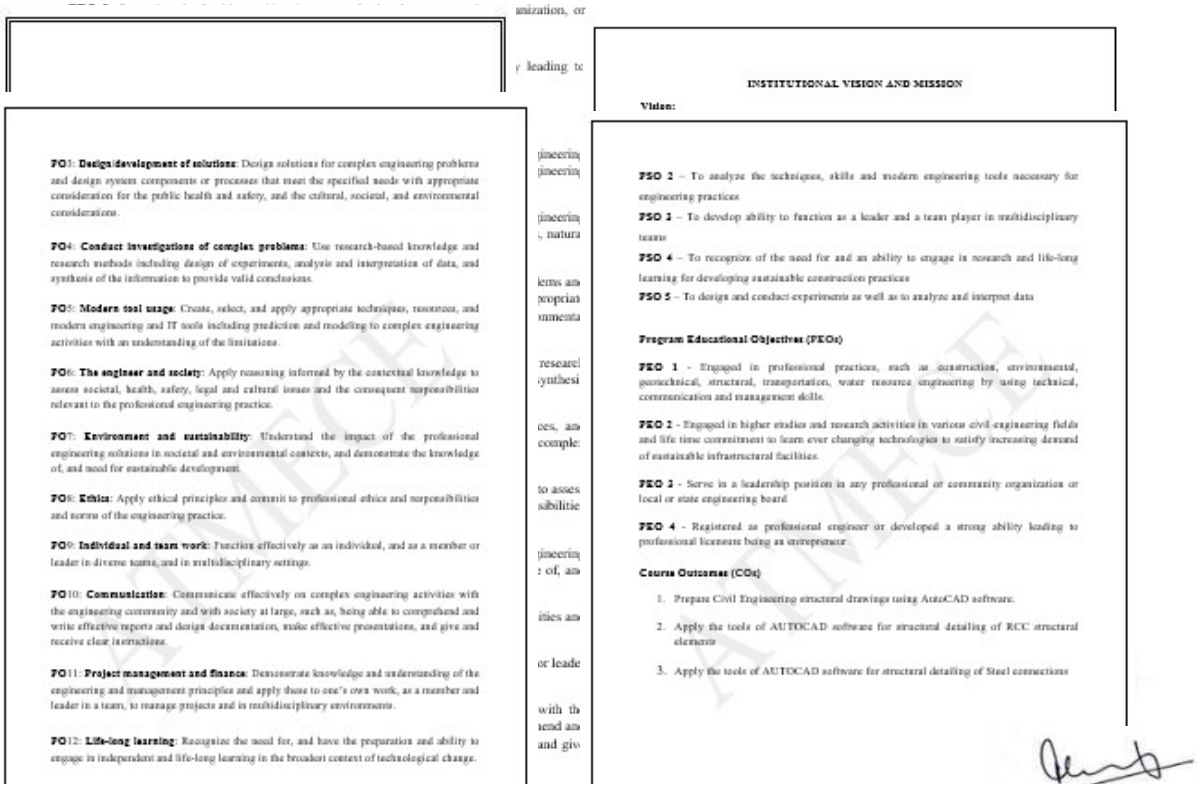
PEO's

Graduates who complete their UG course through our institution will be,

PEO 1- Engaged in professional practices, such as construction, environmental, geotechnical, structural, transportation, or water resources engineering by using technical, communication and management skills.

PEO 2- Engaged in higher studies and research activities in various Civil Engineering fields and a life time commitment to learn ever changing technologies to satisfy increasing demand of sustainable infrastructural facilities

LAB MANUAL SAMPLE



INSTITUTIONAL VISION AND MISSION

Vision:

PSO 2 – To analyze the techniques, skills and modern engineering tools necessary for engineering practices

PSO 3 – To develop ability to function as a leader and a team player in multidisciplinary teams

PSO 4 – To recognize of the need for and an ability to engage in research and life-long learning for developing sustainable construction practices

PSO 5 – To design and conduct experiments as well as to analyze and interpret data

Program Educational Objectives (PEOs)

PEO 1 - Engaged in professional practices, such as construction, environmental, geotechnical, structural, transportation, water resource engineering by using technical, communication and management skills.

PEO 2 - Engaged in higher studies and research activities in various civil engineering fields and life time commitment to learn ever changing technologies to satisfy increasing demand of sustainable infrastructural facilities.

PEO 3 - Serve in a leadership position in any professional or community organization or local or state engineering board

PEO 4 - Registered as professional engineer or developed a strong ability leading to professional licensure being an entrepreneur.

Course Outcomes (COs)

1. Prepare Civil Engineering structural drawings using AutoCAD software.
2. Apply the tools of AUTOCAD software for structural detailing of RCC structural elements
3. Apply the tools of AUTOCAD software for structural detailing of Steel connections

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.

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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.

COURSE MODULE

Course Modules of the Subject Taught for the Session Sep-Dec 2020-21 (Odd Semester)
Course Syllabi with CO's

Faculty Name : SRIVATHSA H U			Academic Year: 2020-2021				
Department: CIVIL ENGINEERING							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
18CV34	**Building Materials & Construction**	Core	**Elements of Civil Engineering**	3	-	-	40
Objectives:	1. To recognize good construction materials based on properties. 2. To investigate soil properties and design suitable foundation. 3. To understand the types and properties of masonry materials and supervise masonry construction. 4. To gain knowledge of structural components like lintels, arches, staircase and roofs. 5. To understand the finishes in construction like flooring, plastering, painting.						

Topics Covered as per Syllabus

Module 1
Building Materials:
Stone as building material: Requirement of good building stones, Dressing of stones, Deterioration and Preservation of stone work.
Bricks: Classification, Manufacturing of clay bricks, Requirement of good bricks. Field and laboratory tests on bricks, compressive strength, water absorption, efflorescence, dimension and warpage.
Cement Concrete blocks, Stabilized Mud Blocks, Sizes, requirement of good blocks. Mortar: types and requirements. Timber as construction material
Fine aggregate: Natural and manufactured: Sieve analysis, zoning, specific gravity, bulking, moisture content, deleterious materials.
Coarse aggregate: Natural and manufactured: Importance of size, shape and texture. Grading of aggregates, Sieve analysis, specific gravity, Flakiness and elongation index, crushing, impact and abrasion tests. **10 Hours**

Module 2
Foundation:
Preliminary investigation of soil, safe bearing capacity of soil, Function and requirements of good foundation, types of foundation, introduction to spread, combined, strap, mat and pile foundation.
Masonry:
Definition and terms used in masonry. Brick masonry, characteristics and requirements of good brick masonry, Bonds in brick work, Header, Stretcher, English, Flemish bond, Stone masonry, Requirements of good stone masonry, Classification, characteristics of different stone masonry, Joints in stone masonry. Types of walls, load bearing, partition walls, cavity walls **10 Hours**

Module 3
Lintels and Arches:
Definition, function and classification of lintels, Balconies, chejja and canopy. Arches; Elements and Stability of an Arch.
Floors and roofs:
Floors: Requirement of good floor, Components of ground floor, Selection of flooring material, Layers of Concrete, Mosaic, Marble, Granite, Tile flooring, Cladding of tiles.
Roof: - Requirement of good roof, Types of roof, Elements of a pitched roof, Trussed roof, King post Truss, Queen Post Truss, Steel Truss,
Different roofing materials, R.C.C. Roof. **10 Hours**

Module 4
Doors, Windows and Ventilators:
Location of doors and windows, technical terms, Materials for doors and windows, Panelled door, Flush door, Collapsible door, rolling shutter, PVC Door, Panelled and glazed Window, Bay Window, French window. Ventilators. Sizes as per IS recommendations
Stairs: Definitions, technical terms and types of stairs, Requirements of good stairs. Geometrical design of RCC dogleggerd and open-well stairs.
Formwork: Introduction to form work, scaffolding, shoring, under pinning **10Hours**

Module 5
Plastering and Pointing: purpose, materials and methods of plastering and pointing, defects in Plastering-Stucco plastering, lathe plastering
Damp proofing- causes, effects and methods.
Paints- Purpose, types, ingredients and defects **10 Hours**

List of Text Books
1. Sushil Kumar "Building Materials and construction", 20th edition, reprint 2015, Standard Publishers
2. Dr. B.C. Punmia, Ashok kumar Jain, Arun Kumar Jain, "Building Construction, Laxmi Publications (P) ltd., New Delhi.
3. Rangwala S. C. "Engineering Materials", Charter Publishing House, Anand, India.

List of Reference Books
1. S.K. Duggal, "Building Materials", (Fourth Edition) New Age International (P) Limited, 2016
2. National Building Code(NBC) of India
3. P C Vergese, "Building Materials", PHI Learning Pvt. Ltd
4. Building Materials and Components, CBRI, 1990, India
5. Jagadish. K.S. "Alternative Building Materials Technology", New Age International, 2007.
6. M. S. Shetty, "Concrete Technology", S. Chand & Co. New Delhi.

URLs : 1. http://nptel.ac.in/courses/105102088/

Course Outcomes	1. Select suitable materials for buildings and adopt suitable construction techniques.	L3
	2. Decide suitable type of foundation based on soil parameters	L4
	3. Supervise the construction of different building elements based on suitability	L4
	4. Exhibit the knowledge of building finishes and form work requirements	L3

Internal Assessment Marks: 30 + 10 (3 Session Tests are conducted during the semester and marks allotted based on average of 3 test and assignment performances).

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	18CV34	TITLE: Building Materials & Construction					Faculty Name:			SRIVATHSA H U	
List of Course Outcomes	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	1	1	-	-	-	-	-	-	-	-	-	1
CO-2	1	1	-	-	-	-	-	1	-	1	-	1
CO-3	1	-	-	-	-	-	-	-	-	-	-	1
CO-4	1	-	-	-	-	-	-	-	-	-	-	1

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	18CV34	TITLE: Building Materials & Construction	Faculty Name:	SRIVATHSA H U
List of Course Outcomes	Program Specific Outcomes			
	PSO1		PSO2	
CO-1	-		1	
CO-2	-		1	
CO-3	-		-	
CO-4	-		1	

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

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C. IA QP and Scheme

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Online IA - 3

Subject Code	:	**18CV34**	**Time**	:	**2:30 – 4:00 PM**
Subject	:	**Building Materials & Construction**	**Date**	:	**28.12.2020**
Semester	:	**III**	**Max. Marks**	:	**50**

	PART-A-Answer any three full Questions	Marks	COs	BTL
01.	a) Answer the following multiple choice questions and each carries 1mark i. The most common type of door is a) Double leaf door b) Louvered door c) Single leaf door d) Battened door ii. A bay window is a multi-panel window, which: a) Is provided at corners b) Runs parallel to the wall c) Embeds inside wall d) Projects outside wall	2 M	3	L1
	b) Explain any 4 types of doors in detail	8 M		L2
02.	a) Answer the following multiple choice questions and each carries 1mark i. The vertical portion between each tread on the stair is called: a) Going b) Nosing c) Winder d) Riser ii. Maximum and Minimum number of steps allowed in a single flight is a) 13, 3 b) 12. 2 c) 12, 3 d) 10, 3	2 M	3	L1
	b) i) Explain Dog legged and Open Newel staircase with a neat sketch ii) Draw plan and sectional elevation of RCC dog-legged staircase for an office building which measures 3m x 5.5m. The vertical distance between the floor is 3.3m (including landing). Provide steps with tread of 300mm and rise of 150mm. Width of stair is 1.5m.	4 M 4 M		L2
03.	a) Answer the following multiple choice questions and each carries 1 mark i. The _____ is used for formwork when it is desired to reuse the formwork several times. a) Stone b) Steel c) Timber d) Bamboo ii. The formwork for _____ consists of stringers, sheets, joist, bearers and vertical post. a) Walls b) Column c) Beams d) Stairs	2 M	4	L1
	b) Define Shoring and explain the types of shores with a neat sketch	8 M		L2
04.	a) Answer the following multiple choice questions and each carries 1 marks i. Sometimes the structures are to be temporarily supported. This is achieved by what is known as the _____ a) Scaffolding b) Shoring c) Underpinning d) Grouting ii. In _____ shore arrangement, the inclined supports are given to the external walls from the ground. a) Raking shore b) Flying shore c) Dead shore d) Patented shore	2M	4	L1
	b) Define Underpinning & Explain the methods of underpinning	8M		L2

	PART-B-Answer any two full Questions	Marks	COs	BTL
01.	a) Answer the following multiple choice questions and each carries 1 marks i. Before plastering, the surface has to be: a) Rough b) Smooth c) Cemented d) Watered ii. Which of the below is not a plaster type based on the material? a) Cement b) Gypsum c) Pozzolana d) Lime	2 M	4	L1
	b) i) Explain any 5 types of surface finishes that are adopted in plastering work ii) Explain any 5 types of defects in plastering	4 M 4 M		L2
02.	a) Answer the following multiple choice questions and each carries 1 marks i. DPM stands for: a) Damp Proof Material b) Damp Proof Mix c) Damp Proof Member d) Damp Proof Membrane ii. A paint normally consists of _____ components a) 3 b) 4 c) 5 d) 6	2 M	4	L1
	b) Explain the methods of damp proofing	8 M		L2
03.	a) Answer the following multiple choice questions and each carries 1 marks i. The appearance of glossy patches on the painted surface is called: a) Flashing b) Blooming c) Running d) Blistering ii. Which of the below is a pigment imparting brown color? a) Raw sienna b) Soot c) Burnt sienna d) Ultramarine	2 M	4	L1
	b) Explain the defects in painting works	8 M		L2

CO1	Select suitable materials for buildings and adopt suitable construction techniques
CO2	Decide suitable type of foundation based on soil parameters
CO3	Supervise the construction of different building elements based on suitability
CO4	Exhibit the knowledge of building finishes and form work requirements

Bloom's Taxonomy Level	
L1	Remembering
L2	Understanding
L3	Applying
L4	Analyzing
L5	Synthesizing
L6	Creating

Sivarthika. H.V
Name & Signature of Course Coordinator

HOD Signature

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Department of Civil Engineering

Subject Name: Building Materials & construction **Subject Code:** 18CV34
Faculty Name: Sivarthika. H.V **IA Number:** 3

CO1	Select suitable materials for buildings and adopt suitable construction techniques
CO2	Decide suitable type of foundation based on soil parameters
CO3	Supervise the construction of different building elements based on suitability
CO4	Exhibit the knowledge of building finishes and form work requirements
CO5	
CO6	

Revised Bloom's Taxonomy Levels
L1: Remembering **L2:** Understanding **L3:** Applying **L4:** Analyzing **L5:** Evaluating **L6:** Creating

No	Solution	Marks	COs	BTL
01.	a) i) Single leaf door ii) Projects outside wall — 1×2 = 2m b) Framed & Panelled door * These type of doors are commonly used in all types of buildings * This type of door consists of framework of vertical members & horizontal members * Panels may be made of timber, black board or glass. Door may have one, two, three or six panels Glazed or sash doors * These are adopted to admit more light into the room adjacent coming from windows. * It may be fully glazed or partly paneled & partly glazed. * In partly glazed & partly paneled, ratio of glazed portion to paneled portion to be maintained in the ratio of 2:1, the bottom $\frac{1}{3}^{rd}$ height is paneled & $\frac{2}{3}^{rd}$ is glazed.	2 8	4 4	L1 L2

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No	Solution	Marks	COs	BTL
	Flush door :- * With the large scale production of plywood flush doors are becoming increasingly popular these days. * It is adopted because of its pleasing appearance, simplicity of construction, less cost, better strength & greater durability * They can be used for both residential as well as public buildings Swinging doors :- * A swing door is provided with special hinges & then the shutter of the door are held in closed position when door is not in use * It is desirable to provide a glazed shutter at eye level to avoid the accidents at the time of opening & closing the shutter. → 4×2 = 8marks			
02.	a) i) Riser ii) 12, 3 → 1×2 = 2marks	2	4	L1
	b) Dog-legged stair * In this type, flight runs in opposite direction & there is no space between them in plan. * Trims are adopted when space available for staircase is equal to twice the width of step. * Name is given because of its appearance in elevation → 2marks	8	4	L2

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No	Solution	Marks	COs	BTL

Open Newel Stairs

* In this type there will be a well @ hole formed in b/w the flights
* These are adopted when space available is greater than twice the width of stair.

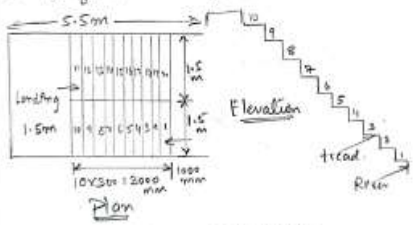
ii) No of riser = Total height of floor / Height of Riser = 3.3 / 0.15 = 22 nos

let us provide 2 flights

∴ No of risers in 1st flight = 22/2 = 11 nos

No of risers in 2nd flight = 11 nos

∴ No of treads in each flight = 11 − 1 = 10 nos



03 a) i) Steel ii) Glass → 2 x 1 = 2 marks provide	2	4	L1
b) Shoring is temporary structure constructed to temporary support for an ongoing structure. → 1 mark.	8	4	L2

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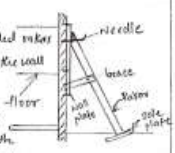
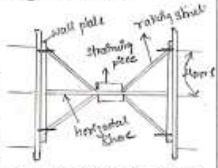
Raking shores

* In this method inclined members called rakers are provided to give lateral support to the wall
* Rakers are provided @ each floors
* At the top rakers are provided with needle & at bottom it is provided with Sole plate to avoid the sliding of raker.
* Another rakers should be placed @ 2 to 4.0 c/c.



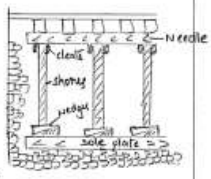
Horizontal Shores

* In this method, horizontal supports are placed parallel to the wall & none of the shores reaches the ground.
* Raking shores are held against the wall & well secured with needle @ top & at bottom Strutting piece is provided to avoid sliding.



Flying Vertical Shores

* This type of shoring consists of vertical members known as dead shores supporting the H/E beams or needles
* Needle transfer the load of wall of 1st floor to the ground through the vertical shores from sole plate.
* Distances at which rakers are cut in walls of 1st floor may vary about 1.2 to 1.5m for fixing needles. → 3 x 3 = 9m



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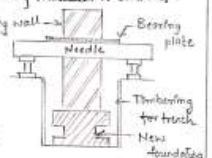
No	Solution	Marks	COs	BTL
04 a) i) Shoring ii) Raking shore → 2 x 1 = 2 marks	2	4	L1

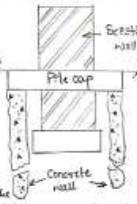
b) Process of placing new foundation below an existing foundation or portion of strengthening the existing foundation is known as Underpinning.

Pit method:



* Existing wall is divided into suitable size of width about 1.2m to 1.5m.
* Holes are made in the existing wall
* Needle with bearing plates are inserted through holes and supported by jacks.
* Pit is excavated & existing foundation is taken upto required level.

Pile method



* Piles are driven into the ground along the sides of the existing walls & then needles in the form of pile caps are provided through the existing walls.
* Underpinning is provided for light structure, the piles are driven along the piles are driven along the structure & cantilever needle are provided to carry structure.

Cement Grouting

* This method is used to restore slab or pavement which has settled.
* The holes are drilled in the slab and cement grout is forced

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No	Solution	Marks	COs	BTL

under pressure through these holes.
* The pressure is maintained until the cement grout has set.

Part-C

01 a) i) Roofing tiles ii) Pozzolana → 2 x 1 = 2 marks	2	5	L1
b) Smooth cast :- It is a finish which presents levelled & smooth surface.	5	5	L2

Rough cast :- It is a finish in which mortar for the final coat contains a proportion of gritty big size coarse aggregate.

Pebble cast :- It is a finish in which small pebbles or crushed stones of suitable size are thrown & left exposed.

Textured finish :- Ornamental patterns or textured surfaces are produced by working with various tools on freshly applied coat.

Sprayed finish :- It is a finish of pronounced rough surface texture to the applied coat. → 5 x 1 = 5 marks

Efflorescence :- Formation of small patches of plaster readily cut beyond the plastered surface due to late flaking

Cracking :- Formation of cracks due to improper proportion

Efflorescence :- Crystalline whitish precipitate appears on finished plastered surface.

Flaking :- Formation of very loose mass of plastered surface

Peeling :- Complete dislocation of some portion of plaster readily after formation of patches → 5 x 1 = 5 marks

02 a) i) Damp proof membrane ii) b → 2 x 1 = 2 marks	2	5	L1
b) Membrane Damp proofing :- It consists of providing a layer of membrane of water impervious material b/w the source of dampness & the part of the structure adjacent to it.	8	5	L2

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No	Solution	Marks	COs	BTL
	a. Integral Damp proofing :- This consists of adding certain waterproofing compounds with the concrete mix so that it becomes impermeable.			
	8. Surface Treatment :- Consists of filling up pores subjected to dampness. The use of water repellent metallic soaps are effective in protecting the building against heavy rain			
	4. Rendering :- This consists of depositing an impervious layer of rich cement mortar over the surface to be water proofed.			
	5. Cavity wall construction :- Cavity wall consists of parallel layers of wall separated by continuous cavity which prevents the transmission of dampness from one wall to outer wall. UK2 = Bronze			
03	a) i) Flashing ii) Burnt Stemma.	2	5	L1
	b) Blistering - Due to entrapped water vapour Bloom - Formation of dull patches due to bad ventilation Fading - loss of colour due to exposure for longer sunlight Flaking - Some portion becomes loose due to moisture movement Flashing - glossy patches are formed due to bad workmanship Efflorescence - If the surface is not sufficiently opaque Running - Paint runs back because of smooth surface Sagging - If vertical or inclined surface are heavily painted. GA1 = Brown	8	5	L2

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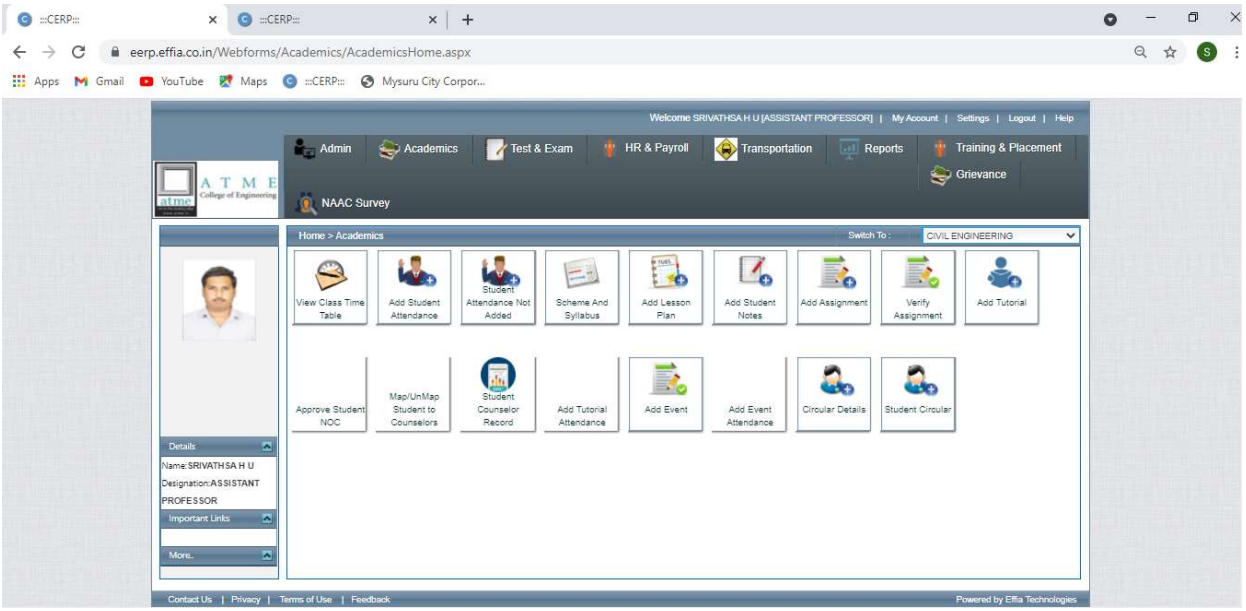
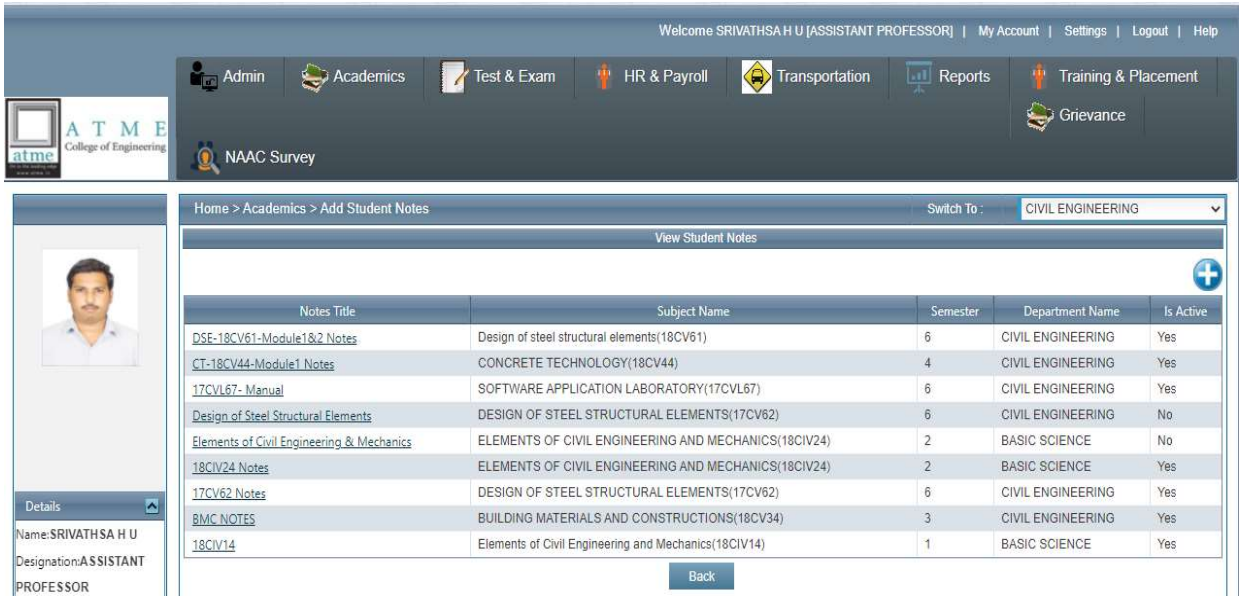
D. CERP Link: https://eerp.effia.co.in/Webforms/frmLogin.aspx

Note: Only authorised access





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E. CLASSROOM, SEMINAR HALL & LABORATORY

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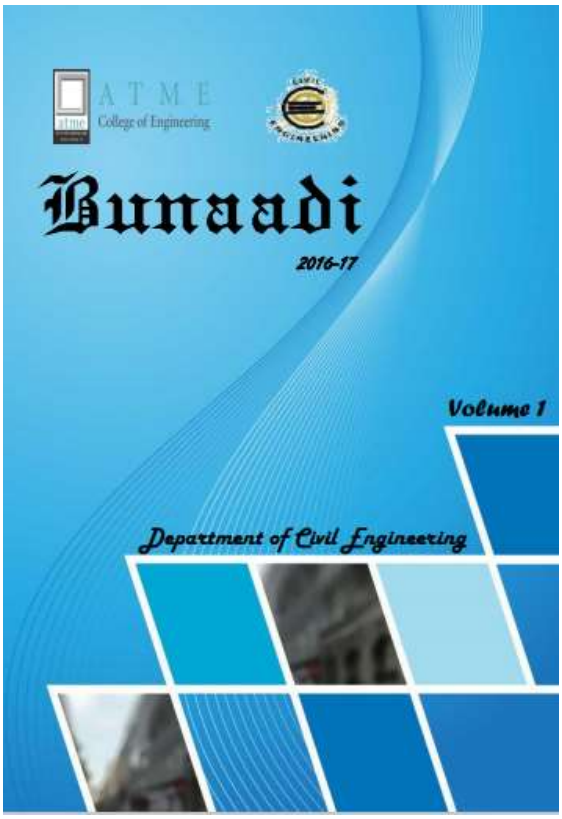
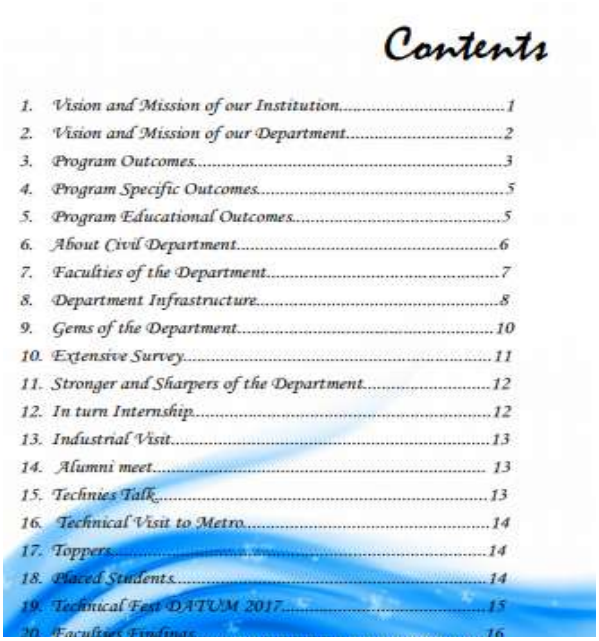
F. Magazine





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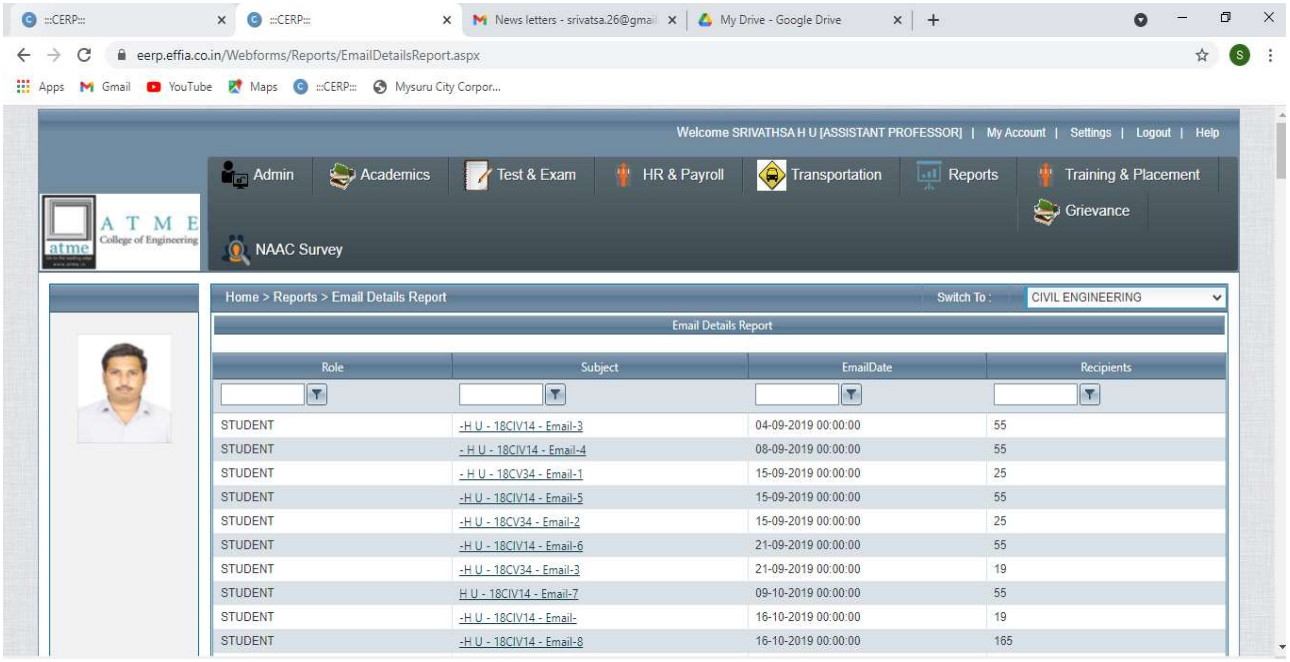
G. Flipped Classroom through Mail (CERP/ MS Teams)



Role	Subject	EmailDate	Recipients
STUDENT	-H U - 18CIV14 - Email-3	04-09-2019 00:00:00	55
STUDENT	- H U - 18CIV14 - Email-4	08-09-2019 00:00:00	55
STUDENT	- H U - 18CV34 - Email-1	15-09-2019 00:00:00	25
STUDENT	-H U - 18CIV14 - Email-5	15-09-2019 00:00:00	55
STUDENT	-H U - 18CV34 - Email-2	15-09-2019 00:00:00	25
STUDENT	-H U - 18CIV14 - Email-6	21-09-2019 00:00:00	55
STUDENT	-H U - 18CV34 - Email-3	21-09-2019 00:00:00	19
STUDENT	H U - 18CIV14 - Email-7	09-10-2019 00:00:00	55
STUDENT	-H U - 18CIV14 - Email-	16-10-2019 00:00:00	19
STUDENT	-H U - 18CIV14 - Email-8	16-10-2019 00:00:00	165

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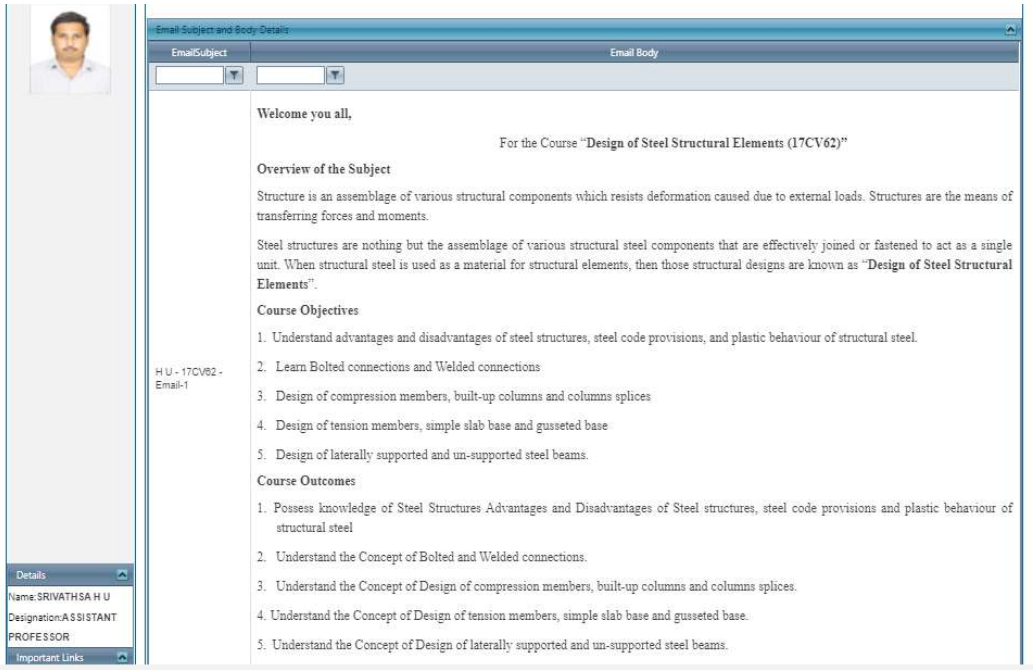

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CO STATEMENTS

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CO Statements, CO-PO & CO-PSO Matrix for the AY 2019-20

Course Name	Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
Calculus & Linear Algebra 18MAT11	C101.1	2	1	-	-	-	-	-	-	-	-	-	1	-	-
	C101.2	3	2	-	-	-	-	-	-	-	-	-	2	-	-
	C101.3	2	2	-	-	-	-	-	-	-	-	-	2	-	-
	C101.4	3	2	-	-	-	-	-	-	-	-	-	2	-	-
	C101.5	3	2	-	-	-	-	-	-	-	-	-	2	-	-
Advanced Calculus & Numerical methods 18MAT22	C201.1	3	3	-	-	-	-	-	-	-	-	-	2	-	-
	C201.2	3	2	-	-	-	-	-	-	-	-	-	2	-	-
	C201.3	3	2	-	-	-	-	-	-	-	-	-	1	-	-
	C201.4	2	2	-	-	-	-	-	-	-	-	-	1	-	-
	C201.5	2	2	-	-	-	-	-	-	-	-	-	2	-	-
Engineering Physics 18PHY12/22	C102.1	3	2	-	-	-	-	-	-	-	-	-	1	-	-
	C102.2	3	2	1	-	-	1	-	-	-	-	-	1	-	-
	C102.3	3	2	-	-	-	-	-	-	-	-	-	1	-	-
	C102.4	3	2	-	-	-	-	-	-	-	-	-	1	-	-
	C102.5	3	2	-	-	-	-	-	-	-	-	-	1	-	-
Engineering Chemistry 18CHE12/22	C102A.1	3	2	-	-	-	-	-	-	-	-	-	3	-	-
	C102A.2	2	1	-	-	-	-	-	-	-	-	-	2	-	-
	C102A.3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
	C102A.4	3	-	-	-	-	2	2	-	-	-	-	3	-	-
	C102A.5	3	2	-	-	-	-	-	-	-	-	-	3	-	-
Basic Electrical Enginering 18ELE13/23	C103.1	3	3	-	-	-	-	-	-	-	-	-	2	-	-
	C103.2	3	3	-	-	-	-	-	-	-	-	-	1	-	-
	C103.3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
	C103.4	2	-	-	-	-	2	-	-	-	-	-	-	-	-
	C103.5	3	3	-	-	-	-	-	-	-	-	-	-	-	-
	C103.6	3	2	-	-	-	-	-	-	-	-	-	-	-	-
C Programming for Problem Solving 18CPS13/23	C103A.1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C103A.2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C103A.3	1	1	-	-	-	-	-	-	-	-	-	-	-	-
	C103A.	2	2	-	-	-	-	-	-	-	-	-	-	-	-

	4														
Elements of Civil Enginnering & Mechanics 18CIV14/24	C104.1	1	-	-	-	-	1	-	-	-	1	-	1	-	-
	C104.2	2	2	-	-	-	-	-	-	-	1	-	2	-	-
	C104.3	2	2	-	-	-	1	-	-	-	1	-	2	-	-
	C104.4	2	2	-	-	-	1	-	-	-	1	-	2	-	-
	C104.5	2	2	-	-	-	-	-	-	-	1	-	2	-	-
Basic Electronics 18ELN14/24	C104A.1	3	2	2	1	-	-	-	-	-	-	-	2	-	-
	C104A.2	3	3	2	1	-	-	-	-	-	-	-	2	-	-
	C104A.3	3	2	2	1	-	-	-	-	-	-	-	2	-	-
	C104A.4	3	3	2	1	-	-	-	-	-	-	-	2	-	-
	C104A.5	3	3	3	2	2	-	-	-	-	-	-	2	-	-
	C104A.6	3	2	1	1	-	-	-	-	-	-	-	2	-	-
Elements of Mechanical Engineering 18ME15/25	C105.1	3	-	-	-	-	-	2	-	-	-	-	2	-	-
	C105.2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
	C105.3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
	C105.4	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C105.5	2	-	-	-	3	-	-	-	-	-	-	2	-	-
Engineering Graphics 18EGDL15/25	C105A.1	2	-	2	-	3	-	-	-	-	2	-	2	-	-
	C105A.2	2	2	-	-	-	-	-	-	-	2	-	-	-	-
	C105A.3	2	2	-	-	-	-	-	-	-	2	-	-	-	-
Engineering Physics Laboratory18PHYL16/26	C106.1	3	-	-	-	-	-	-	1	1	-	-	1	-	-
	C106.2	3	-	-	-	-	-	-	1	1	-	-	1	-	-
	C106.3	3	-	-	-	-	-	-	1	1	-	-	1	-	-
	C106.4	3	-	-	-	-	-	-	1	1	-	-	1	-	-
	C106.5	3	-	-	-	1	-	-	1	1	-	-	1	-	-
	C106.6	3	1	1	-	1	1	-	2	2	1	-	2	-	-
Enigneering Chemistry Lab 18CHEL16/26	C106A.1	3	2	-	-	-	-	2	-	-	-	-	3	-	-
	C106A.2	1	-	-	-	-	-	1	-	-	-	-	2	-	-
Basic Electrical Engineering Laboratory 18ELEL17/27	C107.1	2	-	-	-	-	-	-	-	3	1	-	-	-	-
	C107.2	3	3	-	-	-	-	-	-	3	1	-	2	-	-
	C107.3	3	2	-	-	-	-	-	-	3	2	-	-	-	-

	C107.4	3	2	-	-	-	-	-	-	3	1	-	-	-	-
	C107.5	3	2	-	-	-	-	-	-	3	1	-	-	-	-
	C107.6	2	1	-	-	-	1	-	-	3	1	-	-	-	-
C Programming Laboratory 18CPL17/27	C107A.1	2	2	-	-	2	-	-	-	-	-	-	-	-	-
	C107A.2	1	1	-	-	1	-	-	-	-	-	-	-	-	-
	C107A.3	2	2	-	-	1	-	-	-	-	-	-	-	-	-
	C107A.4	2	2	-	-	2	-	-	-	-	-	-	-	-	-
English (18EGH18)	C108.1	-	-	-	-	-	-	-	1	-	3	1	2	-	-
	C108.2	-	-	-	-	-	-	-	-	-	3	1	2	-	-
	C108.3	-	-	-	-	-	-	-	-	-	1	-	2	-	-
	C108.4	3	-	-	-	-	-	-	-	-	1	1	2	-	-
	C108.5	-	-	-	-	-	-	-	-	1	1	1	2	-	-
Engineering Mathematics-III (18MAT31)	C201.1	1	1	-	-	-	-	-	-	-	-	-	1	-	-
	C201.2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	C201.3	1	1	-	-	-	-	-	-	-	-	-	1	-	-
	C201.4	2	1	-	-	-	-	-	-	-	-	-	2	-	-
	C201.5	2	0	-	-	-	-	-	-	-	-	-	1	-	-
Strength of materials (18CV32)	C202.1	1	2	1	-	-	-	-	-	-	1	1	1	1	-
	C202.2	1	1	-	-	-	-	-	-	1	-	-	1	-	-
	C202.3	1	1	2	1	-	-	-	-	-	-	-	1	-	-
	C202.4	1	2	1	1	-	-	-	-	-	-	-	1	1	-
	C202.5	1	1	1	1	-	-	-	1	-	-	-	1	-	-
Fluid Mechanics (18CV33)	C203.1	3	2	-	-	-	-	-	-	-	-	-	1	-	-
	C203.2	3	2	-	-	-	-	-	-	-	-	-	1	1	-
	C203.3	3	2	-	-	-	-	-	-	-	-	-	1	-	-
	C203.4	3	1	-	-	-	-	-	-	-	-	-	1	-	-
	C203.5	3	1	-	-	-	-	-	-	-	-	-	1	1	-
Building Materials & Construction (18CV34)	C204.1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
	C204.2	1	1	-	-	-	-	-	1	-	1	-	1	1	-
	C204.3	1	-	-	-	-	-	-	-	-	-	-	1	1	-
	C204.4	1	-	-	-	-	-	-	-	-	-	-	1	1	-
Basic Surveying (18CV35)	C205.1	2	-	-	-	-	-	-	-	-	-	-	1	1	-
	C205.2	2	-	-	-	-	-	-	-	-	-	-	1	1	-
	C205.3	1	-	-	-	-	-	-	-	-	-	-	1	1	-
	C205.4	2	1	-	-	-	-	-	-	-	-	-	1	1	-
Engineering Geology (18CV36)	C206.1	1	-	-	-	-	1	-	-	-	-	-	2	-	-
	C206.2	2	1	1	-	-	1	-	-	-	-	-	2	-	-

	C206.3	2	1	1	-	-	1	-	-	-	-	-	2	-	-
	C206.4	2	2	1	-	-	1	1	-	-	-	-	2	1	-
	C206.5	2	-	-	-	-	1	-	-	-	-	-	1	-	-
Computer aided building planning and drawing (18CVL37)	C207.1	3	-	-	-	-	-	-	-	1	1	-	-	-	-
	C207.2	3	-	-	-	-	-	-	-	2	2	-	-	-	-
	C207.3	3	-	-	-	3	-	-	-	2	2	-	-	-	-
Material Testing Lab (18CVL38)	C208.1	3	2	-	2	-	1	-	1	3	1	-	2	1	-
	C208.2	2	2	-	2	-	1	-	1	3	1	-	2	1	-
	C208.3	2	2	-	1	-	1	-	1	3	1	-	1	1	-
Mathematics-IV (18MAT41)	C209.1	2	2	-	-	-	-	-	-	-	-	-	1	-	-
	C209.2	2	1	-	-	-	-	-	-	-	-	-	0	-	-
	C209.3	2	2	-	-	-	-	-	-	-	-	-	1	-	-
	C209.4	2	2	-	-	-	-	-	-	-	-	-	2	-	-
	C209.5	2	2	-	-	-	-	-	-	-	-	-	2	-	-
Analysis of Determinate Structures (18CV42)	C210.1	2	2	2	2	-	-	-	-	-	-	-	2	2	-
	C210.2	2	2	2	2	-	-	-	-	-	-	-	2	2	-
	C210.3	2	2	2	2	-	-	-	-	-	-	-	2	2	-
	C210.4	2	2	2	2	-	-	-	-	-	-	-	2	2	-
	C210.5	2	2	2	2	-	-	-	-	-	-	-	2	2	-
Applied Hydraulics (18CV43)	C211.1	3	1	-	-	-	-	-	-	-	-	-	1	-	-
	C211.2	3	-	1	-	-	-	-	-	-	-	-	1	1	-
	C211.3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
	C211.4	3	1	-	-	-	-	-	-	-	-	-	1	-	-
	C211.5	3	1	1	-	-	-	-	-	-	-	-	1	1	-
Concrete Technology (18CV44)	C212.1	1	-	-	-	-	-	-	-	-	-	-	-	1	-
	C212.2	2	-	-	-	-	-	-	-	-	-	-	-	1	-
	C212.3	2	-	-	-	-	-	-	-	-	-	-	-	1	-
	C212.4	1	-	-	-	-	-	-	-	-	-	-	-	1	-
	C212.5	1	-	-	-	-	-	-	-	-	-	-	-	1	-
Advanced Surveying (18CV45)	C213.1	2	-	-	-	-	-	-	-	-	-	-	1	1	-
	C213.2	3	-	-	-	-	-	-	-	-	-	-	1	1	-
	C213.3	2	-	-	-	-	-	-	-	-	-	-	1	1	-
	C213.4	2	1	2	-	-	-	-	-	-	-	-	1	1	-
Water supply and treatment Engineering(18CV 46)	C214.1	2	-	1	-	-	1	-	-	-	-	-	-	-	1
	C214.2	2	-	1	-	-	1	-	-	-	-	-	1	-	-
	C214.3	2	1	1	-	-	1	-	1	-	-	-	1	-	1
	C214.4	3	1	1	-	-	1	1	-	-	-	-	1	-	1
Engineering Geology Laboratory (18CVL47)	C215.1	1	-	-	-	-	1	-	-	3	1	-	1	-	-
	C215.2	2	1	1	-	-	1	-	-	-	1	-	2	-	-
	C215.3	2	1	1	-	-	1	-	-	-	1	-	2	1	-

	C215.4	2	1	1	-	-	1	-	-	-	1	-	2	1	-
Fluid Mechanics and Hydraulic Machines Laboratory (18CVL48)	C216.1	3	3	2	2	-	1	-	-	3	-	-	2	-	1
	C216.2	3	3	2	2	-	1	1	-	3	-	-	3	-	1
CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP (18CV51)	C301.1	2	-	-	-	1	1	-	-	1	1	2	1	1	-
	C301.2	1	-	-	-	-	2	1	3	-	-	1	1	1	-
	C301.3	1	-	-	-	1	-	1	-	-	-	2	1	1	-
	C301.4	-	-	-	-	-	-	-	-	3	1	1	1	1	-
ANALYSIS OF INDETERMINATE STRUCTURES (18CV52)	C302.1	3	3	2	2	-	-	-	-	-	-	-	3	2	-
	C302.2	3	3	2	2	-	-	-	-	-	-	-	3	2	-
	C302.3	3	3	2	2	-	-	-	-	-	-	-	3	2	-
	C302.4	3	3	2	2	-	-	-	-	-	-	-	3	2	-
	C302.5	3	3	2	2	-	-	-	-	-	-	-	3	2	-
DESIGN OF RC STRUCTURAL ELEMENTS (18CV53)	C303.1	1	1	1	-	-	-	-	-	-	-	-	2	-	-
	C303.2	2	1	1	-	-	1	-	-	-	-	1	1	1	-
	C303.3	2	2	1	-	-	1	2	-	-	-	1	1	1	-
	C303.4	-	-	-	-	-	-	1	1	1	-	-	-	1	-
BASIC GEOTECHNICAL ENGINEERING (18CV54)	C304.1	2	1	-	-	-	-	1	-	-	-	-	1	1	-
	C304.2	2	1	-	-	-	-	1	-	-	-	-	1	1	-
	C304.3	3	1	-	-	-	-	1	-	-	-	-	1	1	-
	C304.4	3	1	-	-	-	-	1	-	-	-	-	1	1	-
	C304.5	3	1	-	-	-	-	1	-	-	-	-	1	1	-
MUNICIPAL WASTEWATER ENGINEERING (18CV55)	C305.1	2	2	2	1	-	1	1	-	-	1	1	1	2	2
	C305.2	2	1	1	1	-	1	1	-	-	1	1	1	2	2
	C305.3	2	2	2	1	-	1	2	-	-	1	2	1	2	3
	C305.4	2	2	2	1	-	1	2	-	-	1	2	1	2	3
	C305.5	2	2	2	1	-	2	2			3	3	3	2	3
HIGHWAY ENGINEERING (18CV56)	C306.1	3	-	1	-	-	-	-	-	-	-	-	1	3	-
	C306.2	1	1	-	1	-	-	-	-	-	-	-	1	2	-
	C306.3	2	-	-	-	-	-	-	-	-	-	-	1	2	1
	C306.4	2	1	-	-	-	-	-	-	-	-	2	1	2	-
SURVEYING PRACTICE (18CVL57)	C307.1	2	1	-	-	-	-	-	-	1	-	-	1	2	-
	C307.2	2	1	-	-	-	1	-	-	1	-	-	1	2	-
	C307.3	2	1	-	-	-	-	-	-	1	-	-	1	2	-
Concrete and Highway Materials Laboratory (18CVL58)	C308.1	2	2	2	1	-	1	-	-	3	1	-	2	1	-
	C308.2	2	2	2	1	-	1	-	-	3	1	-	2	1	-
	C308.3	3	2	2	1	-	1	1	-	3	1	-	3	1	-
	C308.4	2	2	2	1	-	1	-	-	3	1	-	2	1	-
	C308.5	2	2	2	1	-	1	1	-	3	1	-	2	1	-

	C308.6	2	2	2	1	-	1	1	-	3	1	-	2	1	-
DESIGN OF STEEL STRUCTURAL ELEMENTS (18CV61)	C309.1	1	1	-	-	-	-	-	-	-	-	-	1	1	-
	C309.2	2	3	1	-	-	-	-	1	-	1	-	1	1	-
	C309.3	2	2	1	-	-	-	-	1	-	1	-	1	1	-
	C309.4	3	3	1	-	-	-	-	1	-	1	-	1	1	-
	C309.5	2	3	1	-	-	-	-	1	-	-	-	1	1	-
APPLIED GEOTECHNICAL ENGINEERING (18CV62)	C310.1	3	1	-	1	1	-	-	-	-	-	-	-	1	-
	C310.2	3	3	-	-	-	-	-	-	-	-	-	-	1	-
	C310.3	2	3	-	-	-	-	-	-	-	-	-	-	1	-
	C310.4	2	3	1	-	-	-	-	-	-	-	-	-	1	-
	C310.5	2	1	1	-	-	-	-	-	-	-	-	-	1	-
HYDROLOGY AND IRRIGATION ENGINEERING (18CV63)	C311.1	2	-	-	-	-	-	1	-	-	-	-	1	1	-
	C311.2	2	3	-	-	-	-	-	-	-	-	-	1	1	-
	C311.3	2	2	1	1	-	-	-	-	-	-	-	1	1	-
	C311.4	1	-	-	-	-	2	1	-	-	-	-	1	-	-
	C311.5	2	-	-	-	-	1	-	-	-	-	-	1	-	-
	C311.6	3	2	2	2	-	1	1	-	-	-	-	1	-	-
RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS (18CV645)	C312.1	3	-	1	-	-	-	-	-	-	-	-	1	2	-
	C312.2	2	-	-	-	-	-	-	-	-	-	-	1	2	--
	C312.3	2	1	-	-	-	-	-	-	-	-	-	1	2	-
	C312.4	1	1	-	-	-	-	-	-	-	-	-	1	2	-
REMOTE SENSING AND GIS (18CV651)	C313.1	2	1	-	-	2	2	2	-	-	-	-	1	1	-
	C313.2	2	1	-	-	2	1	-	-	1	-	1	1	1	-
	C313.3	2	1	-	2	2	-	-	-	1	1	1	1	1	-
	C313.4	1	1	-	1	-	1	1	-	1	-	1	-	1	-
SOFTWARE APPLICATION LABORATORY (18CVL66)	C314.1	2	2	-	-	1	-	-	-	-	1	-	2	1	-
	C314.2	2	1	-	-	1	-	-	-	-	1	-	1	1	-
	C314.3	2	2	-	-	1	-	-	-	-	1	1	1	1	-
	C314.4	2	2	-	-	1	-	-	-	-	1	-	1	1	-
Municipal and Industrial Waste Water Engineering (17CV71)	C401.1														
	C401.2														
	C401.3														
	C401.4														
Design of RCC and Steel Structures (17CV72)	C402.1	3	-	2	-	-	-	-	-	-	-	-	1	1	-
	C402.2	2	-	2	-	-	-	-	1	-	-	-	1	1	-
	C402.3	2	-	2	-	-	-	-	1	-	-	-	1	1	-
Hydrology and Irrigation Engineering(17CV 73)	C403.1	2	-	-	-	-	-	1	-	-	-	-	1	1	-
	C403.2	2	2	-	-	-	-	-	-	-	-	-	1	1	-
	C403.3	2	2	1	1	-	-	-	-	-	-	-	1	1	-
	C403.4	1	-	-	-	-	1	1	-	-	-	-	1	1	-

DEPARTMENT OF CIVIL ENGINEERING

	C403.5	2	-	-	-	-	1	-	-	-	-	-	1	1	-
	C403.6	2	2	2	2	-	1	1	-	-	-	-	1	1	-
Ground Water and Hydraulics (17CV742)	C404.1	2	-	-	-	-	-	-	-	-	-	-	1	-	-
	C404.2	1	1	-	1	-	-	-	-	-	-	-	1	1	-
	C404.3	1	-	-	-	1	-	-	-	-	-	-	1	1	-
	C404.4	1	-	-	-	-	1	-	-	-	-	-	1	1	-
Rehabilitation and Retrofitting of Structures (17CV753)	C405.1	2	2	2	2	-	-	-	1	-	-	-	-		2
	C405.2	2	2	1	2	-	-	-	1	-	-	1	2		2
	C405.3	2	2	2	2	-	-	-	1	-	-	1	2		2
Environmental Engineering Laboratory (17CVL76)	C406.1	3	2	2	2	-	1	-	-	-	1	-	2	-	2
	C406.2	2	2	2	2	-	2	-	-	-	1	-	2	-	2
	C406.3	2	2	2	2	-	2	-	-	-	1	-	2	-	2
	C406.4	1	1	1	1	-	1	-	-	-	1	-	1	-	2
Computer Aided Detailing of Structures (17CVL77)	C407.1	2	-	-	-	3	-	-	-	-	1	-	2	1	-
	C407.2	2	-	-	-	3	-	-	-	-	-	-	2	1	-
	C407.3	2	-	-	-	3	-	-	-	-	1	-	2	1	-
Quantity Surveying and Contracts Management (17CV81)	C408.1	2	-	-	2	-	-	-	1	3	-	2	-	1	-
	C408.2	2	-	-	2	-	-	-	1	2	-	2	-	1	-
	C408.3	1	-	-	1	-	-	-	1	3	-	1	2	1	-
Design of Pre Stressed Concrete Elements (17CV82)	C409.1	3	2	1	-	-	1	1	1	-	-	-	1	3	-
	C409.2	3	3	1	-	-	1	1	1	-	-	-	-	3	-
	C409.3	2	3	2	-	-	1	1	1	-	-	-	1	3	-
	C409.4	2	1	1	-	-	1	1	1	-	-	-	2	2	-
	C409.5	3	3	-	-	-	1	1	1	-	-	-	2	2	-
Pavement Design (17CV833)	C410.1	3	-	1	-	-	-	1	-	-	-	-	1	2	-
	C410.2	3	1	1	-	-	-	-	-	-	-	-	1	2	-
	C410.3	3	1	-	-	-	-	1	-	-	-	-	1	2	-
	C410.4	1	1	-	-	-	-	-	-	-	-	-	1	2	-
Internship Practice (17CV84)	C411.1														
	C411.2														
Project (17CV85)	C412.1	3	-	-	-	-	-	-	-	-	-	-	3	1	1
	C412.2	3	2	2	2	2	1	1	3	3	3	1	3	2	2
Seminar (17CV86)	C413.4	3	-	-	-	-	-	-	-	-	-	-	3	1	-
	C413.5	3	-	-	-	3	-	-	-	-	3	-	3	2	-

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DEPARTMENT OF CIVIL ENGINEERING

Department of Computer Science and Engineering

Faculty and students are aware of the stated Programme and course outcomes of the Programmes

To create awareness about **Programme and course outcomes** of the department, it has been published and disseminated among the stake holders.

The extent of student awareness about the POs and COs and their actual performance reflecting these would be the real indicators of success or outcome of the programme. In this regard our Institution has taken certain measures to educate and to create the awareness about the program outcomes and course outcomes among the faculty members and students.

Stakeholder	Purpose
Faculty	Implementer (Contributor) of Policies. Key contributor in developing/implementing growth Plan. Responsible for producing competent graduates/product of the Institution.
Student	Product of the Institution, responsible for creating image of the institution while serving the society.

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Department of Computer Science and Engineering

Programme and Course Outcomes Dissemination

SL. No.	Particulars	Programme Outcomes	Course Outcomes
1.	College Website	✓	✓
2.	Corridors	✓	✓
3.	Notes & Lab Manual	✓	✓
4.	Course Module, Lesson Plan	--	✓
5.	IA Question Paper	--	✓
6.	Classroom, Seminar Hall, Laboratory	✓	-
7.	Faculty Office, Dept. Office	✓	-
8.	Magazine	✓	-
9.	College Enterprise Resource Planning(CERP) Portal	✓	-
10.	Student Handbook	✓	✓
11.	Faculty Handbook	✓	✓
12.	Flipped Classroom(Mail) through CERP/MS Teams	--	✓

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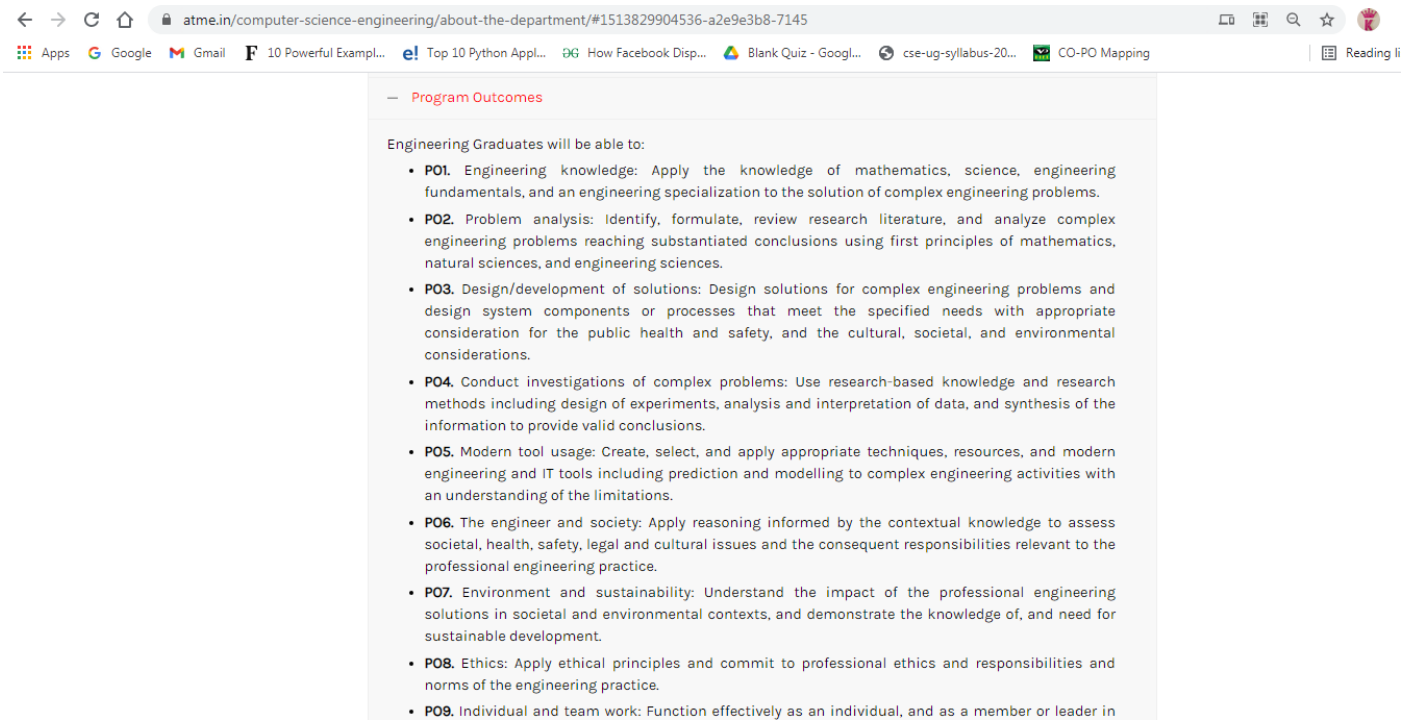
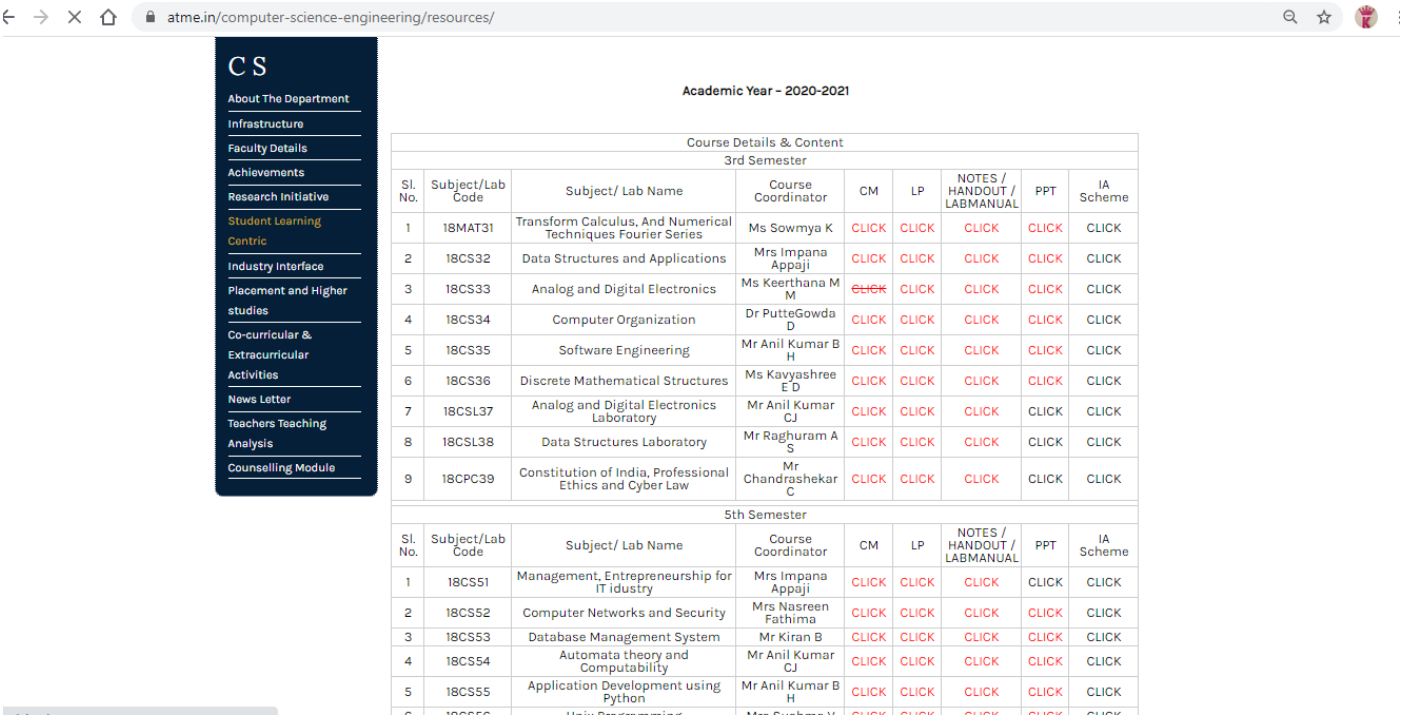
Department of Computer Science and Engineering

A. College Website Dissemination

Link : https://atme.in/computer-science-engineering/about-the-department/#1513829904536-a2e9e3b8-7145



https://atme.in/computer-science-engineering/resources/



B. Department Corridor

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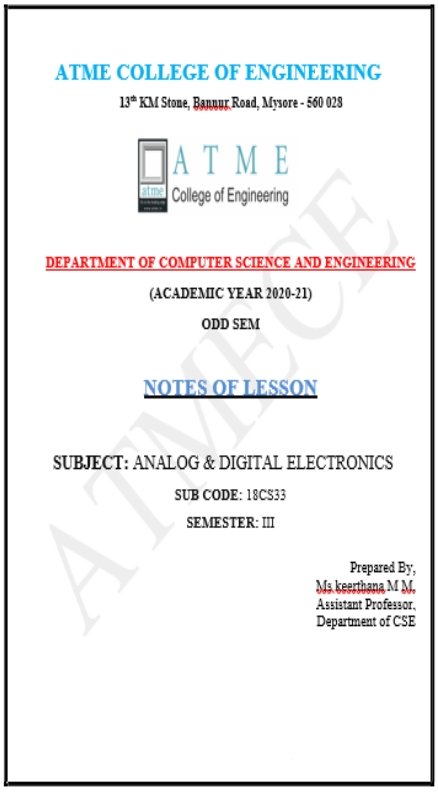
C. Notes, Lab Manual, Course Module, Lesson Plan

NOTES SAMPLE



ATME COLLEGE OF ENGINEERING

13th KM Stone, Bannur Road, Mysore - 560 028

ATME College of Engineering

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(ACADEMIC YEAR 2020-21)

ODD SEM

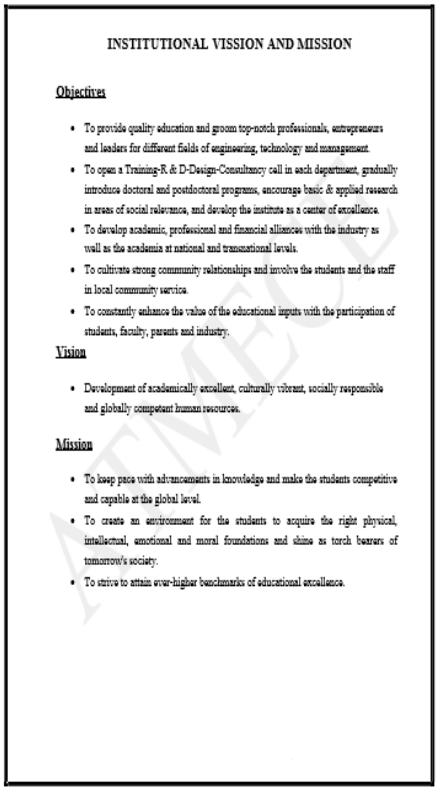
NOTES OF LESSON

SUBJECT: ANALOG & DIGITAL ELECTRONICS

SUB CODE: 18CS33

SEMESTER: III

Prepared By,
Ms keerthana M M,
Assistant Professor,
Department of CSE



INSTITUTIONAL VISSION AND MISSION

Objectives

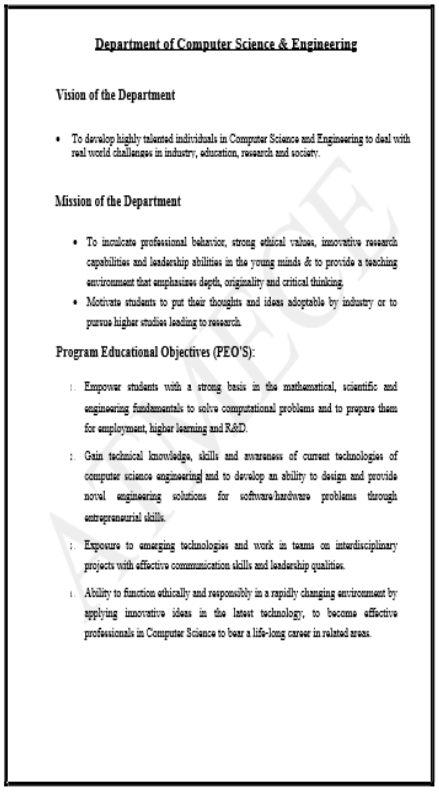
- To provide quality education and groom top-notch professionals, entrepreneurs and leaders for different fields of engineering, technology and management.
- To open a Training-R & D-Design-Consultancy cell in each department, gradually introduce doctoral and postdoctoral programs, encourage basic & applied research in areas of social relevance, and develop the institute as a center of excellence.
- To develop academic, professional and financial alliances with the industry as well as the academia at national and transnational levels.
- To cultivate strong community relationships and involve the students and the staff in local community service.
- To constantly enhance the value of the educational inputs with the participation of students, faculty, parents and industry.

Vision

- Development of academically excellent, culturally vibrant, socially responsible and globally competent human resources.

Mission

- To keep pace with advancements in knowledge and make the students competitive and capable at the global level.
- To create an environment for the students to acquire the right physical, intellectual, emotional and moral foundations and shine as torch bearers of tomorrow's society.
- To strive to attain ever-higher benchmarks of educational excellence.



Department of Computer Science & Engineering

Vision of the Department

- To develop highly talented individuals in Computer Science and Engineering to deal with real world challenges in industry, education, research and society.

Mission of the Department

- To inculcate professional behavior, strong ethical values, innovative research capabilities and leadership abilities in the young minds & to provide a teaching environment that emphasizes depth, originality and critical thinking.
- Motivate students to put their thoughts and ideas adoptable by industry or to pursue higher studies leading to research.

Program Educational Objectives (PEO'S):

1. Empower students with a strong basis in the mathematical, scientific and engineering fundamentals to solve computational problems and to prepare them for employment, higher learning and R&D.
2. Gain technical knowledge, skills and awareness of current technologies of computer science engineering and to develop an ability to design and provide novel engineering solutions for software/hardware problems through entrepreneurial skills.
3. Exposure to emerging technologies and work in teams on interdisciplinary projects with effective communication skills and leadership qualities.
4. Ability to function ethically and responsibly in a rapidly changing environment by applying innovative ideas in the latest technology, to become effective professionals in Computer Science to bear a life-long career in related areas.

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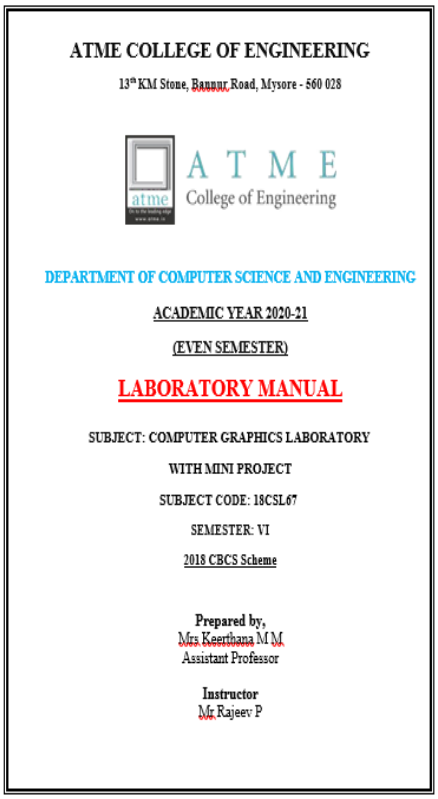
LAB MANUAL SAMPLE



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2020-21

(EVEN SEMESTER)

LABORATORY MANUAL

SUBJECT: COMPUTER GRAPHICS LABORATORY

WITH MINI PROJECT

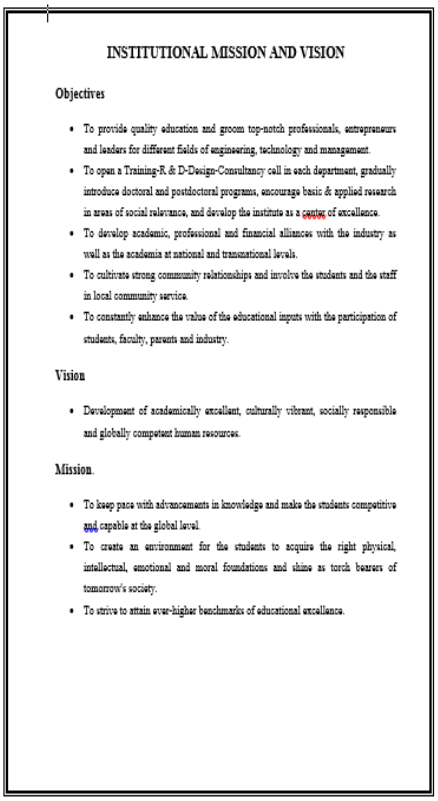
SUBJECT CODE: 18CSL67

SEMESTER: VI

2018 CBCS Scheme

Prepared by,
Mrs Keerthana M M
Assistant Professor

Instructor
Mr Rajeev P



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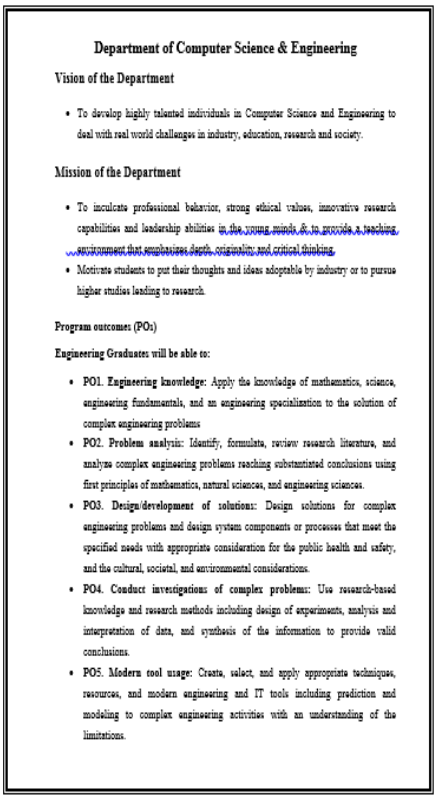
- To strive to attain ever-higher benchmarks of educational excellence.



Department of Computer Science & Engineering

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- Motivate students to put their thoughts and ideas adoptable by industry or to pursue higher studies leading to research.

Program outcomes (POs)

Engineering Graduates will be able to:

- 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.

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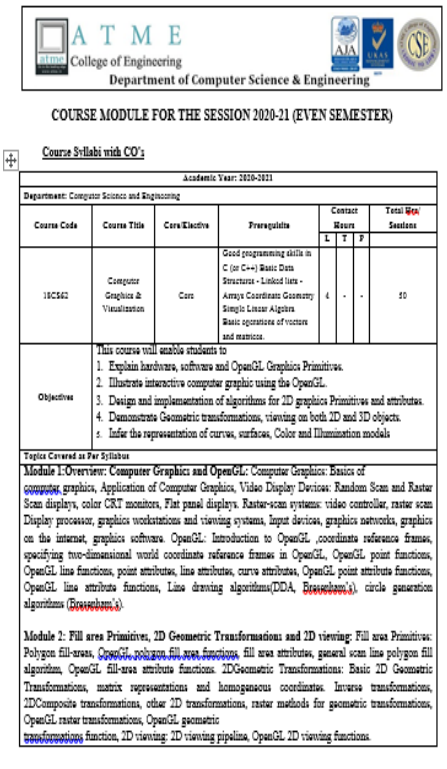
COURSE MODULE



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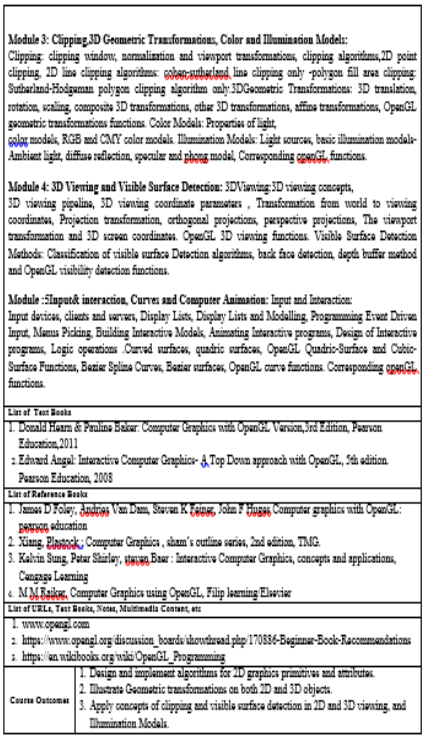
Department of Computer Science & Engineering

COURSE MODULE FOR THE SESSION 2020-21 (EVEN SEMESTER)

Course Syllabi with CO's

Academic Year: 2020-2021								
Department: Computer Science and Engineering								
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
18CS62	Computer Graphics & Visualization	Core	Good programming skills in C (or C++) Basic Data Structures - Linked lists - Arrays Coordinate Geometry Simple Linear Algebra Basic operations of vectors and matrices.	4	-	-	50
Objectives	This course will enable students to 1. Explain hardware, software and OpenGL Graphics Primitives. 2. Illustrate interactive computer graphic using the OpenGL. 3. Design and implementation of algorithms for 2D graphics Primitives and attributes. 4. Demonstrate Geometric transformations, viewing on both 2D and 3D objects. 5. Infer the representation of curves, surfaces, Color and Illumination models							
Topics Covered as Per Syllabus								
Module 1:Overview: Computer Graphics and OpenGL: Computer Graphics: Basics of computer graphics, Application of Computer Graphics, Video Display Devices: Random Scan and Raster Scan displays, color CRT monitors, Flat panel displays. Raster-scan systems: video controller, raster scan Display processor, graphics workstations and viewing systems, Input devices, graphics networks, graphics on the internet, graphics software. OpenGL: Introduction to OpenGL ,coordinate reference frames, specifying two-dimensional world coordinate reference frames in OpenGL, OpenGL point functions, OpenGL line functions, point attributes, line attributes, curve attributes, OpenGL point attribute functions, OpenGL line attribute functions, Line drawing algorithms(DDA, Bresenham's), circle generation algorithms (Bresenham's). Module 2: Fill area Primitives, 2D Geometric Transformations and 2D viewing: Fill area Primitives: Polygon fill-areas, OpenGL polygon fill area functions, fill area attributes, general scan line polygon fill algorithm, OpenGL fill-area attribute functions. 2DGeometric Transformations: Basic 2D Geometric Transformations, matrix representations and homogeneous coordinates. Inverse transformations, 2DComposite transformations, other 2D transformations, raster methods for geometric transformations, OpenGL raster transformations, OpenGL geometric transformations function, 2D viewing: 2D viewing pipeline, OpenGL 2D viewing functions.							

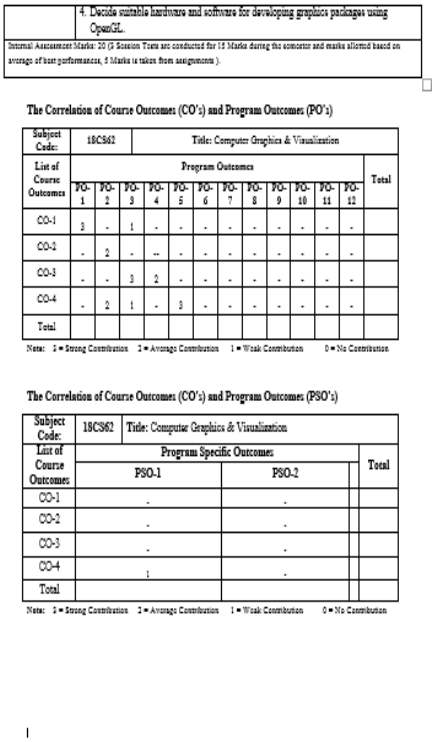


Module 3: Clipping,3D Geometric Transformations, Color and Illumination Models:
Clipping: clipping window, normalization and viewport transformations, clipping algorithms,2D point clipping, 2D line clipping algorithms: cohen-sutherland line clipping only -polygon fill area clipping: Sutherland-Hodgeman polygon clipping algorithm only.3DGeometric Transformations: 3D translation, rotation, scaling, composite 3D transformations, other 3D transformations, affine transformations, OpenGL geometric transformations functions. Color Models: Properties of light,
color models, RGB and CMY color models. Illumination Models: Light sources, basic illumination models-Ambient light, diffuse reflection, specular and phong model, Corresponding openGL functions.

Module 4: 3D Viewing and Visible Surface Detection: 3DViewing:3D viewing concepts,
3D viewing pipeline, 3D viewing coordinate parameters , Transformation from world to viewing coordinates, Projection transformation, orthogonal projections, perspective projections, The viewport transformation and 3D screen coordinates. OpenGL 3D viewing functions. Visible Surface Detection Methods: Classification of visible surface Detection algorithms, back face detection, depth buffer method and OpenGL visibility detection functions.

Module :5Input& interaction, Curves and Computer Animation: Input and Interaction:
Input devices, clients and servers, Display Lists, Display Lists and Modelling, Programming Event Driven Input, Menus Picking, Building Interactive Models, Animating Interactive programs, Design of Interactive programs, Logic operations .Curved surfaces, quadric surfaces, OpenGL Quadric-Surface and Cubic-Surface Functions, Bezier Splins Curves, Bezier surfaces, OpenGL curve functions. Corresponding openGL functions.

List of Text Books
1. Donald Hearn & Pauline Baker: Computer Graphics with OpenGL Version,3rd Edition, Pearson Education,2011 2. Edward Angel: Interactive Computer Graphics- A Top Down approach with OpenGL, 5th edition. Pearson Education, 2008
List of Reference Books
1. James D Foley, Andries Van Dam, Steven K Feiner, John F Huges Computer graphics with OpenGL: pearson education 2. Xiang, Plastock, : Computer Graphics , sham's outline series, 2nd edition, TMG. 3. Kelvin Sung, Peter Shirley, steven Baer : Interactive Computer Graphics, concepts and applications, Cengage Learning 4. M M Raikar, Computer Graphics using OpenGL, Filip learning/Elsevier
List of URLs, Text Books, Notes, Multimedia Content, etc
1. www.opengl.com 2. https://www.opengl.org/discussion_boards/showthread.php/170886-Beginner-Book-Recommendations 3. https://en.wikibooks.org/wiki/OpenGL_Programming
Course Outcomes: 1. Design and implement algorithms for 2D graphics primitives and attributes. 2. Illustrate Geometric transformations on both 2D and 3D objects. 3. Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.



	4. Decide suitable hardware and software for developing graphics packages using OpenGL.
Internal Assessment Marks: 20 (3 Session Tests are conducted for 15 Marks during the semester and marks allotted based on average of best performances, 5 Marks is taken from assignments).	

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	18CS62	Title: Computer Graphics & Visualization											
List of Course Outcomes	Program Outcomes												Total
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	
CO-1	3	-	1	-	-	-	-	-	-	-	-	-	
CO-2	-	2	-	--	-	-	-	-	-	-	-	-	
CO-3	-	-	3	2	-	-	-	-	-	-	-	-	
CO-4	-	2	1	-	3	-	-	-	-	-	-	-	
Total													

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution 0 = No Contribution

The Correlation of Course Outcomes (CO's) and Program Outcomes (PSO's)

Subject Code:	18CS62	Title: Computer Graphics & Visualization	
List of Course Outcomes	Program Specific Outcomes		Total
	PSO-1	PSO-2	
CO-1	-	-	
CO-2	-	-	
CO-3	-	-	
CO-4	1	-	
Total			

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution 0 = No Contribution

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D. IA QP and Scheme

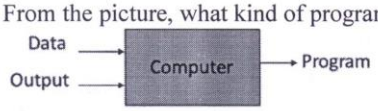
SAMPLE IA QP & SCHEME

A T M E
College of Engineering

Department of Computer Science and Engineering

FIRST INTERNALASSESMENT

COURSE	:	Machine Learning	TIME	:	10.00- 11.30
COURSE CODE	:	17CS73	DATE	:	09-10-2020
SEM/SEC	:	VII A & B	MAX. MARKS	:	50

	PART-A-Answer any three full Questions	Marks	COs	BTL
01.	**a) Multiple Choice Questions**	1M		
	(I) ML is a field of AI consisting of learning algorithms that _____ A. Improve their performance B. At executing some task C. Over time with experience D. All of the above			
	(II) From the picture, what kind of programming is it?  A. Traditional Programming B. Machine Learning C. Modern Programming D. Traditional Learning	1 M	1	1
	b) Explain in detail all the steps involved in designing a learning system.	8 M		2
02.	**a) Multiple Choice Questions**	1M		
	(I) A computer program is said to learn from experience E with respect to some task T and some performance measure P if its performance on T, as measured by P, improves with experience E. Suppose we feed a learning algorithm a lot of historical weather data, and have it learn to predict weather. In this setting, **what is T?** A. The weather prediction task. B. None of these. C. The probability of it correctly predicting a future date's weather. D. The process of the algorithm examining a large amount of historical weather data.		1	1
	(II) Final design of the Learning system consists of A. Experiment Generator B. Generalizer C. Critic D. Performance System	1M		

ATME College of Engineering

Department of Computer Science and Engineering

	E. All of the above			
	b) Illustrate Candidate-Elimination algorithm on the following data *Origin* / *Manufacturer* / *Color* / *Decade* / *Type* / *Example Type* Japan / Honda / Blue / 1980 / Economy / Positive Japan / Toyota / Green / 1970 / Sports / Negative Japan / Toyota / Blue / 1990 / Economy / Positive USA / Chrysler / Red / 1980 / Economy / Negative Japan / Honda / White / 1980 / Economy / Positive	8 M		2
03.	**a) Multiple Choice Questions** (I) Find-S Algorithm is guaranteed to output the_____ hypothesis A. Specific B. General C. Consistent D. Inonsistent (II) The applications of Machine Learning are _____ A. Learning to recognize spoken words B. Learning to play world-class backgammon C. Learning to classify new astronomical structures D. All of the above.	1M 1M	1	1
	b) Explain the inductive biased hypothesis space, unbiased learner and the futility of Bias Free Learning. Describe the three types of learner.	8 M		2
04.	**a) Multiple Choice Questions** (I) Version space consists of _____ A. subset of hypotheses from H B. Specific hypothesis C. General Hypothesis D. All of the above (II) The '?' in Candidate Elimination Algorithm reperesents _____ A. No value B. All values C. Any value D. Specific Value	1 M 1M	1	1
	b) Outline Concept learning as search with respect to General to specific ordering of hypothesis.	8 M		2

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Department of Computer Science and Engineering

	PART-B-Answer any two full Questions	Marks	COs	BTL
05.	**a) Multiple Choice Questions** (I)The decision tree reaches its decision by _____ a) Single test b) Two test c) Sequence of test d) No test (II) Decision trees are an algorithm for which machine learning task? a) clustering b) dimensionality reduction c) classification d) regression	2 M	2	1
	b) What do you mean by Gain and Entropy? How is it used to build the Decision tree in algorithm? Illustrate using an example.	8 M		1
06.	**a) Multiple Choice Questions** (I) What is Decision Tree? A. Flow-Chart B. Structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label C. Flow-Chart & Structure in which internal node represents test on an attribute, each branch represents outcome of test and each leaf node represents class label D. None of the mentioned (II)_____ are the Decision Tree Learning Algorithms A. ID3 B. C4.5 C. ASSISTANT D. All of the above	2 M	2	1
	b) (I) What are appropriate problems for Decision tree learning? (II) Explain the following with examples: Decision Tree and Decision Tree Representation.	5M 3M		2
07.	**a) Multiple Choice Questions** (I)Which of the following are the advantage/s of Decision Trees? A. Possible Scenarios can be added B. Use a white box model, If given result is provided by a model C. Worst, best and expected values can be determined for different scenarios D. All of the mentioned	2 M	2	1

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Department of Computer Science and Engineering

	(II) The entropy is 0 if all members of S belong _____ A. to the same class B. when the collection contains an equal number of positive and negative examples C. If the collection contains unequal numbers of positive and negative examples D. None of the above			
	b) Consider the following set of training examples: What is the entropy of this collection of training examples with respect to the target function classification? What is the information gain of a2 relative to these training examples?	8 M		2

Instance	Classification	A1	A2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

CO1	Discuss basics of machine learning and concept learning.
CO2	Gain the knowledge on decision tree learning.
CO3	Explain neural networks for problems that appear in machine learning.
CO4	Understand theory of probability and statistics related to machine learning and Illustrate Bayes classifier
CO5	Recall the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning.

Name & Signature of Course Coordinator
M S SUNITHA PATEL

HoD Signature 8/10/2020

Bloom's Taxonomy Level	
L1	Remembering
L2	Understanding
L3	Applying
L4	Analyzing
L5	Evaluating
L6	Creating

ATME College of Engineering

Department of Computer Science & Engineering

SCHEME AND SOLUTION
ACADEMIC YEAR 2020-2021 (ODD SEM)
INTERNAL ASSESSMENT –I

Subject: Machine Learning **Subject Code:** 17CS73 **Sem:** 7 A

CO1	Understand Machine Learning and problems that can be handled by ML
CO2	Outline the concepts of Decision Tree Learning
CO3	Illustrate Artificial Neural Networks and its issues
CO4	Analyze theory of probability & Statics related to Bayes classifier, Bayesian Belief NWs, etc
CO5	Explain/Evaluate instance based and reinforcement learning algorithms and compare learning algorithms

Bloom's Taxonomy Levels
L1: Remembering L2: Understanding L3: Applying L4: Analyzing L5: Evaluating L6: Creating

Question No	Solution	Marks Allotted	Mapped CO's	BTL
1a.	i) ALL of the Above ii) Traditional Programming.	2m		1
1b.	Steps involved in Designing a Learning system. (a) choosing the training experience. (b) choosing the target function. (c) choosing a representation for the target function. (d) choosing the function approximation algorithm. (e) final design.		1	
	(a) choosing the training experience • This type of training experience will decide on success or failure of the learner • First key attribute is weather the training experience provides direct or indirect feedback.			

Question No	Solution	Marks Allotted	Mapped CO's	BTL
	• Direct: Individual checkers board states and correct move for each. • Indirect: Final out comes for games Played. • Credit assignment: Determines the degree to which each move in the Sequence deserve credit Second attribute. of the training example is learner controlling the sequence of training examples. (a) Learner waits for teacher (b) Learner asks the teacher (c) Learner learns itself with no teacher Third attribute. How well the distribution of examples is made, how is the Performace measured over this. Task - T Checkers game { Performance P: Percent of games system wins. Experience E: games played to itself (2) Choosing target experience. • The next design choice is to determine exactly what type of knowledge will be learned and how this will be used by the Performance program.	2m		1

Question No	Solution	Marks Allotted	Mapped CO's	BTL
	In checkers program. 1) Let us begin with a checkers playing program that can generate the legal moves from any boardstate 2) The program needs only to learn how to choose the best move from these legal move. 3) Choosing of best move, for any given board state. 4) choose move. 5) choose move $B \rightarrow M$ to indicate that this function accepts as input any board from the set of legal board states B and produces as output some move from set of legal move M. 6) An alternative target function is the evolution that assigns a numerical score to any given board state. target function $V \rightarrow B \rightarrow R$ V maps any legal board state from the set B to some real value C) choosing Representation of target function let us choose a simple representation For any given board state, Function V will be calculated as Linear Combination	2m		

Question No	Solution	Marks Allotted	Mapped CO's	BTL

x_1: the number of black pieces on the board.

x_2: Red pieces on board

x_3: black pieces on board

x_4: red kings on board

x_5: the number of black pieces threatened by red.

x_6: red pieces threatened by black.

$V : B \rightarrow R$: Target function.

$V'(b) : w_0 + w_1 x_1 + w_2 x_2 + w_3 x_3 + w_4 x_4 + w_5 x_5 + w_6 x_6$

Choosing the function approximation Algorithm — 3m

$\langle b, V_{train}(b) \rangle$

$V_{train}(b)$ training value to

$\langle b, V_{train}(b) \rangle = \langle \langle x_1 = 3, x_2 = 0, x_3 = 1, x_4 = 0, x_5 = 0, x_6 = 0 \rangle, +100 \rangle$

Estimating values.

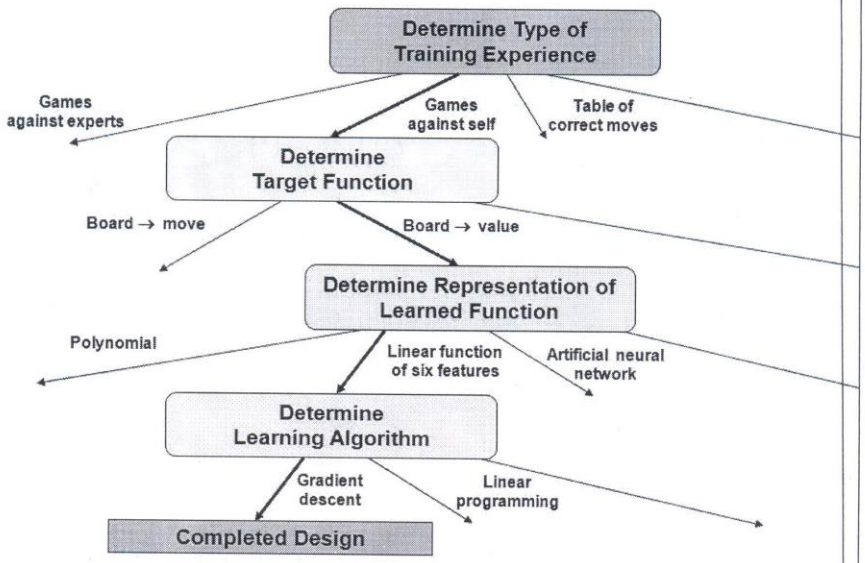
$V_{train}(b) \leftarrow \hat{V}(Successor(b))$

Adjusting weights

$E = \sum_{\langle b, V_{train}(b) \rangle} (V_{train}(b) - \hat{V}(b))^2$

Question No	Solution	Marks Allotted	Mapped COs	Mapped CO's	BTL
5	Final Design.				

Design Choices for Learning to Play Checkers



1M

10M

Question No	Solution	Marks Allotted	Mapped CO's	BTL
2	a i) The weather prediction task ii) All of the above	2m		
	b) candidate Elimination Algorithm			
	① Positive example <Japan, Honda, Blue, 1980, Economy> S = {<Japan, Honda, Blue, 1980, Economy> Initialize G to Singleton G = {<?, ?, ?, ?, ?>}	2m		1
	② Negative example <Japan, Toyota, Green, 1970, Sports> S = {<Japan, Honda, Blue, 1980, Economy>	2m	1	
	G = {<?, Honda, ?, ??>, <?, ? Blue, ??>, <??? 1980>, <???? economy>} G = <(?, ?, ?, ?, ?>>			
	③ Positive example <Japan, Toyota, Blue, 1990, economy> S = {<Japan, ?, Blue, ?, Economy>	2m		
	G = {<?, ?, Blue, ?, ?> <? ??? economy>			

Question No	Solution	Marks Allotted	Mapped CO's	BTL
	Similarly G boundary will consist of the hypothesis that rules out only observed negative example $G: \{\neg(x_4 \vee x_5)\}$. iii) Futility of Bias-Free Learning. The above discussion illustrates a fundamental property of inductive inference. a learner that makes no a priori assumption regarding the identity of target concept has no rational basis for classifying any unseen instances. • In fact the only reason that candidate Elimination algorithm was able to generalize beyond the observed training examples in our original formulation of the Enjoy Sport task is that it was biased by the implicit assumption that the target concept could be represented by conjunction of attribute values. ⇒ In cases where this assumption is correct its classification of new instances will also be correct.	4m		

Question No	Solution	Marks Allotted	Mapped CO's	BTL
	Consider the general setting in which an arbitrary learning algorithm L is provided an arbitrary set of training data $D_c = \{x, c(x)\}$ of some arbitrary target concept c. After training, L is asked to classify a new instance x_i. Let $L(x_i, D_c)$ denote the classification that L assigns to x_i, after learning from the training data D_c. $(D_c \wedge x_i) > L(x_i, D_c)$ $y > z$ indicates that z is inductively inferred from y. L → Candidate elimination Algorithm D_c → training Data. x_i → new instance need to be classified. $L(x_i, D_c)$ = EnjoySport (Yes)	10m		

Question No	Solution	Marks Allotted	Mapped CO's	BTL
4a	i) Subset of hypothesis from H. ii) Any value.	2m		
b	Generic to Specific ordering of Hypothesis . Many algorithms for concept learning organize the search through the hypothesis space by relying on a very useful structure that exist for any Concept learning problem Consider two hypothesis. $h_1 = \langle Sunny, ?, ?, Strong, ?, ? \rangle$ $h_2 = \langle Sunny, ?, ?, ?, ?, ? \rangle$ h_2 → is more generic h_1 → is more specific Instance classified positive by h_1, will also be classified positive by h_2 First for any instance x in X Hypothesis h in H We say that x satisfies h if and only if $h(x)=1$ $(x, X)\ [h_k(x)=1) \rightarrow (h_j(x)=1)]$ $x_1 = \langle Sunny, Warm, High, Cool, Same \rangle$ $x_2 = \langle Sunny, Warm, High, Light, Warm, Same \rangle$	4m	1	2

Question No	Solution	Marks Allotted	Mapped CO's	BTL

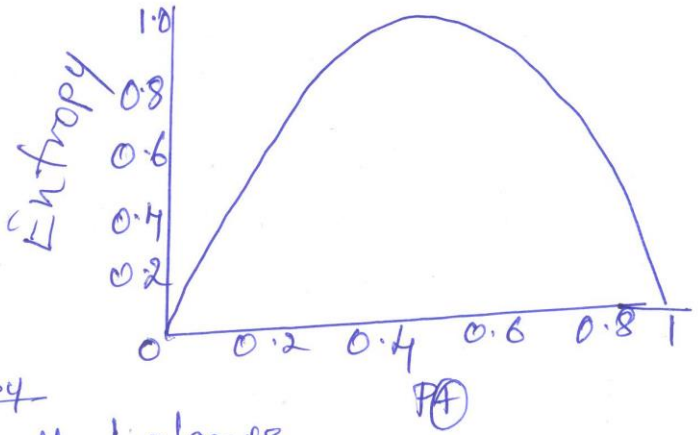
Given collection of S, containing Positive and Negative examples

Entropy (S) $= -P_{\oplus} \log P_{\oplus} - P_{\ominus} \log P_{\ominus}$

If 9 yes or 5 NO.

Entropy $= -9/14 \log_2 9/14 - (5/14) \log_2 5/14$

$= 0.940$.



2m

Entropy

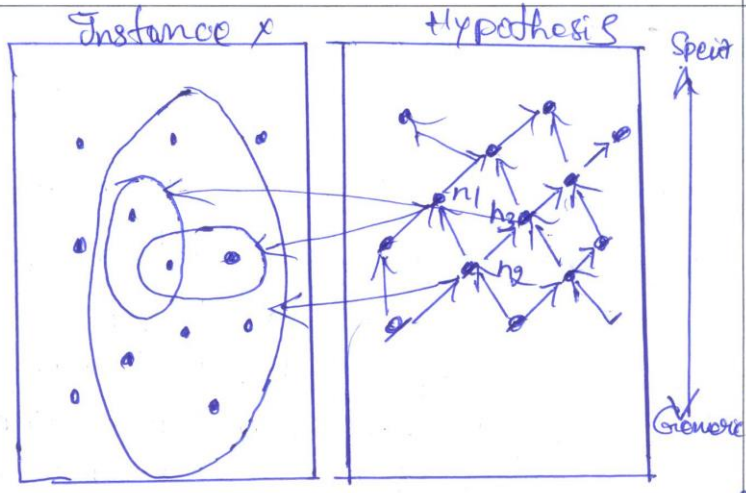
0 if all belongs to same class.

Entropy = 1 if the is equally distributed

4m

$$Gain(S, A) = Entropy(S) - \sum_{v \in values(A)} \frac{|S_v|}{|S|} Entropy(S_v)$$

10m

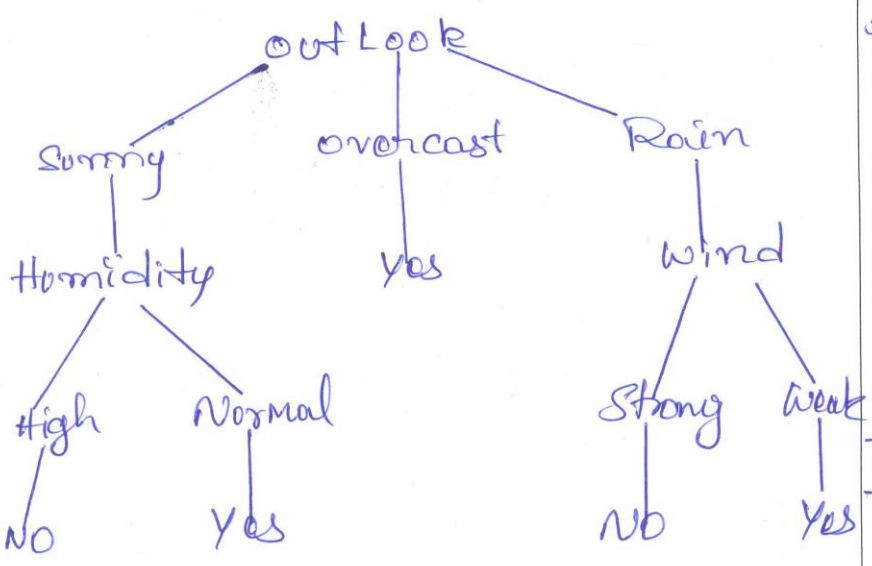
Question No	Solution	Marks Allotted	Mapped CO's	BTL
		4M		
	x_1 = <Sunny, Warm, high, Strong, cool, Same> h_1 = <Sunny ?, ? Strong ? ?> x_2 = <Sunny Warm, high, light, Warm, Same> h_2 = <Sunny ? ? ? ? ?> h_3 = <Sunny ? ? cool ? ?	10M		
5a	i) Sequence of test ii) Classification.	2m		
5b	What is good quantitative measure of worth of an attribute? we will define a Statistical property called information gain. Information gain measures how well a given attribute seperates the training example according to their target classification. Entropy In order to define information gain precisely, we begin by defining a measure commonly used in information theory called entropy	2m	2	1

Question No	Solution	Marks Allotted	Mapped CO's	BTL
6a	i) C. Flowchart & structure ii) All of the above.	2m		
6b	i) Appropriate problems for decision tree. • ID_3 - Search complete hypothesis Space • ID_3 - Searches incompletely. • ID_3 - Preference Bias • How deeply to grow Decicsiontree • Handling continuous attributes. • Choosing appropriate attributs • Handling training data with Missing attributes values • Efficiency • Avoiding overfitting of Data.	5m	2	1
b	ii) Decision tree learning is a method for approximation discrete valued target function in which the learned function is represented by a decision tree.			

Question No	Solution	Marks Allotted	Mapped CO's	BTL

Decision trees classify instances by sorting them down the tree from the root to some leaf node, which provides the classification of the instance. Each node in the tree specifies a test of some attributes of the instance, and each branch descending from that node corresponds to one of the possible values for this attribute. An Instance is classified by starting at the root node of the tree, testing the attribute specified by this node, then moving down the tree branch corresponding to the value of the attribute in the given example. below.

3m



10m

Question No	Solution	Marks Allotted	Mapped CO's	BTL
7a	i) All of the Mentioned ii) to the Same class	2m		
7b	What is the entropy of this collection of training examples. Soln: P = 3 N = 3 Total = 6 $Entropy(S) = -\frac{3}{6}\log_2\left(\frac{3}{6}\right) - \frac{3}{6}\log_2\left(\frac{3}{6}\right)$ $= 1$	1m	2	1
	what is the information gain of a2 relative to these training examples? For Attribute A2 - Calculate Entropy for each values i.e., '+' and '-'			

A2	P	N	Entropy
True	2	2	1
False	1	1	1

3m

$E(A2 = True) = -\frac{2}{6}\log\left(\frac{2}{6}\right) - \frac{2}{6}\log\left(\frac{2}{6}\right) = 1$

$E(A2 = False) = -\frac{1}{6}\log\left(\frac{1}{6}\right) - \frac{1}{6}\log\left(\frac{1}{6}\right) = 1$

$I(A2) = \frac{P_{True} + N_{True}}{P+N} Entropy(A2 = True) + \frac{P_{False} + N_{False}}{P+N} Entropy(A2 = False)$

$= \frac{2+2}{3+3} * 1 + \frac{1+1}{3+3} * 1 = \frac{4}{6} \times 1 + \frac{2}{6} \times 1 = 1.332$

4m

$Gain = Entropy(S) - I(A2) = 1 - 1.332$

$= 0.332$

10M

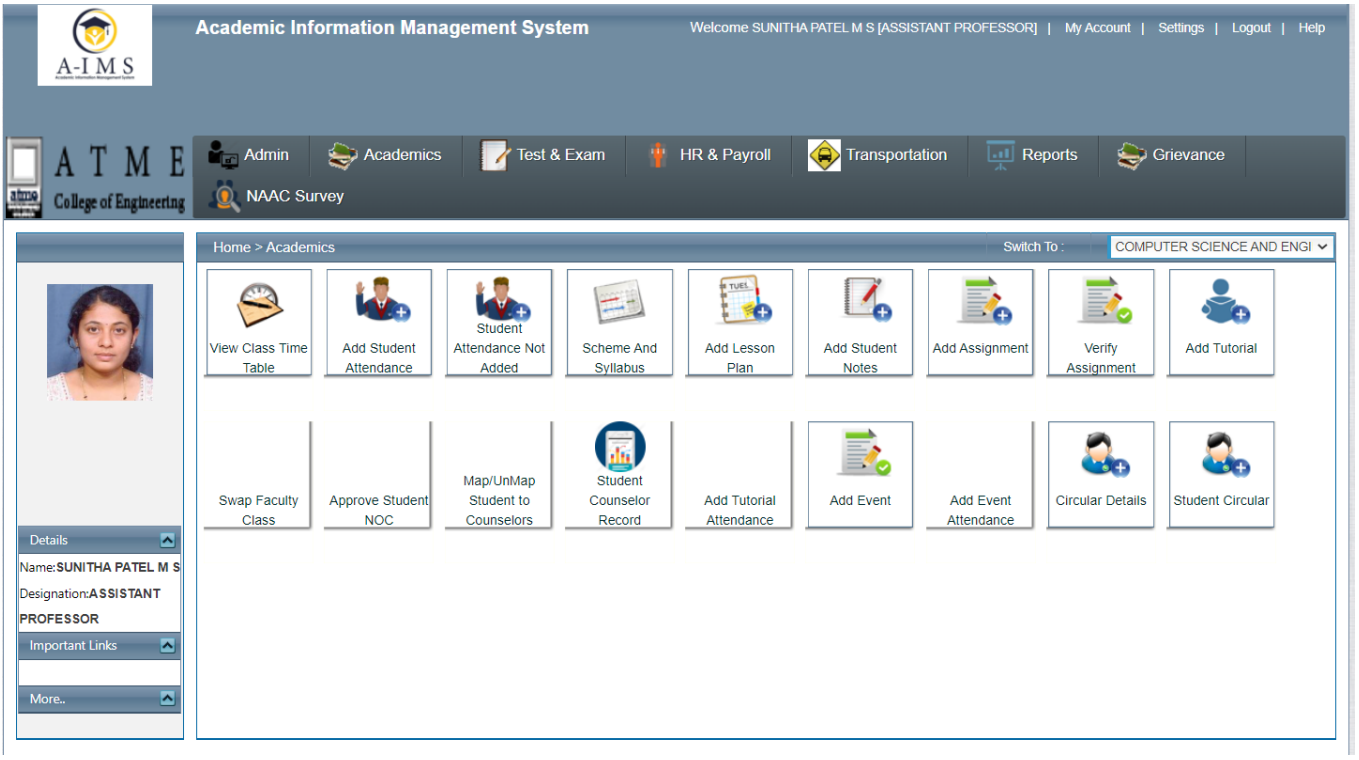
Name & Signature of Course Coordinator
M S SUNITHA PATEL

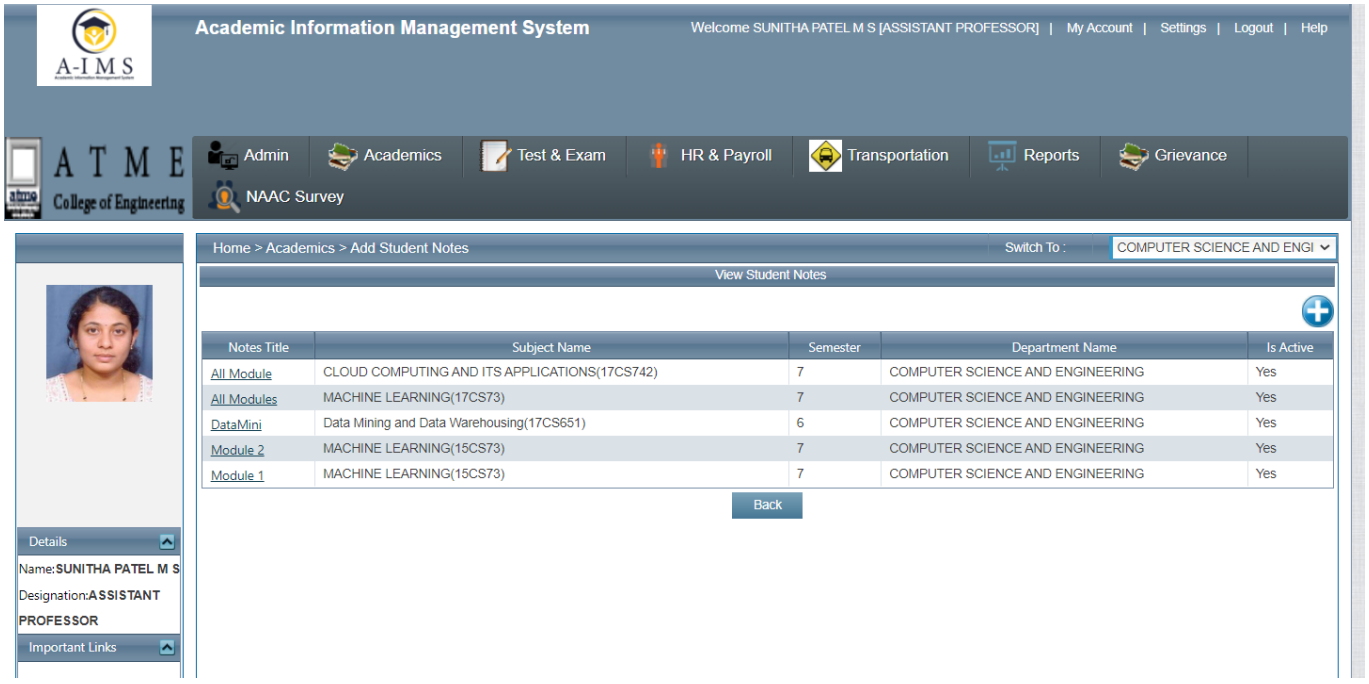
HoD Signature

E. CERP

Link :https://eerp.effia.co.in/Webforms/frmLogin.aspx

Note: Only authorized access





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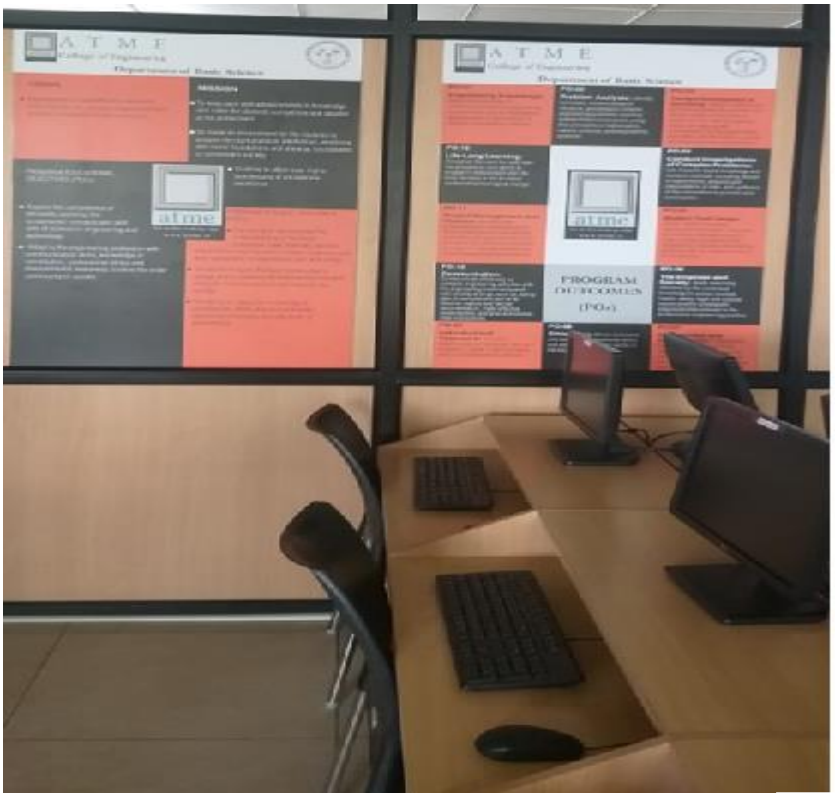
F.Classroom, Seminar Hall, Laboratory



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G. HoD and Department Office

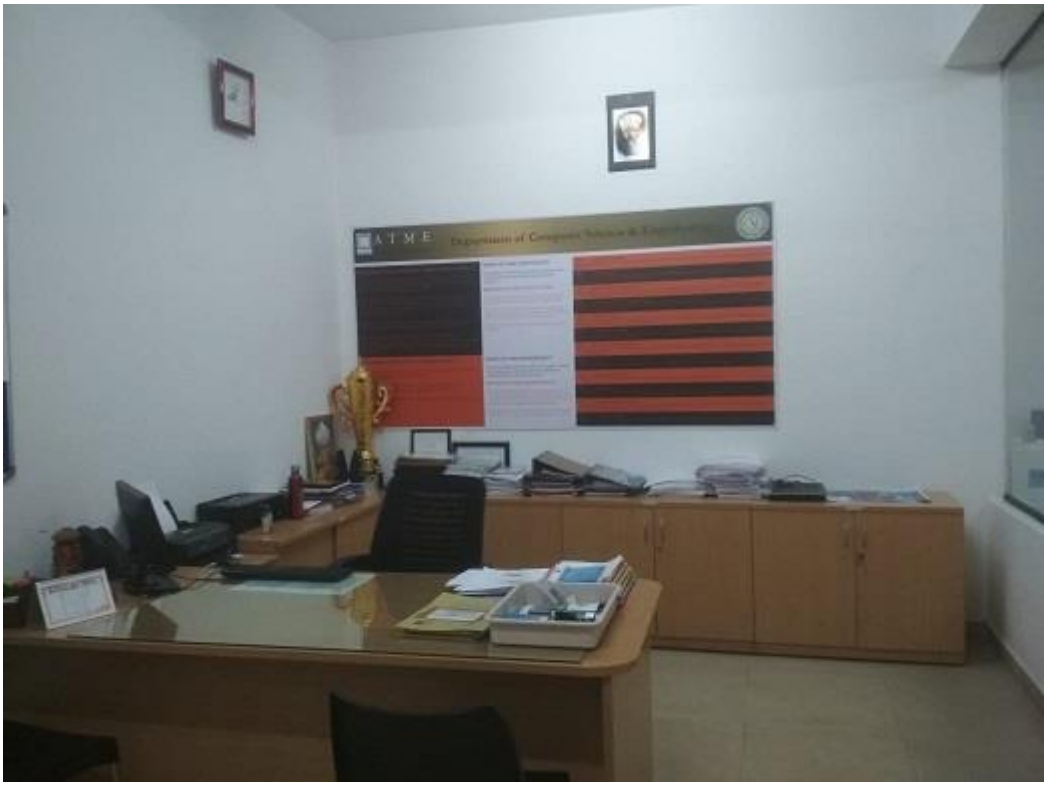

Fig: HoD Office

F

Fig: Department Office

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS MAIL

NEWSLETTER VOLUME 9, ISSUE I, FEB 2021

Dear Readers,

It is with great pleasure that we bring you Volume 8, Issue I of our department newsletter "CS MAIL". The current newsletter highlights the activities of the department, achievements of faculty and students during the past six months. It also features workshop organized and attended, paper publication details and other social activity undertaken from CS Department. Your valuable comments and suggestions are appreciated.

We wish all the readers an enjoyable reading.

VISION OF THE DEPARTMENT

- To develop highly talented individuals in Computer Science and Engineering to deal with real world challenges in industry, education, research and society.

MISSION OF THE DEPARTMENT

- To inculcate professional behavior, Strong ethical values, innovative research capabilities and leadership abilities in the young minds & to provide a teaching environment that emphasizes depth, originality and critical thinking.
- Motivate students to put their thoughts and ideas adoptable by industry or to pursue higher studies leading to research.

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

- Empower students with a strong basis in the mathematical, scientific and engineering fundamentals to solve computational problems and to prepare them for employment, higher learning and R&D.
- Gain technical knowledge, skills and awareness of current technologies of computer science engineering and to develop an ability to design and provide novel engineering solutions for software/hardware problems through entrepreneurial skills.
- Exposure to emerging technologies and work in teams on interdisciplinary projects with effective communication skills and leadership qualities.
- Ability to function ethically and responsibly in a rapidly changing environment by applying innovative ideas in the latest technology, to become effective professionals in Computer Science to bear a life-long career in related areas.

Message From Principal

ATMECE has emerged as a prominent institute offering quality education. All round continuous changes in infrastructure and academics standard have helped us to build a brand name. It gives me immense pleasure to introduce the **Volume 9, Issue 1 OF THE HALF YEARLY NEWSLETTER "CS MAIL"** of Computer Science Department. I am pleased to know that the newsletter will showcase the activities and credentials of CS&E department. I hope this will become a platform for students and staff to exhibit their talents in science and technology. On behalf of management, I appreciate the newsletter committee for their efforts in bringing out this edition.

I wish the editorial all success!!!

Regards
Dr L Basavaraj
Principal, ATMECE

DON'T WAIT FOR OPPORTUNITY CREATE IT

Message From Chief Editor

Dr Puttegowda D
HoD, CS&E

Department of Computer Science & Engineering commits to work towards developing dedicated professional with a rich blend of competent, technical, managerial and social skills to contribute nation building. I am happy to inform that our department newsletter **"CS MAIL"** is being released in the month of Feb 2021. The newsletter encourage departments technical activities and also motivate students to bring out their innovative ideas , hidden talents and also provide a common platform to share their knowledge, in turn gain technical knowledge.

I wish all the readers an enjoyable reading!!!

EDITORIAL TEAM

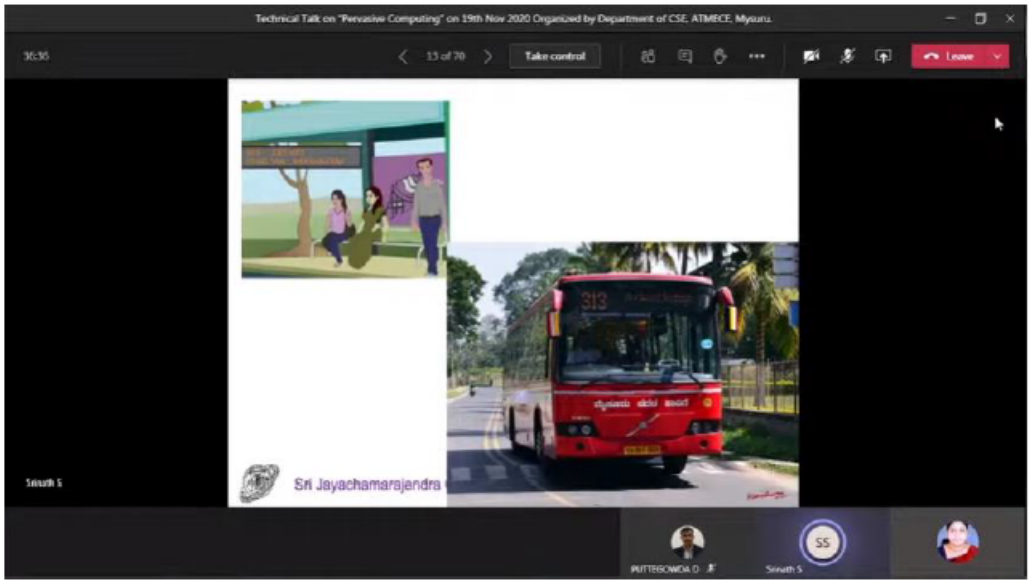
A DREAM BECOMES A GOAL WHEN ACTION IS TAKEN TOWARD ITS ACHIEVEMENT

DEPARTMENT ACTIVITIES

"Technical talk on Pervasive Computing"

Department of Computer Science & Engineering had organized a Technical Talk on "Pervasive Computing" on 19th NOV 2020 virtually for faculties and students.

Resource Person: Dr. Srinath S
Topic Delivered: Pervasive Computing.



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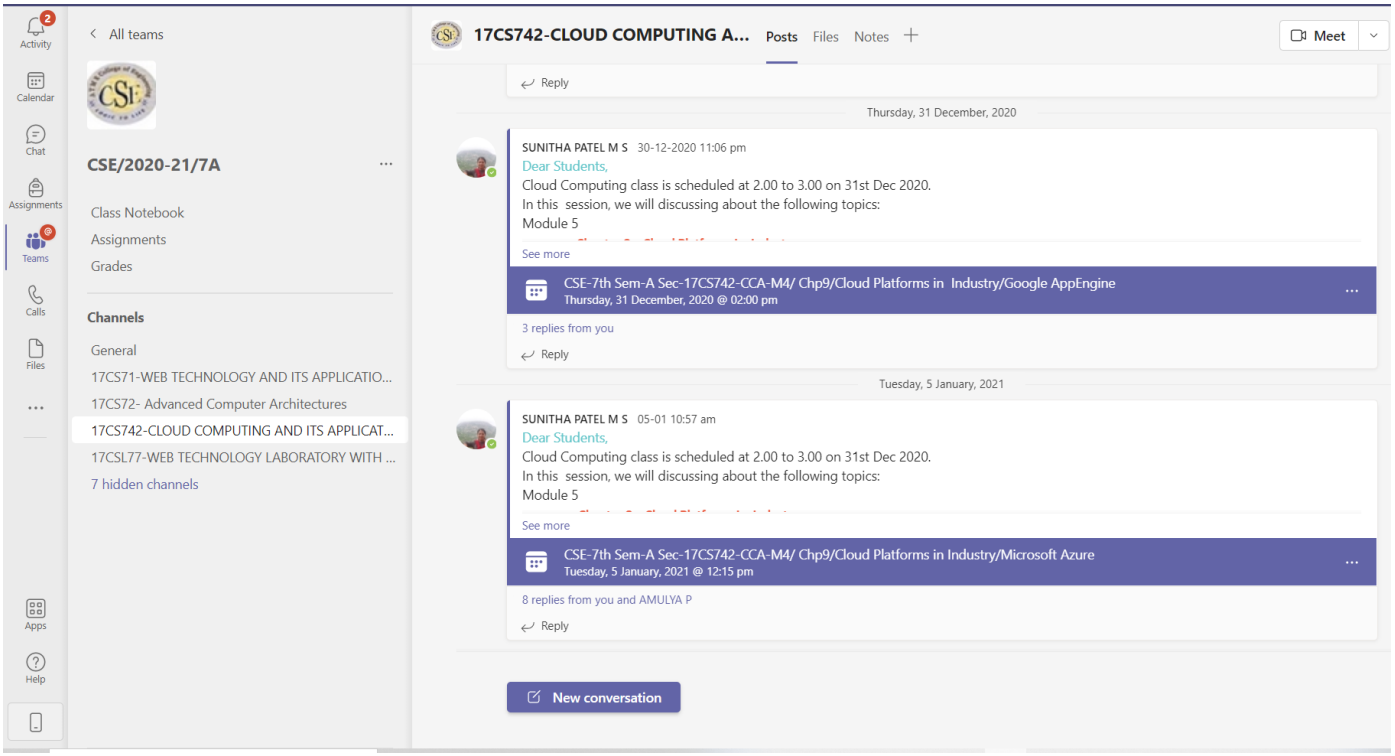
Department of Computer Science and Engineering

Flipped Classroom through Mail (A-IMS)

To enhance the learning ability and problem solving ability preface of the topic to be delivered is sent to students through Microsoft Teams.



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CO STATEMENTS

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO THIRD SEMESTER MATRIX AY 2020-21

Course Name: ENGINEERING MATHEMATICS III (18MAT31)

C2O1	C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
	C201.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
	C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
	C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
	C201.5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C201.1	2	2	-	-	-	-	-	-	-	-	-	1	-	-
C201.2	1	1	-	-	-	-	-	-	-	-	-	1	-	-
C201.3	2	1	-	-	-	-	-	-	-	-	-	2	-	-
C201.4	2	1	-	-	-	-	-	-	-	-	-	1	-	-
C201.5	3	2	-	-	-	-	-	-	-	-	-	2	-	-

Course Name: DATA STRUCTURES AND APPLICATION (18CS32)

C202	C202.1	Use different types of data structures, operations and algorithms
	C202.2	Apply searching and sorting operations on files
	C202.3	Use stack, Queue, Lists, Trees and Graphs in problem solving
	C202.4	Implement all data structures in a high-level language for problem solving.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C202.1	2	2	2	-	-	-	-	-	-	-	-	-	1	-
C202.2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
C202.3	2	3	2	-	-	-	-	-	-	-	-	-	-	-
C202.4	-	2	1	-	-	-	-	-	-	-	-	-	-	-

Course Name: ANALOG AND DIGITAL ELECTRONICS (18CS33)														
C2O3	C203.1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp												
	C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.												
	C203.3	Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods												
	C203.4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.												
	C203.5	Develop simple HDL programs.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C203.1	2	2		-	-	-	-	-	-	-	-	-	-	-
	C203.2	2	2	1	-	-	-	-	-	-	-	-	-	-	-
	C203.3	2	3	3	-	-	-	-	-	-	-	-	-	-	-
	C203.4	2	3	2	-	-	-	-	-	-	-	-	-	-	-
	C203.5	-	2	-	-	-	-	-	-	-	-	-	-	-	
Course Name: COMPUTER ORGANISATION(18CS34)														
C2O4	C204.1	Explain the basic organization of a computer system.												
	C204.2	Demonstrate functioning of different sub systems, such as processor, Input/output,and memory												
	C204.3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.												
	C204.4	Design and analyse simple arithmetic and logical units.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C204.1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
	C204.2	2	3	1	-	-	-	-	-	-	-	-	-	-	-
	C204.3	1	1	1	1	-	-	-	-	-	-	-	2	-	-
	C204.4	1	-	2	1	-	-	-	-	-	-	-	-	-	-
Course Name: SOFTWARE ENGINEERING(18CS35)														
C2O5	C205.1	Design a software system, component, or process to meet desired needs within realistic constraints.												
	C205.2	Assess professional and ethical responsibility												
	C205.3	Function on multi-disciplinary teams												
	C205.4	Use the techniques, skills, and modern engineering tools necessary for engineering practice												
	C205.5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C205.1	-	-	3	-	-	-	-	-	-	-	-	-	1	-
	C205.2	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	C205.3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
	C205.4	3	-	-	-	-	-	-	-	-	-	-	-	1	-
	C205.5	-	-	1	-	-	-	-	-	-	-	1	-	-	-

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Course Name: Discrete Mathematical Structures (18CS36)														
C2O6	C2O6.1	Use propositional and predicate logic in knowledge representation and truth verification.												
	C2O6.2	Demonstrate the application of discrete structures in different fields of computer science.												
	C2O6.3	Solve problems using recurrence relations and generating functions.												
	C2O6.4	Application of different mathematical proofs techniques in proving theorems in the courses.												
	C2O6.5	Compare graphs, trees and their applications.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C2O6.1	3	3	-	3	-	-	-	-	-	-	-	-	-	-
	C2O6.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C2O6.3	3	2	-	3	-	-	-	-	-	-	-	-	-	-
	C2O6.4	3	1	-	3	-	-	-	-	-	-	-	-	-	-
	C206.5	3	2	-	3	-	-	-	-	-	-	-	-	-	-

Course Name: ANALOG AND DIGITAL ELECTRONICS LAB (18CSL37)														
C2O7	C2O7.1	Use appropriate design equations / methods to design the given circuit.												
	C2O7.2	Examine and verify the design of both analog and digital circuits using simulators.												
	C2O7.3	Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.												
	C2O7.4	Compile a laboratory journal which includes; aim, tool/instruments/software/components used, design equations used and designs, schematics, program listing, procedure followed, relevanttheory, results as graphs and tables, interpreting and concluding the findings.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C2O7.1	2	3	3	3	1	-	-	-	-	-	-	-	-	-
	C2O7.2	-	2	1	2	2	-	-	-	-	-	-	-	-	-
	C2O7.3	-	-		-	-	-	-	-	-	-	-	-	-	-
	C2O7.4	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Course Name: DATA STRUCTURES LAB (18CSL38)														
C2O8	C2O8.1	Analyze and Compare various linear and non-linear data structures												
	C2O8.2	Code, debug and demonstrate the working nature of different types of data structures and their applications												
	C2O8.3	Implement, analyze and evaluate the searching and sorting algorithms												
	C2O8.4	Choose the appropriate data structure for solving real world problems												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C2O8.1	2	3	3	3	1	-	-	-	-	-	-	-	-	-
	C2O8.2	-	2	1	2	2	-	-	-	-	-	-	-	-	-
	C2O8.3	-	-		-	-	-	-	-	-	-	-	-	-	-
	C2O8.4	2	-	-	-	-	-	-	-	-	-	-	-	-	-

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Faculty and students are aware of the stated Programme and course outcomes of the Programmes

To create awareness about **Programme and course outcomes** of the department, it has been published and disseminated among the stake holders.

The extent of student awareness about the POs and COs and their actual performance reflecting these would be the real indicators of success or outcome of the programme. In this regard our Institution has taken certain measures to educate and to create the awareness about the program outcomes and course outcomes among the faculty members and students.

Stakeholder	Purpose
Faculty	Implementer (Contributor) of Policies. Key contributor in developing/implementing growth Plan. Responsible for producing competent graduates/product of the Institution.
Student	Product of the Institution, responsible for creating Image of the institution while serving the society.

HOD

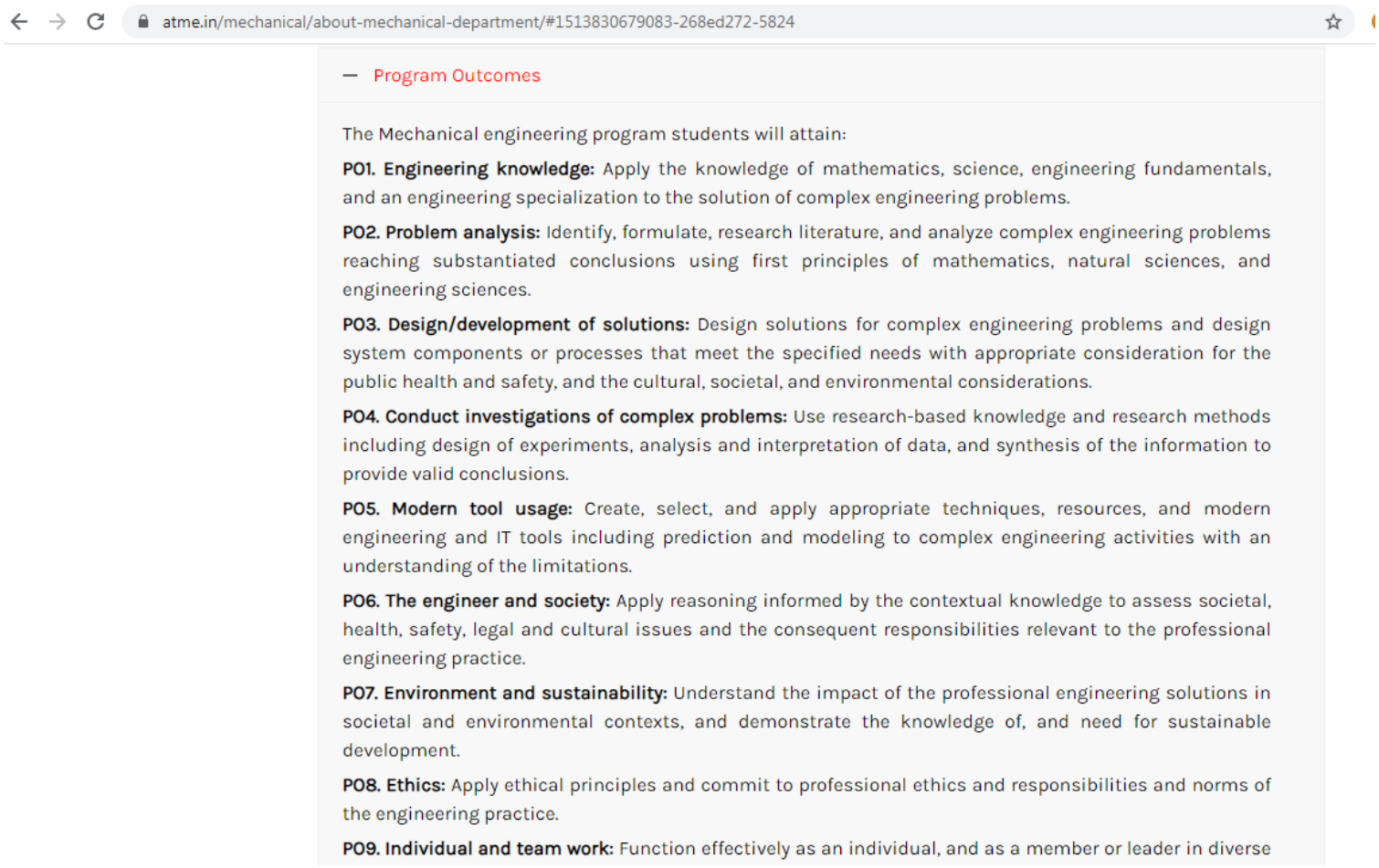
Programme and Course Outcomes Dissemination

Sl.No	Particulars	Programme Outcomes	Course Outcomes
1	**College Website**	✓	✓
2	Corridors	✓	✓
3	**Notes & Lab Manual**	✓	✓
4	**Course Module, Lesson Plan**	-	✓
5	**IA Question Paper**	-	✓
6	**Classroom, Seminar Hall, Laboratory**	✓	-
7	**Faculty Office, Dept. Office**	✓	-
8	**Magazine**	✓	-
9	**College Enterprise Resource Planning(CERP) Portal**	✓	-
10	**Student Handbook**	✓	✓
11	**Faculty Handbook**	✓	✓
12	**Flipped Classroom(Mail) through CERP/MS Teams**	-	✓

HOD

A. College Website Dissemination

Link : https://atme.in/mechanical/resourses-mechanical-department/



atme.in/mechanical/about-mechanical-department/#1513830679083-268ed272-5824

— Program Outcomes

The Mechanical engineering program students will attain:

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, 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.

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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.

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

HOD

Website Link: http://atme.in/mechanical/resourses-mechanical-department/

Mech

About The Department
Infrastructure
Faculty Details
Student Learning Centric
Achivements
Research Initiative
Industry Interface
Placement
Co curricular & Extra Curricular activities
Teachers Teaching Analysis
Counselling module
E News Letter

Academic Year – 2020-2021

Course Details & Content								
3rd Semester								
Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
1	18MAT31	Transform Calculus, Fourier Series and Numerical Techniques	Ms.Banupriya J (A) / Mr.Sudhakar N (B)	CLICK	CLICK	CLICK	CLICK	CLICK
2	18ME32	Mechanics of Materials	Mr. Yashwanth N (A) / Mr. Suresh Kumar S (B)	CLICK	CLICK	CLICK	CLICK	CLICK
3	18ME33	Basic Thermodynamics	Mr. Pavan Kumar K P (A) / Mr. Ravikumar S (B)	CLICK	CLICK	CLICK	CLICK	CLICK
4	18ME34	Material Science	Mr. Devaraj M R (A) / Mr. Deepak MVS (B)	CLICK	CLICK	CLICK	CLICK	CLICK
5	18ME35A	Metal cutting and forming	Mr. Niranjan Kumar V S (A)	CLICK	CLICK	CLICK	CLICK	CLICK
6	18ME35B	Metal Casting and Welding	Dr. Chethan S (B)	CLICK	CLICK	CLICK	CLICK	CLICK
7	18ME36A	Computer Aided Machine Drawing	Mr. Rohith S (A)	CLICK	CLICK	CLICK	CLICK	CLICK
8	18ME36B	Mechanical Measurements and Metrology	Mr. Ramanuja C M (B)	CLICK	CLICK	CLICK	CLICK	CLICK
9	18MEL37A	Meterial Testing Lab	Mr. Yathisha N & Mr. Karthik Kumar M	CLICK	CLICK	CLICK	CLICK	CLICK
10	18MEL37B	Mechanical Measurements and Metrology lab	Dr. Chethan S	CLICK	CLICK	CLICK	CLICK	CLICK
11	18MEL38A	Workshop and Machine Shop Practice (Consists of Fitting, and Machining)	Mr Niranjan Kumar V S & Mr. Thej Kumar J	CLICK	CLICK	CLICK	CLICK	CLICK
12	18MEL38B	Foundry,Forging and Welding lab	Mr. Devaraj MR & Mr. Niranjan Kumar V S	CLICK	CLICK	CLICK	CLICK	CLICK
14	18CPC39	Constitution of India, Professional Ethics and Cyber Law	Mr. Chandrashekar C (A & B)	CLICK	CLICK	CLICK	CLICK	CLICK

5th-SEMESTER COURSES								
Sl. No.	Subject/Lab Code	Subject/ Lab Name	Course Coordinator	CM	LP	NOTES / HANDOUT / LABMANUAL	PPT	IA Scheme
1	18ME51	Management and Economics	Mr. Ramanuja C M (A) / Mr. Niranjan Kumar V S (B)	CLICK	CLICK	CLICK	CLICK	CLICK
2	18ME52	Design of Machine Elements I	Dr. Srinivasa K (A) / Mr. Rohith S (B)	CLICK	CLICK	CLICK	CLICK	CLICK
3	18ME53	Dynamics of Machines	Mr. Suresh Kumar S (A) / Mr. Yathisha N (B)	CLICK	CLICK	CLICK	CLICK	CLICK
4	18ME54	Turbo Machines	Dr. M S Govinde Gowda (A) / Mr. Raghu (B)	CLICK	CLICK	CLICK	CLICK	CLICK
5	18ME55	Fluid Power Engineering	Mr. Raghu (A) / Mr. Pavan Kumar K P (B)	CLICK	CLICK	CLICK	CLICK	CLICK
6	18ME56	Operations Management	Dr. Chethan S (A) / Dr. Rathnakar G (B)	CLICK	CLICK	CLICK	CLICK	CLICK
7	18MEL57	Fluid Mechanics/Machines lab	Mr. Ravi Kumar S / Mr. Pavan Kumar K P / Dr Manjunath H S / Mr. Yashwanth N / Mr. Niranjan Kumar V S / Mr. Raghu / Dr. Chethan S	CLICK	CLICK	CLICK	CLICK	CLICK
8	18MEL58	Energy Conversion Lab	Mr. Pavan Kumar K P / Mr. Raghu / Mr. Suresh Kumar S / Mr. Ravi Kumar S / Dr. MD Nadeem M	CLICK	CLICK	CLICK	CLICK	CLICK
9	18CIV59	Environmental Studies		CLICK	CLICK	CLICK	CLICK	CLICK

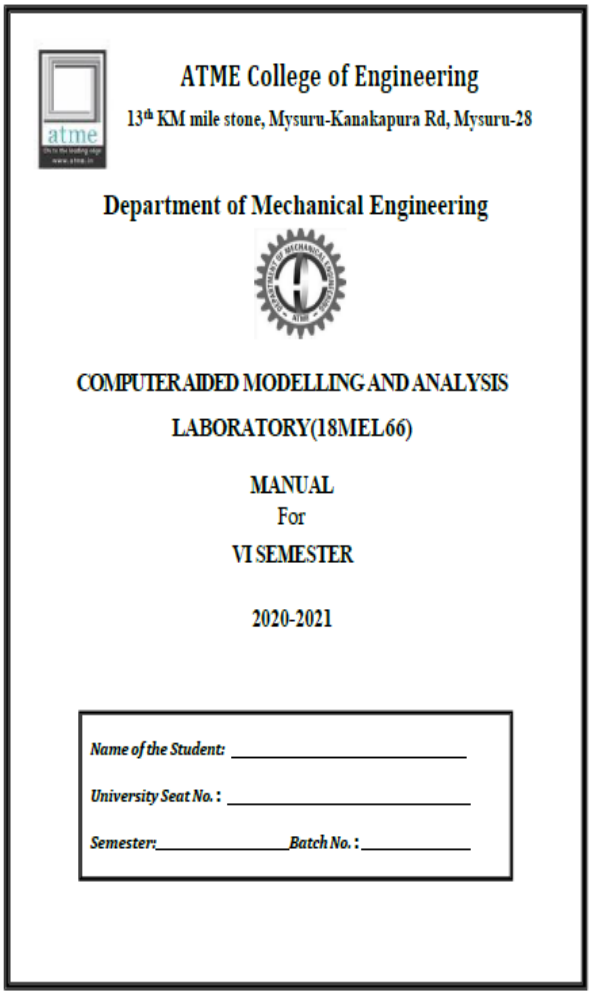
B. Department Corridor

Class Room

Department Library

HOD

C. Notes, Lab Manual and Course Module



ATME College of Engineering

13th KM mile stone, Mysuru-Kanakapura Rd, Mysuru-28

Department of Mechanical Engineering

COMPUTER AIDED MODELLING AND ANALYSIS LABORATORY(18MEL66)

MANUAL

For

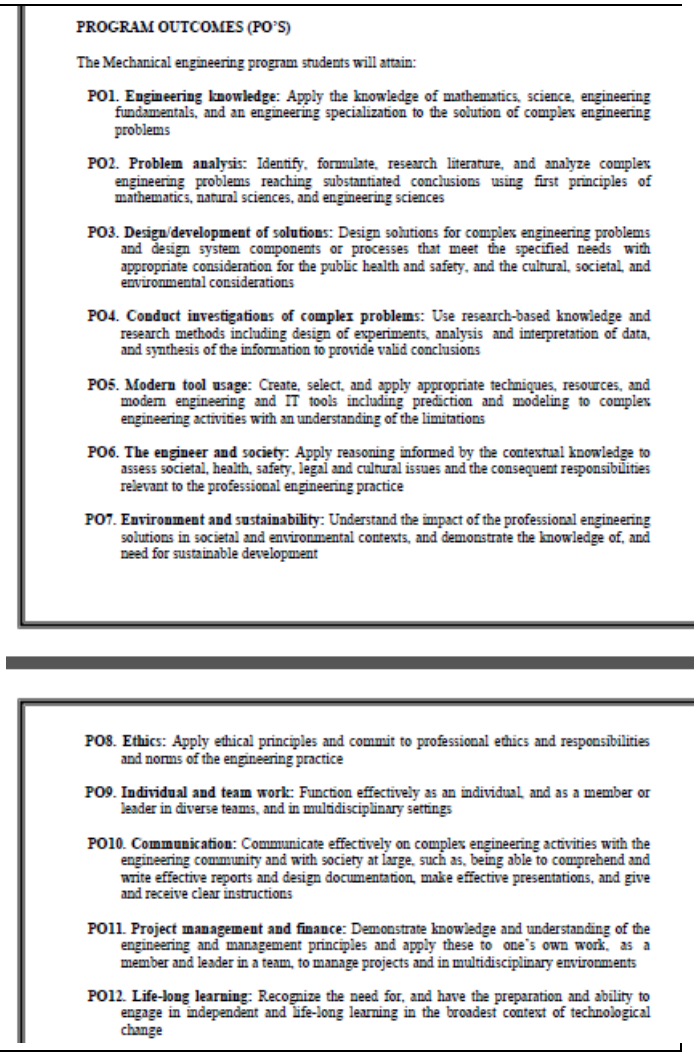
VI SEMESTER

2020-2021

Name of the Student: _____

University Seat No. : _____

*Semester:*_____ *Batch No.* : _____



PROGRAM OUTCOMES (PO'S)

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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

HOD

COURSE MODULE

ATME College of Engineering

Department of Mechanical Engineering

COURSE MODULE

Faculty Name :			Academic Year: 2020-21 (EVEN SEM)				
Department: Mechanical Engineering							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours L	T	P	Total Hrs/ Sessions
18ME61	Finite Element Method:	Core	Basics of Engineering Mathematics, Mechanics of Materials	3	2	-	50
Objectives	1. To learn the basic principles of finite element analysis procedure 2. To understand the design and heat transfer problems with application of FEM. 3. Solve 1 D, 2 D and dynamic problems using Finite Element Analysis approach. 4. To learn the theory and characteristics of finite elements that represent engineering structures. 5. To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses.						

Topics Covered as per Syllabus

MODULE 1

Introduction to Finite Element Method: General description of the finite element method. Engineering applications of finite element method. Boundary conditions: homogeneous and non homogeneous for structural, heat transfer and fluid flow problems. Potential energy method, Rayleigh Ritz method, Galerkin's method, Displacement method of finite element formulation. Convergence criteria, Discretization process, Types of elements: 1D, 2D and 3D, Node numbering, Location of nodes. Strain displacement relations, Stress strain relations, Plain stress and Plain strain conditions, temperature effects.

Interpolation models: Simplex, complex and multiplex elements, Linear interpolation polynomials in terms of global coordinates 1D, 2D, 3D Simplex Elements.

10 Hours

MODULE 2

One-Dimensional Elements-Analysis of Bars and Trusses, Linear interpolation polynomials in terms of local coordinate's for1D, 2Delements. Higher order interpolation functions for 1D quadratic and cubic elements in natural coordinates, Constant strain triangle, Four-Nodded Tetrahedral Element (TET 4), Eight-Nodded Hexahedral Element (HEXA8), 2D iso-parametric element, Lagrange interpolation functions, Numerical integration: Gaussian quadrature one point ,two point formulae, 2D integrals. Fore terms: Body force, traction force and point loads,

Numerical Problems: Solution for displacement, stress and strain in 1D straight bars, stepped bars and tapered bars using elimination approach and penalty approach, Analysis of trusses.

10 Hours

MODULE 3

Beams and Shafts: Boundary conditions, Load vector, Hermite shape functions, Beam stiffness matrix based on Euler-Bernoulli beam theory, Examples on cantilever beams, propped cantilever beams, Numerical problems on simply supported, fixed straight and stepped beams using direct stiffness method with concentrated and uniformly distributed load.

Torsion of Shafts: Finite element formulation of shafts, determination of stress and twists in circular shafts.

10 Hours

MODULE 4

Heat Transfer: Basic equations of heat transfer: Energy balance equation, Rate equation: conduction, convection, radiation, energy generated in solid, energy stored insolid, 1D finite element formulation using vibrational method, Problems with temperature gradient and heat fluxes, heat transfer in composite sections, straight fins.

10 Hours

MODULE 5

Axi-symmetric Solid Elements: Derivation of stiffness matrix of axisymmetric bodies with triangular elements, Numerical solution of axisymmetric triangular element(s) subjected to surface forces, point loads, angular velocity, pressure vessels.

Dynamic Considerations: Formulation for point mass and distributed masses, Consistent element mass matrix of one dimensional bar element, truss element, axisymmetric triangular element, quadrilateral element, beam element. Lumped mass matrix of bar element, truss element, Evaluation of eigen values and eigen vectors, Applications to bars, stepped bars, and beams.

10 Hours

List of Text Books:

1. Logan, D. L., A first course in the finite element method,6th Edition, Cengage Learning, 2016.
2. Rao, S. S., Finite element method in engineering, 5th Edition, Pergamon Int. Library of Science, 2010.
3. Chandrupatla T. R., Finite Elements in engineering, 2nd Edition, PHI, 2013.

List of Reference Books:

1. J.N.Reddy, "Finite Element Method"- McGraw -Hill International Edition Bathe K. J. Finite Elements Procedures, PHI.
2. Cook R. D., et al. "Concepts and Application of Finite Elements Analysis"- 4th Edition, Wiley & Sons, 2003.

List of URLs, Text Books, Notes, Multimedia Content, etc

- http://www.engr.uvic.ca/~mech410/lectures/FEA_Theory
- http://nptel.ac.in/courses/112104116/

Course Outcomes

Upon successful completion of this course you should be able to:

1. Understand the concepts behind formulation methods in FEM.
2. Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.
3. Develop element characteristic equation and generation of global equation.
4. Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strains induced.

Internal Assessment Marks: Internal Assessment Marks: 40 (30 Marks three Session tests are conducted during the semester and marks allotted based on the average of three performances and additional 10 Marks for Assignments/Unit/tests/ Written quizzes)

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code: 18ME61	TITLE: Finite Element Methods							Faculty Name:				
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3	1	-	1	-	-	-	-	-	-	-
CO-2	3	3	1	1	1	-	-	-	-	-	-	1
CO-3	2	2	1	1	1	-	-	-	-	-	-	-
CO-4	3	3	2	2	2	-	-	-	-	-	-	1

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code: 18ME61	TITLE: Finite Element Methods	Faculty Name:
List of Course Outcomes	Program Specific Outcomes	
	PSO1	PSO2
CO-1	1	-
CO-2	2	-
CO-3	3	-
CO-4	3	-

Note: 3 = Strong Contribution 2= Average Contribution 1 = Weak Contribution - = No Contribution

HOD

D. IA QP and Scheme

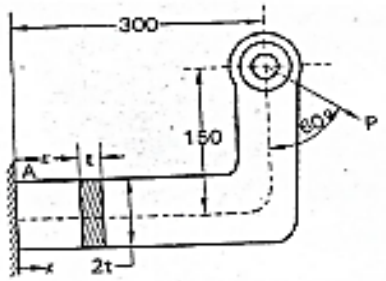
SAMPLE IA QP & SCHEME

ATME College of Engineering

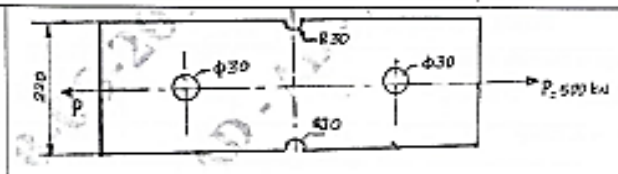
Department of Mechanical Engineering

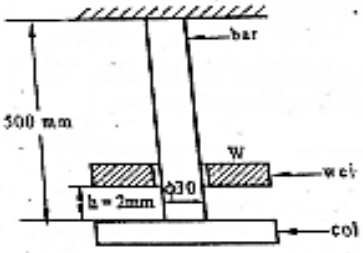
FIRST INTERNAL ASSESMENT

COURSE	:	Design of Machine Elements I	TIME	:	10 am to 11.30am
COURSE CODE	:	18ME52	DATE	:	12.10.2020
SEM/SEC	:	5th Sem A, B Sec	MAX. MARKS	:	50

	PART-A-Answer any three full Questions	Marks	COs	BTL
01.	a) Metals which have iron as their main constituent. i. Ferrous Metals iii. Both ii. Non Ferrous Metals iv. None of the above	2 M	1	
	b) With a neat block diagram, **Develop** the Phases of Design according to Shigley's method.	8 M		1.3
02.	a) An external load whose line of action is parallel but does not coincide with centroidal axis of a machine component is known as _____. i. Centroid iii. Eccentric ii. Axial iv. Bending	2 M	1	
	b) A wall bracket with a rectangular cross section as shown in the figure, The force P is acting on the bracket at 60° to the vertical is 5kN. The material of the bracket is grey cast iron (σ_u = 124Mpa) and FOS is 2. **Find** the dimensions of cross section for the bracket shown in figure. All dimensions are in mm 	8 M		1.1
03.	a) From DDHB Fig no. 2.16/ Pg 38 the value of r/b is 0.15 and H/b is 1.5 then what is the value for stress concentration factor? i. 1.9 iii. 1.86 ii. 1.75 iv. 1.8	2 M	1	
	b) A Machine element loaded as shown in figure. Find the safe value thickness of the plate. Material selected for the machine element has allowable stress of 200 Mpa.	8 M		1.1

A T M E
College of Engineering
ISO 9001:2015
Department of Mechanical Engineering

				
04.	a) Which theory states that the failure of the mechanical component subjected to bi axial or tri axial stresses occurs when the maximum normal stress reaches the yield or ultimate strength of the material. i. Rankine Theory iii. Von Misses Theory ii. Guest Theory iv. Saint vanant's theory	2 M	1	
	b) A machine element is subjected to following stresses σ_x=60Mpa, σ_y = 45Mpa and τ_{xy} = 30Mpa. **Find** the FOS if it is made of C45 steel having yield stress at 353Mpa, using following theories 1.Maximum normal stress theory 2.Maximum shear stress theory 3.Shear energy theory 4.Maximum strain theory, taking poison's ratio μ = 0.3	8 M		L1

	PART-B-Answer any two full Questions	Marks	COs	BTL
01.	a) when type of impact is logitudinal impact on bar, what is the coefficient value of "a" i. 1/3 iii. 13/35 ii. 17/35 iv. 4/17	2 M	2	
	b) A weight of 2kN falls through a height of 2mm and strikes the collar as shown in figure. The diameter of the steel bar is 30 mm and length of the bar is 500mm. Take E = 200 GPa. **Determine** a) Stress induced in the bar by neglecting the inertia of the bar b) Stress induced in the bar considering the inertia of the bar. Specific weight of the bar material 78kN/m^3 	8 M		L5

ATME College of Engineering

Department of Mechanical Engineering

02.	a)Falling weight is absorbed by the bar and energy stored in the form of _____. i. Potential Energy iii. Solar Energy ii. Strain Energy iv. All the above	2 M	2	
	b) Develop an expression for Impact stress in an axial bar.	8 M		L3
03.	a) What is the maximum deflection "y" for simply supported beam i. $y = -\frac{1}{3}\frac{Fl^3}{EI}$ iii. $y = -\frac{1}{8}\frac{Fl^3}{EI}$ ii. $y = -\frac{1}{6}\frac{Fl^3}{EI}$ iv. $y = -\frac{1}{48}\frac{Fl^3}{EI}$	2 M	2	
	b) A hammer of 4kN strikes the mid pan of a simply supported beam of span 4m, the beam as a depth of 200mm and width of 100mm. Determine the height through which the hammer can be allowed to fall. If the maximum stress in the beam is limited to 100Mpa, the modulus of elasticity of the beam material is 206Gpa.	8 M		L5

Name & Signature of Course Coordinator

HoD Signature

CO1	Describe the design process, choose material, apply the codes and standards in design process, and analyze the behavior of machine components under static loading using theories of failure.
CO2	Analyze the behavior of machine components under impact and fatigue loading.
CO3	Design of shafts, keys and couplings.
CO4	Design of Riveted and welded joints.
CO5	Design of threaded fasteners, power screws and temporary joints.

Bloom's Taxonomy Level	
L1	Remembering
L2	Understanding
L3	Applying
L4	Analyzing
L5	Synthesizing
L6	Creating

ATME College of Engineering

Department of Mechanical Engineering

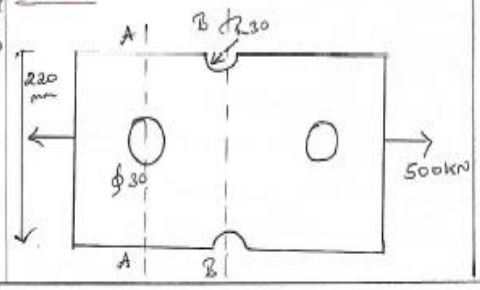
Internal Assessment Scheme & Solution 2020-21

Faculty Name: Dr. Srinivasa. K, Mr. Rohith. S Date of I.A: 12/10/2020

Subject with Code: Design of M/c Elements - 1 (18ME55) Semester: 5th A, B

Q. No	Scheme & Solution	Marks Allotted	CO: RBT
	Part - A		
1.a)	Ferrous metal	2	CO1
b)	Identification of need ↓ Definition of Problem ↓ Synthesis ↓ Analysis & optimisation ↓ Evaluation ↓ Presentation. Explanation of each steps/process.	2 6	CO1
2.a)	Eccentric.	2	CO1
b)	Resolving forces $P_V = P\cos 60^\circ = 5000\cos 60^\circ = 2500N$ $P_H = P\sin 60^\circ = 5000\sin 60^\circ = 4330N$	2	CO1
	i) Consider Vertical Component $M = P_V \times 300 = 75\times10^4$ N-mm $\sigma_1 = \frac{112.5\times10^4}{t^3}$ MPa.		

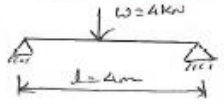
Department of Mechanical Engineering, ATMECE

Q. No	Scheme & Solution	Marks Allotted	CO: RBT
	i) Consider horizontal Component a) Direct Stress, $\sigma_2 = \frac{P_H}{A}$ $\sigma_2 = \frac{2165.06}{t^2}$ MPa.	2	
	b) Bending stress, $\sigma_3 = \frac{974278.57}{t^3}$ MPa		
	$\sigma = \frac{\sigma_1 + \sigma_2 + \sigma_3}{2}$ for Grey cast iron, $\sigma_u = 124$ MPa $\sigma = \frac{\sigma_u}{FOS} = \frac{124}{2} = 62$ MPa	2	
	$62 = \frac{2099278.57 + 2165.06t}{t^3}$ $\therefore t = 35$ mm $b = 35$ mm $h = 70$ mm.	2	
3a)	1.86	2	CO1
b)			CO1

Department of Mechanical Engineering, ATMECE

Q. No	Scheme & Solution	Marks Allotted	CO/ RBT
	Consider Section A-A B = 220mm a = 30mm $\frac{a}{B} = 0.136$	2	
	$\therefore K_t = 2.65$ $K_t = \frac{\sigma_{max}}{\sigma_{nom}} \Rightarrow 2.65 = \frac{200}{\sigma_{nom}}$ $\therefore \sigma_{nom} = 75.47\ N/mm^2$ $\sigma_{nom} = \frac{F}{A} = \frac{F}{(B-a)t}$	2	
	$75.47 = \frac{500 \times 10^3}{(220-30)t}$ $t = 34.86\ mm$		
	Consider Section B-B B = 220mm, b = B - 2R = 160mm $\sigma_{max} = 200\ MPa$ P = 500KN	2	
	$\frac{B}{b} = 1.37$, $\frac{r}{b} = 0.187$ $\therefore K_t = 2.05$ $K_t = \frac{\sigma_{max}}{\sigma_{nom}} \Rightarrow 2.05 = \frac{200}{\sigma_{nom}}$ $\sigma_{nom} = 97.56\ MPa$ $t = 32\ mm$	2	

Department of Mechanical Engineering, ATMECE

Q. No	Scheme & Solution	Marks Allotted
3a)	$y = \frac{1}{48} \frac{FL^3}{EI}$	2
b)		
	$\sigma_b' = \sigma_b \left[1 + \sqrt{1 + \frac{2h}{y}}\right]$	2
	For SSB, $M = \frac{WL}{4} = \frac{4 \times 10^3 \times 400}{4} = 4 \times 10^6\ N\text{-}mm$ $y = \frac{200}{2} = 100mm$	2
	$I = \frac{bh^3}{12} = \frac{200^3 \times 100}{12}$ $I = 66.67 \times 10^6\ mm^4$ $\therefore \sigma_b = \frac{My}{I} = 6\ MPa.$	
	Deflection $y = \frac{1}{48} \frac{FL^3}{EI}$ $y = 0.3883\ mm$	2
	$\sigma_b' = \sigma_b \left[1 + \sqrt{1 + \frac{2h}{y}}\right]$ $100 = 6 \left[1 + \sqrt{1 + \frac{2h}{0.3883}}\right]$ $h = 47.45\ mm,$	2

Signature of the Staff:

Department of Mechanical Engineering, ATMECE

Signature of the HoD:

14/10/2020

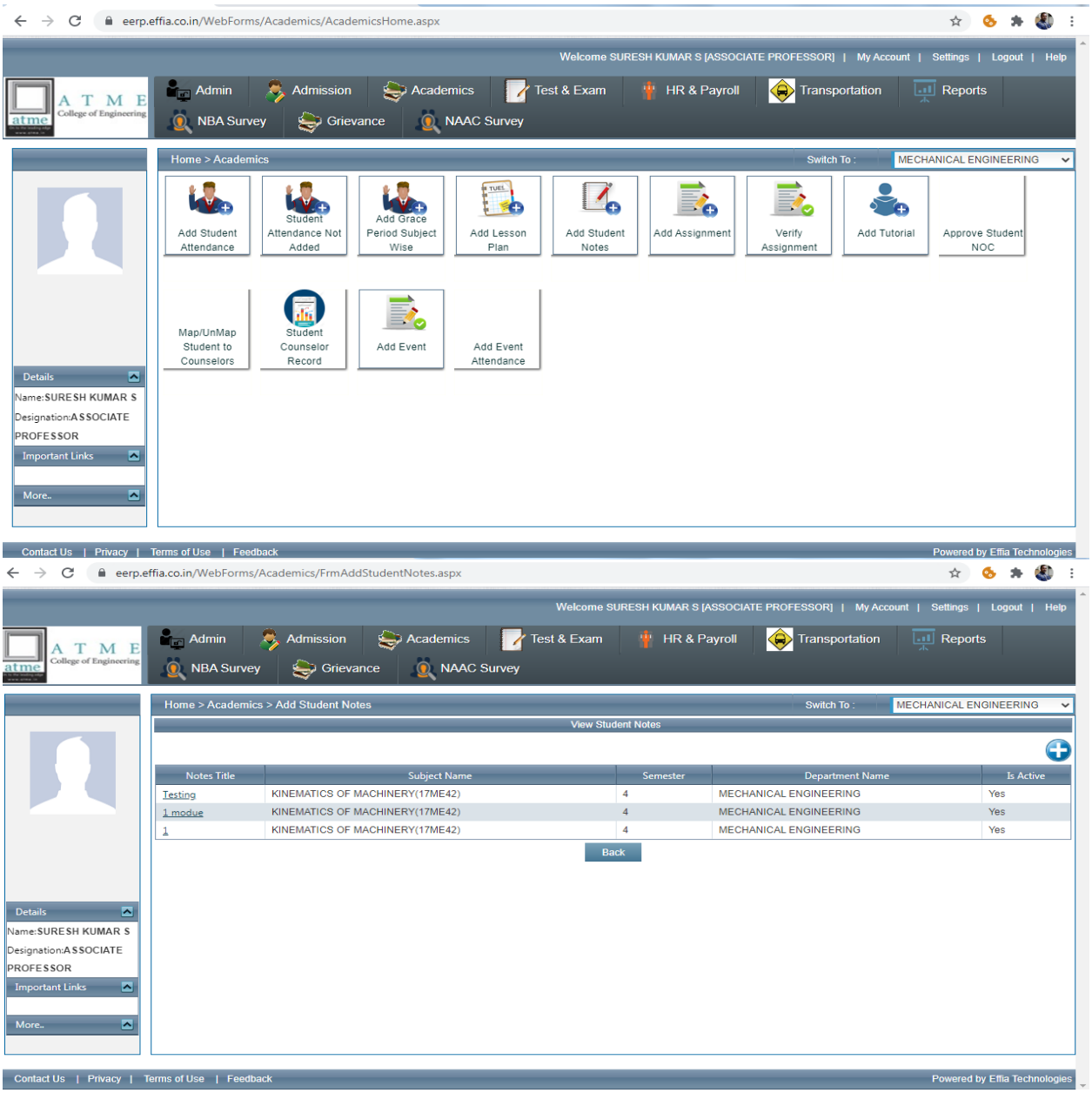
HOD

HOD

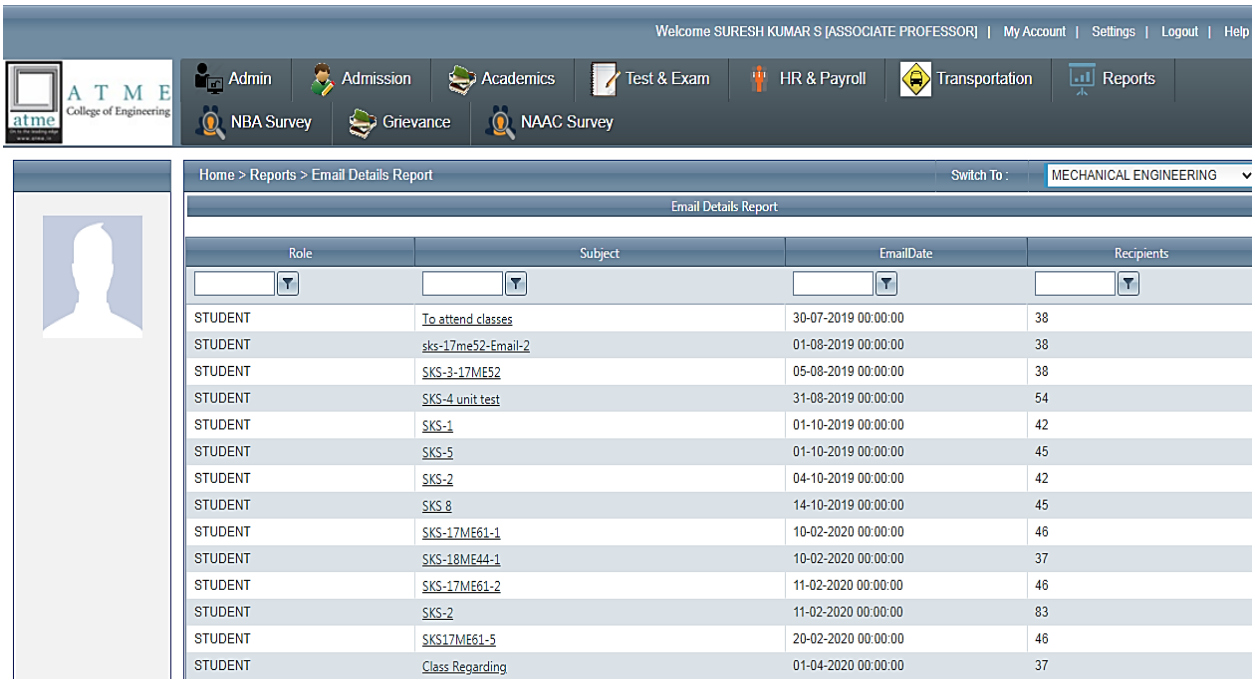
E. CERP Link :

https://eerp.effia.co.in/WebForms/Academics/AcademicsHome.aspx

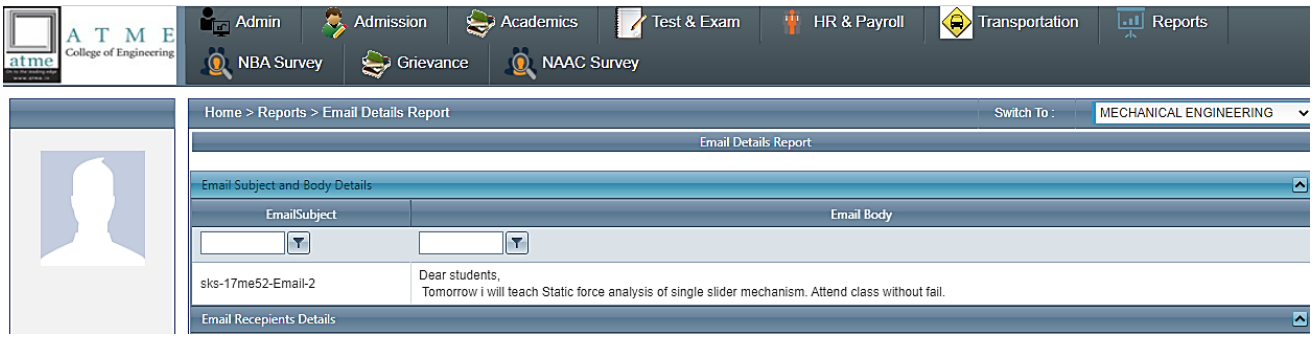
Note: Only authorised access



F. Flipped Classroom through Mail (CERP/ MS Teams)



Role	Subject	EmailDate	Recipients
STUDENT	To attend classes	30-07-2019 00:00:00	38
STUDENT	sks-17me52-Email-2	01-08-2019 00:00:00	38
STUDENT	SKS-3-17ME52	05-08-2019 00:00:00	38
STUDENT	SKS-4 unit test	31-08-2019 00:00:00	54
STUDENT	SKS-1	01-10-2019 00:00:00	42
STUDENT	SKS-5	01-10-2019 00:00:00	45
STUDENT	SKS-2	04-10-2019 00:00:00	42
STUDENT	SKS 8	14-10-2019 00:00:00	45
STUDENT	SKS-17ME61-1	10-02-2020 00:00:00	46
STUDENT	SKS-18ME44-1	10-02-2020 00:00:00	37
STUDENT	SKS-17ME61-2	11-02-2020 00:00:00	46
STUDENT	SKS-2	11-02-2020 00:00:00	83
STUDENT	SKS17ME61-5	20-02-2020 00:00:00	46
STUDENT	Class Regarding	01-04-2020 00:00:00	37



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CO STATEMENTS

Course Name: Transform calculus, fourier series and Numerical techniques[18MAT31]														
C201	C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.												
	C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory												
	C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.												
	C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.												
	C201.5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.												
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C201.1	3	3	-	-	-	-	-	-	-	-	-	1	-	-
	C201.2	2	2	-	-	-	-	-	-	-	-	-	1	-	-
	C201.3	1	1	-	-	-	-	-	-	-	-	-	1	-	-
	C201.4	2	1	-	-	-	-	-	-	-	-	-	2	-	-
	C201.5	2	1	-	-	-	-	-	-	-	-	-	1	-	-
Course Name: Mechanics of Materials [18ME32]														
C202	C202.1	Understand and Determine different types of stresses and strains, mechanical properties including elastic constants and their relations.												
	C202.2	Explain the idea of analyticity, potential fields residues and poles of complex Potentials in field theory and electromagnetic theory.												
	C202.3	Understand and determine the dimensions of shafts based on torsional strength, rigidity and also to apply Theories of failures for structural members												
	C202.4	Determine strain energy stored in structural members subjected to different loads and also elastic stability of columns using Rankin's and Euler's theory.												
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C202.1	3	-	-	-	-	-	-	-	-	-	-	-	2	
	C202.2	3	3	1	-	-	-	-	-	-	-	-	-	2	
	C202.3	3	3	1	-	-	-	-	-	-	-	-	-	2	
	C202.4	3	2	1	-	-	-	-	-	-	-	-	-	2	
Course Name: Basic Thermodynamics [18ME33]														
C203	C203.1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems												
	C203.2	Analyze structural members and cylinders for stresses, strains and deformations subjected to bending and shear loadsEvaluate the feasibility of cyclic and non-cyclic processes usi												
	C203.3	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems and apply 1st law of thermodynamics to closed and open systems and determine quantity of energy transfers and change in properties.												
	C203.4	Interpret the behavior of pure substances and its application in practical problems.												
	C203.5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations												
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C203.1	**3**	-	-	-	-	-	-	-	-	-	-	**2**	2	
	C203.2	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	2	
	C203.3	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	2	
	C203.4	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	2	
	C203.5	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	2	
Course Name: Material Science [18ME34]														

	C204.1	Understand the mechanical properties of metals and their alloys													
	C204.2	Understand the various modes of failure and understand the microstructures of ferrous and nonferrous materials.													
	C204.3	Describe the processes of heat treatment of various alloys.													
	C204.4	Acquire the Knowledge of composite materials and their production process as well as applications.													
	C204.5	Understand the properties and potentialities of various materials available and material selection													
C204		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C204.1	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	2	
	C204.2	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	2	
	C204.3	**3**	**-**	**-**	**-**	**-**	**-**	**-**	-	**-**	**-**	**-**	**2**	2	
	C204.4	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	2	
	C204.5	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	2	
Course Name: Metal cutting and forming [18ME35A/45A]															
	C205.1	Discuss different cutting tool materials, tool nomenclature and mechanics of orthogonal cutting.													
	C205.2	Explain the construction &operation of various machine tools.													
	C205.3	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost and time.													
	C205.4	Describe the concepts of different metal forming processes.													
	C205.5	Apply the concepts of design of sheet metal dies to design different dies for simple sheet metal components.													
C205		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C205.1	3	-	-	-	-	-	-	-	-	-	-	2	2	
	C205.2	2	-	-	-	-	-	-	-	-	-	-	2	2	
	C205.3	3	2	-	2	2	-	-	-	-	-	-	2	1	
	C205.4	3	-	-	-	-	-	-	-	-	-	-	2	1	
	C205.5	3	2	-	-	-	-	-	-	-	-	-	2	-	
Course Name: Metal Casting and welding [18ME35B/45B]															
	C206.1	Infer, Compare and Select appropriate Manufacturing Processes													
	C206.2	Analyse and Interpret the Principles & process of Casting, Forming and Welding to specific applications													
	C206.3	Interpret the Solidification & Metallurgical aspects in both Ferrous & Non-Ferrous alloys.													
C206		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C206.1	2	2	-				2					2	-	
	C206.2	2	2	1				2					2	2	
	C206.3	-	2	3				2					2	2	
Course Name: Computer Aided Machine Drawing [18ME36A/46A]															
	C207.1	Identify the national and international standards pertaining to machine drawing.													
	C207.2	Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings.													
	C207.3	Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.													
	C207.4	Interpret the Machining and surface finish symbols on the component drawings													
	C207.5	Preparation of the part or assembly drawings as per the conventions.													
C207		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C207.1	3	-	-	-	-	-	-	3	-	-	-	-	2	2
	C207.2	3	1	2	1	3	-	-	-	-	-	-	2	2	2
	C207.3	3	2	1	-	2	-	-	1	-	-	-	2	2	2
	C207.4	2	-	2	-	1	-	-	1	-	-	-	2	2	2
	C207.5	3	2	2	-	3	-	-	-	-	-	-	2	2	3
Course Name: Mechanical Measurements & Metrology [18ME36B/46B]															
	C208.1	To Understand the objectives of metrology, methods of measurement, standards of measurement & various measurement parameters													
	C208.2	To Understand the tolerance, limits of size, fits, geometric and position tolerances, gauges and their design and also working principle of different types of comparators.													

	C208.3	To Understand measurement of major & minor diameter, pitch, angle and effective diameter of screw threads and Gears.													
	C208.4	To Understand measurement systems, transducers, intermediate modifying devices and terminating devices.													
	C208.5	To Understand functioning of force, torque, pressure, strain and temperature measuring devices.													
C208		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C208.1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	C208.2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	C208.3	1	1	-	-	-	-	-	-	-	-	-	-	-	-
	C208.4	1	1	-	-	1	-	-	-	-	-	-	-	-	-
	C208.5	2	1	-	-	1	-	-	-	-	-	-	-	-	-
Course Name: Material Testing Lab [18MEL37A/47A]															
	C208.1	Identify the different engineering materials, describe their properties and predict their behavior under different types of loading													
	C208.2	Solve for stresses, strains, moments, & Select materials, sizes and sections for various applications.													
	C208.3	Determine mechanical properties by destructive and non-destructive methods													
C210		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C208.1		3	3	2	-	-	-	-	-	-	-	-	-	-
	C208.2	2	3	1	3	-	-	-	-	-	-	-	-	-	-
	C208.3		3	3	2	2	-	-	-	-	-	-	-	-	-
Course Name: Mechanical Measurements & Metrology Lab [18MEL37B/47B]															
	C211.1	Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometer.													
	C211.2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.													
	C211.3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.													
	C211.4	Understand the concepts of measurement of surface roughness. Analyze tool forces using Lathe/Drill tool dynamometer.													
	C211.5	Analyze Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier/Gear tooth micrometer.													
C211		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C211.1	3	-	1	-	-	-	-	-	-	-	-	-	-	-
	C211.2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
	C211.3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
	C211.4	3	-	-	-	-	-	-	-	-	-	-	-	-	-
	C211.5	3	2	-	-	-	-	-	-	-	-	-	-	-	-
Course Name: Workshop and Machine shop practice Lab [18MEL38A/48A]															
	C212.1	Use of precaution and safety norms followed in machine shop and exhibit interpersonal skills towards working in a team.													
	C212.2	Prepare fitting models according to drawings using hand tools- V-block, marking gauge, files, hack saw, drills etc.													
	C212.3	To understand integral parts of lathe, shaping and milling machines and various accessories and attachments used and also to read working drawings, and execute machining operations.													
	C212.4	Perform cylindrical turning operations such as plain turning, taper turning, step turning, thread Cutting, facing, knurling, internal thread cutting, eccentric turning and estimate cu													
	C212.5	Perform machining operations such as plain shaping, inclined shaping, keyway cutting, Indexing and Gear cutting and estimate cutting time.													
C212		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C212.1	2	-	1	-	-	2	-	-	3	2	-	-	-	-
	C212.2	2	2	-	-	-	-	-	-	-	1	-	1	-	-
	C212.3	2									1			-	-
	C212.4	2	2	-	-	-	-	-	-	-	1	-	2	-	-
	C212.5	2	2	-	-	-	-	-	-	-	1	-	2	-	-
Course Name: Foundry, Forging and Welding lab [18MEL38B48B]															
	C213.1	Demonstrate skills in preparation of various green sand moulds using with and without Patterns													
	C213.2	Demonstrate various skills in preparation of moulding sand for conducting tensile, shear and compression tests using Universal sand testing machine.													

	C213.3	Demonstrate skills in determining permeability, clay content and Grain Fineness Number of base- sands.													
	C213.4	Demonstrate skills in preparation of forging models involving upsetting, drawing and bending operations.													
	C213.5	Demonstrate skills in preparation of various welding joints on M.S flats using Arc welding equipment.													
C213		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C213.1	**2**	-	-	-	-	-	-	-	-	-	-	**2**	-	-
	C213.2	**2**	-	-	-	-	-	-	-	-	-	-	**1**	-	-
	C213.3	**2**	-	-	-	-	-	-	-	-	-	-	**1**	-	-
	C213.4	**2**	-	-	-	-	-	-	-	-	-	-	**2**	-	-
	C213.5	**2**	-	-	-	-	-	-	-	-	-	-	**2**	-	-
Course Name: Applied Thermodynamics [18ME42]															
	C217.1	Apply thermodynamic concepts to analyze the performance of gas power cycles and vapour power cycle including propulsion systems.													
	C217.2	Understand combustion of fuels and performance of I C engines.													
	C217.3	Understand the principles and applications of refrigeration systems and Apply Thermodynamic concepts to determine performance parameters of refrigeration and air conditioning systems.													
	C217.4	Understand the working principle of Air compressors and Steam nozzles, applications, relevance of air and identify methods for performance improvement.													
C217		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C217.1	**3**	**2**	-	-	-	-	-	-	-	-	-	-	2	-
	C217.2	**3**	**2**	-	-	-	-	**2**	-	-	-	-	-	2	-
	C217.3	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	2	-
	C217.4	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	2	-
Course Name: Applied Thermodynamics [18ME43]															
	C218.1	Identify and calculate the key fluid properties used in the analysis of fluid behaviour and explain the principles of pressure, buoyancy and floatation.													
	C218.2	Describe and apply the principles of fluid kinematics and dynamics while addressing problems of mechanical engineering.													
	C218.3	Explain the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.													
	C218.4	Illustrate and explain the basic concept of compressible flow and CFD.													
C218		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C218.1	**3**	**3**	**2**	**2**	-	-	-	**1**	-	**1**	-	**1**	**1**	-
	C218.2	**3**	**3**	**2**	**1**	-	-	-	**1**	-	-	-	**1**	**1**	-
	C218.3	**3**	**3**	**1**	**1**	-	-	**1**	**1**	-	**1**	-	**1**	**1**	-
	C218.4	**3**	**3**	**1**	**1**	**1**	-	**1**	**1**	-	-	-	**1**	**2**	-
Course Name: Kinematics of Machines [18ME44]															
	C219.1	Understand mechanisms and inversions with basic understanding of motion.													
	C219.2	Analyse the velocity, acceleration of links and joints of mechanisms.													
	C219.3	Analysis of cam follower motion for the motion specifications.													
	C219.4	Analyse the gear trains speed ratio and torque and Understand the working of the spur gears.													
C219		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C219.1	2	2	2	-	-	-	-	-	-	-	-	2	**3**	-
	C219.2	3	3	3	-	-	-	-	-	-	-	-	2	**3**	-
	C219.3	3	3	3	-	-	-	-	-	-	-	-	2	**3**	-
	C219.4	3	3	3	-	-	-	-	-	-	-	-	2	**3**	-
Course Name: Complex Analysis,Probability and Stastical Methods [18MAT41]															
	C209.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.													
	C209.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.													
	C209.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.													
	C209.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.													
	C209.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.													

C209		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C209.1	2	2	-	-	-	-	-	-	-	-	-	1		
	C209.2	1	1	-	-	-	-	-	-	-	-	-	0		
	C209.3	1	1	-	-	-	-	-	-	-	-	-	1		
	C209.4	2	1	-	-	-	-	-	-	-	-	-	1		
	C209.5	1	0	-	-	-	-	-	-	-	-	-	1		

Course Name: Management and Economics [18ME51]														
C301	C301.1	To Understand and practice managerial role and functions through effective decision making in an organization.												
	C301.2	To Understand the importance of decision making, problem solving, law of supply demand and select best economic model from various available alternatives by using Preser												
	C301.3	To Understand the procedure involved in cost estimation of simple component, product costing and depreciation with its methods.												
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C301.1	-	-	-	-	-	-	**1**	**1**	**2**	-	-	-	2	-
	C301.2	**1**	**2**	-	-	-	-	-	-	**2**	-	**3**	-	2	-
	C301.3	**1**	**2**	-	-	-	-	-	-	-	-	**1**	-	2	-

Course Name: Design of Machine Elements I [18ME52]														
C302	C302.1	Describe the design process, choose material, apply the codes and standards in design process and analyze the behavior of machine components under static loading using theories of failure.												
	C302.2	Analyze the behavior of machine components under Impact and fatigue loading												
	C302.3	Design of shafts, keys and couplings.												
	C302.4	Design of Riveted and welded joints												
	C302.5	Design of threaded fasteners, power screws and temporary joints.												
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C302.1	3	3	1	1	-	-	-	1	-	1	-	3	-	-
	C302.2	3	3	1	2	-	-	-	1	-	2	-	3	-	-
	C302.3	3	3	3	2	-	-	-	1	-	2	-	2	-	-
	C302.4	3	3	3	2	-	-	-	1	-	2	-	2	-	-
	C302.5	3	3	3	2	-	-	-	1	-	2	-	2	-	-

Course Name: Dynamics of Machines [18ME53]														
C303	C303.1	Analyse the forces and Torques for static and dynamic conditions of four bar and slider crank mechanisms to keep the system in equilibrium.												
	C303.2	Analyze static and dynamic balancing for Rotating and Reciprocating masses												
	C303.3	Determine Equilibrium speed, sensitiveness, isochronism, effort and power of porter and hartnell governor. Also gyroscopic couple and effects related to aero plane, ship plane disc and 2 & 4 wheeler.												
	C303.4	Understand types of vibration, equation of motion and determine frequency and its behavior of Single degree Damped, Undamped and Forced Vibrations.												
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C303.1	3	3	2	-	-	-	-	-	-	-	-	-	2	-
	C303.2	3	3	2	-	-	-	-	-	-	-	-	-	2	-
	C303.3	3	3	1	-	-	-	-	-	-	-	-	-	2	-
	C303.4	3	3	3	-	-	-	-	-	-	-	-	-	2	-

Course NameTurbo Machines [18ME54]		
	C304.1	Understand the basics of turbomachines and explain various types of turbomachines and also analyze various thermodynamic process.

	C304.2	Apply the Euler's equation to turbomachines and, analyze its energy transfer and performance.													
	C304.3	Distinguish between different types of steam turbines and, evaluate its performance and preliminary design.													
	C304.4	Demonstrate the working principle and, determine the performance and preliminary design of hydraulic turbines.													
	C304.5	Explain the principle of operation and, obtain the performance and elementary design of Centrifugal pumps and Compressors.													
C304		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C304.1	3	2	-	-	-	-	-	-	-	-	-	-	2	-
	C304.2	3	2	2	-	-	-	-	-	-	-	-	2	2	-
	C304.3	3	2	2	-	-	-	-	-	-	-	-	2	2	-
	C304.4	3	2	2	-	-	-	-	-	-	-	-	2	2	-
	C304.5	3	2	2	-	-	-	-	-	-	-	-	2	2	-
Course Name: Fluid Power Engineering [18ME55]															
	C305.4.1	Identify and analyse the functional requirements of a fluid power transmission system for a given application													
	C305.4.2	Visualize how hydraulic components will work to accomplish the function													
	C305.4.3	Understand the functioning of valves and design an appropriate hydraulic circuit for given application													
	C305.4.4	Selection of different components and design of pneumatic circuits													
	C305.4.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application													
C305		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C305.4.1	2	1	1	-	-	1	1	-	-	1	1	1	2	-
	C305.4.2	2	1	-	-	-	1	1	1	-	1	1	1	2	-
	C305.4.3	2	1	3	1	-	1	1	1	-	1	1	1	2	-
	C305.4.4	3	1	2	-	-	1	1	1	-	1	1	2	2	-
	C305.4.5	3	1	2	1	1	-	1	-	-	1	-	2	2	-
Course Name: Operations Management [18ME56]															
	C306.2.1	Understand the framework, concept and scope of OM, Recognize the functions relevant to business organization and Demonstrate an appropriate technique to aid in Decision making.													
	C306.2.2	Estimate future events of organization by using appropriate Forecasting technique.													
	C306.2.3	Evaluate the appropriate methods/models for effective capacity management and optimum utilization of various plant layout used in various manufacturing and service organizations.													
	C306.2.4	Assess various strategies of aggregate and optimum scheduling for effective utilization of resources and operations.													
C306	**C306.2.5**	Discuss the concepts of Material Resource Planning (MRP) and recognize appropriate procurement and tender techniques for controlling production and delivery activities.													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C306.2.1	2	2	1	-	-	-	-	-	-	-	1	-	-	-
	C306.2.2	2	2	-	-	-	-	-	-	-	-	-	-	2	-
	C306.2.3	1	2	-		-	-	-	-	-	-	1	-	-	-
	C306.2.4	2	2	1	-	-	-	-	-	-	-	-	-	-	-
	C306.2.5	1	-	-	-	-	-	1	-	-	-	**1**	-	2	-
Course Name: Fluid Mechanics/Machines lab [18MEL57]															
	C307.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.													
	C307.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics													
	C307.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.													
	C307.4	Determine the energy flow pattern through the hydraulic turbines and pumps.													
	C307.5	Exhibit his competency towards preventive maintenance of hydraulic machines.													
C307		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**

	C307.1	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**2**	-
	C307.2	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**2**	-
	C307.3	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	**2**	-
	C307.4	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**2**	-
	C307.5	**2**	-	-	-	-	-	-	-	-	-	-	**2**	**2**	-
Course Name: Energy Conversion Lab [18MEL58]															
C308	**C308.1**	Perform experiments to determine the properties of fuels and oils.													
	C308.2	Conduct performance test on different types of engines and draw inferences on various engine parameters and implement the knowledge in industry.													
	C308.3	Determine the energy flow pattern (heat balance sheet) through the I C Engine and identify exhaust emissions, factors affecting them and exhibit his competency towards preventive maintenance of IC engines													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C308.1	**3**	**2**	-	-	-	**2**	-	-	-	-	-	-	**3**	-
	C308.2	**3**	**2**	-	-	-	-	-	-	-	-	-	**2**	**3**	-
	C308.3	**3**	**2**	-	-	-	**2**	**2**	-	-	-	-	**2**	**3**	-
Course Name: Environmental Studies [18CIV59]															
C309	**C309.1**	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale													
	C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment													
	C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components													
	C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C309.1	-	-	-	-	-	-	3	1	-	-	-	2	-	3
	C309.2	-	-	-	-	-	-	2	2	-	-	-	3	-	-
	C309.3	-	-	-	-	-	-	1	-	-	-	-	2	-	2
	C309.4	-	-	-	-	-	-	2	-	-	-	-	3	-	-
Course NameFinite Element Methods [18ME61]															
C310	**C310.1**	Understand the concepts behind formulation methods in FEM													
	C310.2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.													
	C310.3	Develop element characteristic equation and generation of global equation.													
	C310.4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems and sol													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C310.1	2	2	1	1	1	-	-	-	-	-	-	1	**1**	1
	C310.2	2	2	1	1	1	-	-	-	-	-	-	-	**1**	1
	C310.3	2	1	1	1	-	-	-	-	-	-	-	-	**1**	1
	C310.4	3	3	2	2	2	-	-	-	-	-	-	1	**1**	1
Course Name: Design of Machine Elements II [18ME62]															
C311	**C311.1**	Apply design principles for the design of mechanical systems involving springs, belts, pulleys, and wire ropes.													
	C311.2	Design different types of gears and simple gear boxes for relevant applications													
	C311.3	Understand the design principles of brakes and clutches													
	C311.4	Apply design concepts of hydrodynamic bearings for different applications and select Anti friction bearings for different applications using the manufacturers, catalogue													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C311.1	3	3	3	3	-	-	-	1	2	2	1	3	-	-
	C311.2	3	3	3	3	-	-	-	1	2	2	1	3	-	-
	C311.3	3	3	3	3	-	-	-	1	2	2	1	3	-	-

	C311.4	3	3	3	3	-	-	-	1	2	2	1	3	-	-
Course Name: Heat Transfer [18ME63]															
	C312.1	Understand the basic modes of heat transfer.													
	C312.2	Compute temperature distribution in steady-state and unsteady-state heat conduction													
	C312.3	Understand and interpret heat transfer through extended surfaces.													
	C312.4	Interpret and compute forced and free convective heat transfer.													
	C312.5	Explain the principles of radiation heat transfer and Understand the numerical formula for heat conduction problems.													
	C312.6	Design heat exchangers using LMTD and NTU methods.													
C312		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C312.1	3	2	-	-	-	-	-	-	-	-	-	-	2	-
	C312.2	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	C312.3	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	C312.4	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	C312.5	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	C312.6	3	2	2	-	-	-	-	-	-	-	-	2	**2**	-
Course Name: Non Traditional Machining [18ME641]															
	C313.1	Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.													
	C313.2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.													
	C313.3	Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations.													
	C313.4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.													
C313	**C313.5**	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM.													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C313.1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C313.2	2	2	-	-	-	-	-	-	-	-	-	-	2	-
	C313.3	2	2	-	-	-	-	-	-	-	-	-	-	2	-
	C313.4	2	2	-	-	-	-	-	-	-	-	-	-	2	-
	C313.5	2	2	-	-	-	-	-	-	-	-	-	-	2	-
Course Name: Computer Aided Modelling and Analysis Lab [18MEL66]															
	C315.1	Use the modern tools to formulate the problem, create geometry, descritize, apply boundary conditions to solve problems of bars, truss, beams, and plate to find stresses with different-loading conditions.													
	C315.2	Demonstrate the ability to obtain deflection of beams subjected to point, uniformly distributed and varying loads and use the available results to draw shear force and bending moment diagrams.													
	C315.3	Analyze and solve 1D and 2D heat transfer conduction and convection problems with different boundary conditions													
C315	**C315.4**	Carry out dynamic analysis and finding natural frequencies of beams, plates, and bars for various boundary conditions and also carry out dynamic analysis with forcing functions.													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C315.1	**2**	**1**	**1**	**1**	**2**	-	-	-	-	**1**	-	**1**	-	2
	C315.2	**2**	**1**	**1**	**1**	**2**	-	-	-	-	**1**	-	**1**	-	2
	C315.3	**2**	**1**	**1**	**1**	**2**	-	-	-	-	**1**	-	**1**	-	2
	C315.4	**2**	**1**	**1**	**1**	**2**	-	-	-	-	**1**	-	**1**	-	2
Course Name: Heat Transfer Lab [18MEL67]															
	C316.1	Perform experiments to determine the thermal conductivity of a metal rod													

	C316.2	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.													
	C316.3	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin													
	C316.4	Determine surface emissivity of a test plate.													
	C316.5	Estimate performance of a refrigerator and Air-conditioning system.													
	C316.6	Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach.													
C316		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C316.1	3	2	-	2	-	-	-	-	-	-	-	2	2	-
	C316.2	3	2	-	2	-	-	-	-	-	-	-	2	2	-
	C316.3	3	2	-	2	-	-	-	-	-	-	-	2	2	-
	C316.4	3	2	-	2	-	-	-	-	-	-	-	2	2	-
	C316.5	3	2	-	2	-	-	-	-	-	-	-	2	2	-
	C316.6	3	2	-	2	-	-	-	-	-	-	-	2	2	-
Course Name: ENVIRONMENTAL SCIENCE [18CIV59]															
	C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.													
	C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.													
	C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.													
	C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.													
C309		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C309.1	-	-	-	-	-	-	**3**	**1**	-	-	-	**2**	-	**3**
	C309.2	-	-	-	-	-	-	**2**	**2**	-	-	-	**3**	-	-
	C309.3	-	-	-	-	-	-	**1**	-	-	-	-	**2**	-	**2**
	C309.4	-	-	-	-	-	-	**2**	-	-	-	-	**3**	-	-

Course Name: Energy Engineering [17ME71]															
C401	C401.1	Understand the working and components of Steam power plant.													
	C401.2	Understand the working and applications of diesel engine and hydroelectric power plants													
	C401.3	Acquire the basic concepts of solar radiation, Photovoltaic and solar thermal systems													
	C401.4	Understand the principles of energy conversion from alternate sources like wind, tidal, geothermal, ocean, biomass and biogas.													
	C401.5	Identify methods of energy storage for specific applications													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C401.1	3	2	-	-	-	-	2	-	-	-	-	-	2	-
	C401.2	3	2	-	-	-	-	2	-	-	-	-	-	2	-
	C401.3	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	C401.4	3	2	-	-	-	-	-	-	-	-	-	2	2	-
	C401.5	2	-	-	-	-	-	-	-	-	-	-	-	2	-
Course Name: Fluid Power Systems [17ME72]															
C402	C402.1	Identify and analyse the functional requirements of a fluid power transmission system for a given application													
	C402.2	Visualize how hydraulic components will work to accomplish the function													
	C402.3	Understand the functioning of valves and design an appropriate hydraulic circuit for given application													
	C402.4	Selection of different components and design of pneumatic circuits													
	C402.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C402.1	2	1	1	-	-	1	1	-	-	1	1	1	1	-
	C402.2	2	1	-	-	-	1	1	1	-	1	1	1	2	-
	C402.3	2	1	3	1	-	1	1	1	-	1	1	1	2	-
	C402.4	3	1	2	-	-	1	1	1	-	1	1	2	1	-
	C402.5	3	1	2	1	1	-	1	-	-	1	-	2	2	-
Course Name: Control Engineering [17ME73]															
C403	C403.1	Recognize control system and its types, control actions and to determine the system governing equations for physical models (Electrical, Thermal, Mechanical, Electro Mechanical).													
	C403.2	Calculate the gain of the system using block diagram and signal flow graph.													
	C403.3	Illustrate the response of 1st and 2nd order systems													
	C403.4	Determine the stability of control system in complex domain and frequency domain utilizing different plots for time variant and time invariant system.													
	C403.5	Employ state equations to study the controlability and observability													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C403.1	3	3	1	-	-	-	-	-	-	-	-	1	1	-
	C403.2	3	3	2	1	-	-	-	-	-	-	-	-	-	-
	C403.3	3	2	2	1	-	-	-	-	-	-	-	-	-	-
	C403.4	3	3	3	3	-	-	-	-	-	-	-	-	-	-
	C403.5	3	2	3	3	-	-	-	-	-	-	-	-	-	-
Course Name: Tribology [17ME742]															

	C404.2.1	Understand the fundamentals of tribology and associated parameters. Apply concepts of tribology for the performance analysis and design of components experiencing relative motion													
	C404.2.2	Analyse the requirements and design hydrodynamic and hydrostatic bearings and plane slider bearings for a given application.													
	C404.2.3	Select proper bearing materials and lubricants for a given tribological application.													
	C404.2.4	Apply the principles of surface engineering for different applications of tribology.													
C404.2		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C404.2.1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
	C404.2.2	2	2	-	1	-	1	-	1	-	-	-	-	1	-
	C404.2.3	2	-	-	-	-	1	-	-	-	-	-	-	1	-
	C404.2.4	2	-	-	-	-	1	-	-	-	-	-	-	1	-
Course Name: Mechatronics [17ME753]															
	C405.3.1	llustrate various components of Mechatronics systems.													
	C405.3.2	llustrate various control systems used in automation.													
	C405.3.3	Develop mechanical, hydraulic, pneumatic and electrical control systems													
C405.3		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C405.3.1	3	2	-	-	-	-	-	-	-	-	-	2	-	-
	C405.3.2	3	2	-	-	-	-	-	-	1	-	-	3	-	-
	C405.3.3	3	2	-	-	-	-	-	-	1	-	-	3	-	-
Course Name: Design Lab [17MEL76]															
	C406.1	To understand the working principles of machine elements such as Governors,Gyroscopes etc.,													
	C406.2	To identify forces and couples in rotating mechanical system components.													
	C406.3	To identify vibrations in machine elements and design appropriate damping methods and to determine the critical speed of a rotating shaft													
	C406.4	To measure strain in various machine elements using strain gauges													
	C406.5	To determine the minimum film thickness, load carrying capacity, frictional torque and pressure distribution of journal bearing.													
	C406.6	To determine strain induced in a structural member using the principle of photo-elasticity.													
C406		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C406.1	3	3	-	-	-	-	-	-	-	-	-	2	2	-
	C406.2	3	3	-	-	-	-	-	-	-	-	-	2	2	-
	C406.3	3	3	-	-	-	-	-	-	-	-	-	2	2	-
	C406.4	3	3	-	-	-	-	-	-	-	-	-	2	2	-
	C406.5	2	3	-	-	-	-	-	-	-	-	-	-	2	-
	C406.6	3	3	-	-	-	-	-	-	-	-	-	2	2	-
Course Name: Computer Integrated Manufacturing Lab [17MEL77]															
	C407.1	To Generate CNC Lathe part program for Turning, Facing, Chamfering, Grooving, Step turning, Taper turning, Circular interpolation etc.													
	C407.2	To Generate CNC Mill Part programming for Point to point motions, Line motions, Circular interpolation, Contour motion, Pocket milling- circular, rectangular, Mirror commands etc.													
	C407.3	To Use Canned Cycles for Drilling, Peck drilling, Boring, Tapping, Turning, Facing, Taper turning Thread cutting etc.													
	C407.4	To Simulate Tool Path for different Machining operations of small components using CNC Lathe & CNC Milling Machine.													
	C407.5	To Use high end CAM packages for machining complex parts; use state of art cutting tools and related cutting parameters; optimize cycle time.													
	C407.6	To Understand & write programs for Robot control; understand the operating principles of hydraulics, pneumatics and electro pneumatic systems. Apply this knowledge to automate & improve efficiency of manufacturing.													
C407		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C407.1	2	-	-	-	2	-	-	-	-	1	-	2	-	2
	C407.2	2	-	-	-	2	-	-	-	-	1	-	2	-	2
	C407.3	2	-	-	-	2	-	-	-	-	1	-	2	-	2
	C407.4	2	-	-	-	2	-	-	-	-	1	-	2	-	2

	C407.5	2	-	-	-	3	-	-	-	-	1	-	2	-	2
	C407.6	3	-	-	-	3	-	-	-	-	1	-	2	-	2
Course Name: Project Phase 1 [17MEP78]															
C408	C408.1	Analyze complex mechanical engineering problems and apply appropriate mathematical, engineering techniques and design processes.													
	C408.2	Develop creative solutions to problems and conceive innovative approaches in developing and designing of mechanical systems and machines.													
	C408.3	Prepare engineering documents and present a clear and coherent presentation of these to a range of technical and nontechnical audiences.													
	C408.4	Acquire and evaluate research regarding new knowledge development within the mechanical engineering discipline and its social, cultural, environmental and legal context.													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C408.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	C408.2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	C408.3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	C408.4	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Course Name: Operations Research [17ME81]															
C409	C409.1	Understand the meaning, definitions, scope, need, phases and techniques of operations research.													
	C409.2	Formulate as L. P. P and derive optimal solutions to linear programming problems by graphical method, Simplex method, Big-M method and Dual Simplex method.													
	C409.3	Formulate as Transportation and Assignment problems and derive optimum solutions for transportation, Assignment and travelling salesman problems.													
	C409.4	Students will analyses and illustrates Network models and problem-solving techniques to solve queuing models.													
	C409.5	Students acquainted to obtain the optimal solution to decision making problems (Game theory) and also sequencing models in order to increase production and productivity as a whole.													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C409.1	2	-	-	-	-	-	-	1	2	1	1	1	-	-
	C409.2	-	-	-	-	-	-	-	1	2	1	1	1	-	-
	C409.3	-	-	2	-	-	-	-	-	2	1	1	1	1	-
	C409.4	-	3	1	-	-	-	-	1	2	1	1	1	1	-
	C409.5	-	3	-	-	-	-	-	-	2	1	1	1	1	-
Course Name: Additive Manufacturing [17ME82]															
C410	C410.1	Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.													
	C410.2	Analyse the different characterization techniques.													
	C410.3	Describe the various NC, CNC machine programing and Automation techniques.													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C410.1	3	-	-	3	3	2	-	-	-	-	-	2	2	-
	C410.2	3	-	-	3	3	1	-	-	-	-	-	2	2	-
	C410.3	3	-	-	2	3	1	-	-	-	-	-	2	2	2
Course Name: Experimental Stress Analysis [17ME832]															
C411.2	C411.21	Explain characterize the elastic behaviour of solid bodies and describe stress strain analysis of mechanical systems using electrical resistance strain gauges.													
	C411.22	Describe skills for experimental investigations using the concepts of photo elastic method and to study and characterize the elastic behaviour of solid bodies.													
	C411.23	Discuss stress strain behaviour of solid bodies using methods of coating and stress strain analysis of solid bodies using the methods of Holography													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C411.21	3	3	1	2	-	-	1	-	-	-	-	-	1	-
	C411.22	3	3	1	2	1	-	-	-	-	-	-	-	1	-
	C411.23	2	3	1	0	-	-	-	-	-	-	-	-	1	-
Course Name: Internship/Professional Practice [17ME84]															
	C412.1	Apply gained technical knowledge and skills in engineering practice.													

	C412.2	Work individually, in team and communicate effectively through reports and presentations.													
	C412.3	Demonstrate workplace attitude, professional engineering norms and ethics.													
C412		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C412.1	2	-	-	-	3	-	-	-	-	1	-	1	2	1
	C412.2	-	-	-	-	-	1	-	1	2	1	-	1	2	-
	C412.3	-	-	-	-	-	1	-	2	1	1	-	1	2	-
Course Name: Project Phase 2 [17ME85]															
	C413.1	Analyze complex mechanical engineering problems and apply appropriate mathematical, engineering techniques and design processes.													
	C413.2	Develop creative solutions to problems and conceive innovative approaches in developing and designing of mechanical systems and machines.													
	C413.3	Prepare engineering documents and present a clear and coherent presentation of these to a range of technical and nontechnical audiences.													
	C413.4	Acquire and evaluate research regarding new knowledge development within the mechanical engineering discipline and its social, cultural, environmental and legal context.													
C413		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C413.1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	C413.2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	C413.3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	C413.4	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Course Name: Seminar [17MES86]															
	C414.1	Learn beyond academics by reviewing literature available at many other sources.													
	C414.2	Review research papers periodicals, magazines and review publications on the internet and in other electronic resources.													
	C414.3	Present views comprehensibly to produce a presentation briefly with the surveyed information under the direction of the guide.													
C414		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
	C414.1	3	2	3	3	1	2	2	1	2	3	1	3	3	1
	C414.2	3	3	2	3	3	2	2	1	2	3	1	3	3	3
	C414.3	3	3	3	3	3	3	3	3	3	3	3	3	1	3

OBE, Curricular Gap & Activities

The institution follows Outcome Based education. Outcome-Based Education (OBE) is a student-centric teaching and learning methodology in which the course delivery, assessment are planned to achieve stated objectives and outcomes.

It focuses on measuring student performance i.e. outcomes at different levels.

Some important aspects of the Outcome Based Education

1. Course is defined as a theory, practical or theory cum practical subject studied in a semester.

2. Course Outcome (CO) Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally, three or more course outcomes may be specified for each course based on its weightage.

3. Programme is defined as the specialization or discipline of a Degree. It is the interconnected arrangement of courses, co-curricular and extracurricular activities to accomplish predetermined objectives leading to the awarding of a degree.

4. Programme Outcomes (POs) Program outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

5. Program Educational Objectives (PEOs) The Programme Educational Objectives of a program are the statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation.

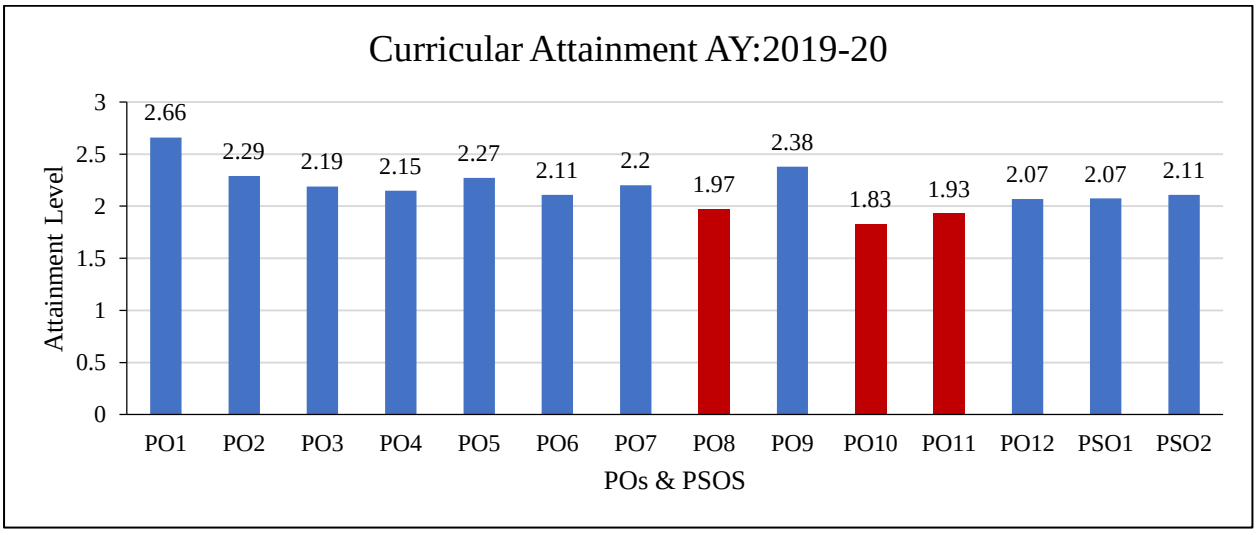
6. Programme Specific Outcomes (PSO) Programme Specific Outcomes are what the students should be able to do at the time of graduation with reference to a specific discipline. Usually there are two to four PSOs for a programme.

HOD

Curricular Gap for the attainment of PO and PSO
AY: 2019-2020

2019-20	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Curriculum Attainment Level	**2.46**	**2.26**	**2.13**	**2.06**	**1.96**	**1.75**	**1.75**	**1.69**	**2.01**	**1.94**	**1.94**	**2.38**	2.07	2.11

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Average Values		2.57	2.10	1.99	1.93	2.08	1.88	2.00	1.71	2.23	1.53	1.66	1.83	2.07	2.11
Surveys 2018-19	Program Exit Survey	96	95.7	95.7	96	96	95.7	93.7	94	94.3	94.34	94.67	96.34		
	Employer Survey	75	72.6	72.6	70	65	70	60	72.6	70	70	72.6	75		
	Alumni Survey	80	74	72	70	72	62	62	58	68	66	72	86		
Average Values		83.7	80.8	80.1	78.7	77.7	75.9	71.9	74.9	77.4	76.78	79.757	85.78		
Levels		3	3	3	3	3	3	3	3	3	3	3	3		



HOD

Academic Year 2018-19

Sl. No.	Gap identified	Title of the Events organized	Date	Resource Person with Designation	% of students present	PO's and PSO's
01	Career opportunities	Guest lecture on opportunities at IRIS	21-05-2019	Mr. Madhusudhan, CEO IRIS Tech	85	PO1,PO2,PO5, PO12, PSO1,PSO2
02	Project Management	Guest lecture on Project Management	22-03-2019	Dr Sundereshan. Freelance Consultant & Visiting Professor	85	PO1,PO2,PO7, PO9,PO10, PO11,PO12,PSO2,PSO3
03	Project management, Engineer and society	Workshop on Engineering in Agriculture and Entrepreneurship	6-2-2019 & 7-2-2019	Mr. Keshavamurty N, Program Excecutive, AIR, Mysuru Mr. Manjegowda, Farmer, Mandya Mr. Anil, Entrepreneur, Mysuru	100	PO1,PO2,PO3, PO5,PO9, PO12,PSO1,PSO2
04	Career opportunities	Technical Talk on Professional benefits of Institution of Engineers India (IEI)	16-11-2018	Mr. Dinesh Kumar, Secretary, IEI, Mysuru chapter	100	PO1,PO2,PO12 ,PSO1,PSO2
05	Modern tool usage	Workshop on Advanced Manufacturing Techniques with Case Studies	10-10-2018 & 12-10-2018	Mr. Prakash K L, DGM , GTTC, Mysuru Dr. Ramesh K, Principal, GTTC, Mysuru	77	PO1,PO5,PO9, PO10, PO12,PSO1,PSO2,PSO3
06	Career opportunities	Technical Talk on Career Opportunities	4-10-2018	Mrs. Geetha Shah, Head Career launcher	90	PO1,PO2,PO5, PO12, PSO1,PSO2
07	Advanced technologies	Workshop on Role of Renewable Energy and Energy Conservation in the present day Scenario	27-9-2018	Mr. Dinesh Kumar, Region Head, KREDL Govt of Karnataka	75	PO1,PO3,PO6, PO7,PO8, PO11,PO12
08	Career opportunities, Advanced technologies	Technical talk on Awareness program COE at GTTC	24-9-2018	Mr. Prakash K L, DGM , GTTC, Mysuru	56	PO1,PO3,PO5, PO7,PO10, PO12,PSO1,PSO3
09	Project management	Technical talk on Project awareness program	28-08-2018	Md. Nadem M, Asst. Prof. ATMECE, Mysuru	76	PO1,PO2,PO7, PO9,PO10, PO11,PO12,PSO2,PSO3

Academic Year 2017-18

Sl. No.	Gap Identified	Action Taken	Date	Resource Person with Designation	% of Students Present	Relevance to POs, PSOs
01	Career opportunities	Technical Talk on "Knowledge enhancement"	23/08/2017	Mr. Ram, CADD Centre, Mysuru.	69	PO10, PO11, PO12, PSO1
02	Career opportunities	Technical Talk on 'Career opportunities available at GTTC'	7/09/2017	Mr. Prakash K L, DGM, GTTC, Mysuru. Dr. N. Ramesh, Principal skill Centre, GTTC, Mysuru	62	PO10, PO11, PO12, PSO1, PSO2
03	Modern tool usage.	Technical Talk on "Importance of composite materials in present world"	27/9/2017	Dr. Manjula, CPET, Mysuru	86	PO1, PO5, PO6, PO12, PSO3
04	Modern tool usage.	Technical Talk on "Ansys" in Mechanical Engineering	9/10/2017	Ark Solutions, Bangalore.	92	PO1, PO2, PO5, PO12, PSO1, PSO3
05	Modern tool usage.	One day workshop on "Application & Usage of Mechatronics System Tool Kit"	03/11/2017	Mynics.in. Mysuru	84	PO3, PO4, PO5, PSO1 PSO3
06	Career opportunities	Technical Talk on "After marketing Technical writing skills"	8/02/2018	Mr. Arvind Leva kumar. VFS technologies Bangalore.	80	PO4, PO8, PO10, PO11, PO12, PSO3
07	Career opportunities, Advanced technologies	Technical Talk on 'Recent Advances in Automation for Manufacturing'	19/03/2018	Mr. A. Raghunath, AGM, Manufacturing division, BEML Mysuru.	85	PO1, PO2, PO5, PO7, PO12, PSO3
08	Career opportunities, Advanced technologies	Two Day Workshop on 'Non-Destructive techniques'	20/04/2018 & 21/04/2018	IRIS Technologies	97	PO6, PO10, PO11, PO12, PSO1, PSO3
09	Career opportunities	Technical Talk on 'Career opportunities at GTTC'	23/04/2018	Mr. Prakash K L, DGM, GTTC, Mysuru. Dr. N. Ramesh, Principal skill Centre, GTTC, Mysuru	80	PO10, PO11, PO12, PSO2, PSO4

Academic Year 2016-17

Sl. No.	Gap Identified	Action Taken	Date	Resource Person with Designation	% of Students Present	Relevance to POs, PSOs
1	Advanced technology	Recent Technologies in NANO Materials &Nano Composites	26/08/16 & 27/08/16	1. Dr. Rajeev George, Professor, Mechanical Engineering Department, MSRIT, Bengaluru. 2. Dr. Suresh B, Professor, Mechanical Engineering, NIE, Mysuru. 3. Dr. Siddharth Joshi, Professor, Mechanical Engineering, NIE, Mysuru.	100	PO1, PO2, PO3, PO12, PSO3
2	Advanced technology / Modern tools	One Day Technical Talk on 'Introduction to CATIA and It's Benefits'	08/09/2016	Mr. Ram, Director, CADD Centre, Bangalore.	87	PO5,PO12, PSO3
3	Multidisciplinary topics.	Two Day Workshop on 'Sphere Drone'.	20/09/2016 & 21/09/2016	1. Mr. Bheru Singh Skyfi Labs. 2. Mr. Ramanath Bhat Sky-fi Labs.	100	PO1, PO2, PO3,PO6, PO9, PSO3
4	Contribution to society / Sustainable development .	Two Day Workshop on 'Renewable Energy & Energy Conservation for Sustainable Development'	30/01/2017 & 31/01/2017	1.Dr. H Naganagouda, Director, National Training Centre for Solar Technology, Karnataka Power Corporation Limited (KPCL), Bangalore	100	PO1, PO2, PO3, PO4, PO7, PO9, PO11, PSO1, PSO4
5	Practical exposure/ Hands on session on IC Engines.	Two Day Workshop on 'IC Engine Overhauling'	03/03/2017 & 04/03/2017	1. Mr. Ashish Jha, Maintenance Engineer, T&T Motors - Mercedes Benz, New Delhi.	100	PO2, PO9, PO12, PSO1, PSO2
6	Product development in recent technology	Technical Talk on 'Role of CAE in Product Development'	08/03/2017	Mr. Shankar Prakash D., Technical Director, ROYOTA Engg. Solutions Pvt. Ltd. Bangalore	87	PO1, PO5, PO6, PO9, PO11, PO12 PSO3
7	Advanced technology	One Day Workshop on 'Advances in Metrology'	08/04/2017	1. Dr N V Raghavendra, Professor NIE College of Engineering, Mysuru. 2. Mr. Prabhakar Kikkeri, National Service Manager, Carl Zeiss, Bengaluru. 3. Dr. Ramesh, Professor GTTC Mysuru	99	PO1, PO2, PO5,PO12, PSO1, PSO3
8	Latest technology/ Hands on exposure	Two Day Work shop on 'Additive Manufacturing'	12/04/2016 & 13/04/2017	Mr. Anil kumar M P, Managing Director, ASP Design Centre Pvt. Ltd.	99	PO1, PO2, PO5, PO12, PSO3
9	Career opportunities	A day at GTTC	17/04/2017	Mr. Prakash K L, DGM, GTTC, Mysuru. Dr. N. Ramesh, Principal Skill Centre, GTTC,	99	PO10, PO11, PO12, PSO2, PSO4

Curricular Gap for the attainment of PO and PSO, Previous Years

Table 1a&b: POs and PSOs attainment for the University Curriculum in the Academic Year: 2018-19

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PAM and Feedbacks from Stakeholders	2.46	2.26	2.13	2.06	1.96	1.75	1.75	1.69	2.01	1.94	1.94	2.38

Method	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	2.62	2.21	2.30	2.25

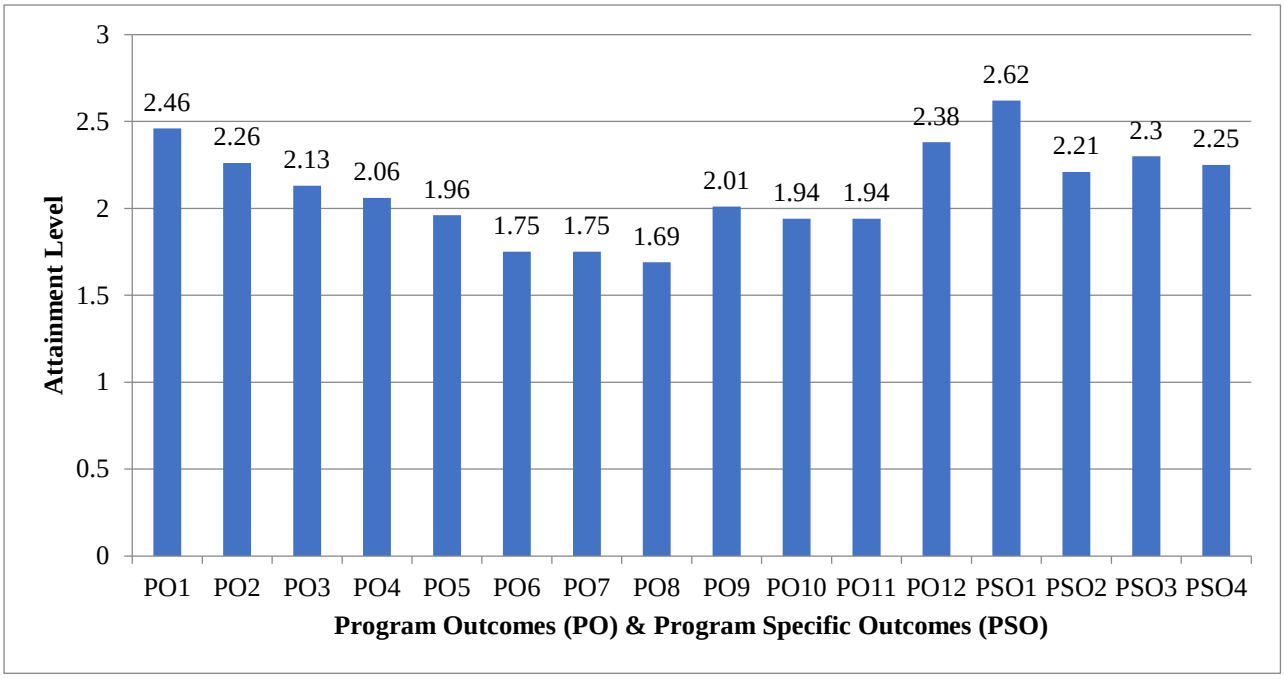


Figure.1 : POs and PSOs attainment with university curriculum CAY (2018-19)

Table II: POs and PSOs attainment for the University Curriculum in the Academic Year: 2017-18

Table 2a&b: POs and PSOs attainment for the University Curriculum in the Academic Year: 2017-18

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PAM and Feedbacks from Stakeholders	2.36	2.17	2.02	1.90	1.71	1.54	1.60	1.45	1.90	1.74	1.69	2.24

Method	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	2.42	2.25	2.05	2.09

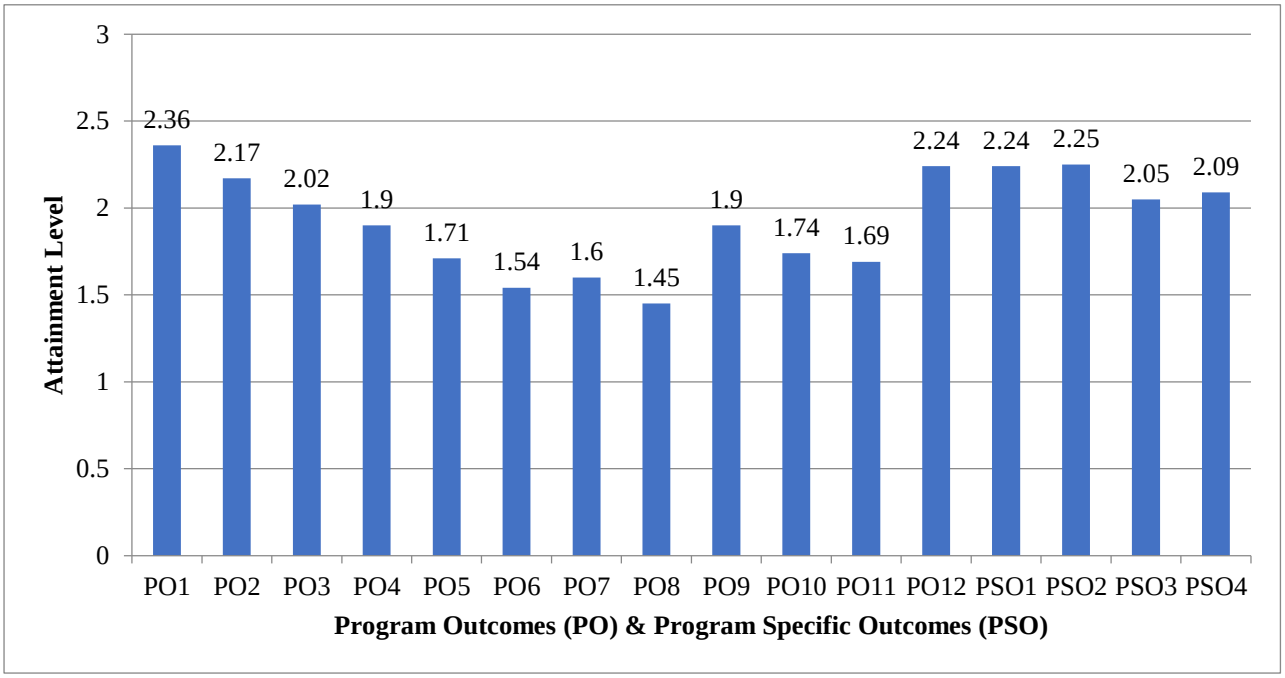


Figure 2: POs and PSOs attainment with curriculum - 2017-18

Table III: POs and PSOs attainment for the University Curriculum in the Academic Year: 2016-17

Table 3a&b: POs and PSOs attainment for the University Curriculum in the Academic Year: 2016-17

Method	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PAM and Feedbacks from Stakeholders	2.38	2.17	2.00	1.83	1.69	1.53	1.57	1.35	1.79	1.70	1.66	2.18

Method	PSO1	PSO2	PSO3	PSO4
PAM and Feedbacks from Stakeholders	2.45	2.15	2.00	2.04

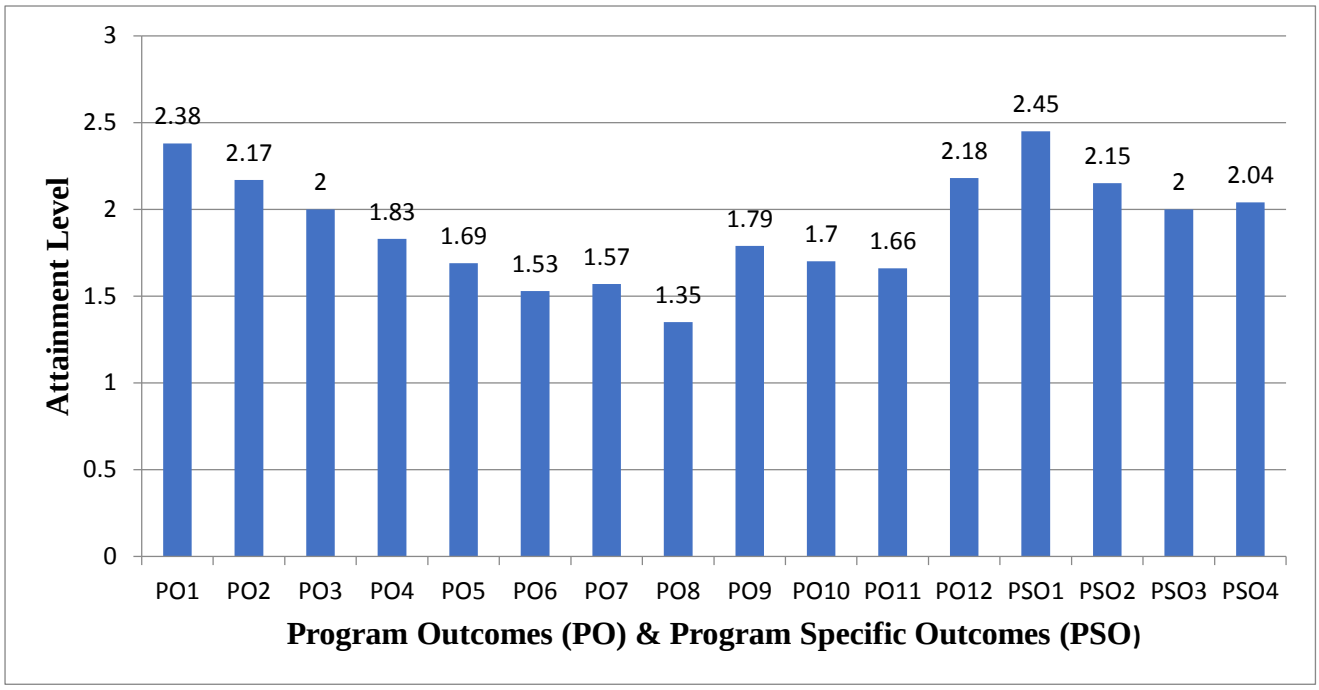


Figure 3: Attainment in with university curriculum 2016-17