SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Department of Electrical and Electronics Engineering

Minutes of 5th Meeting of BoS (UG, PG and Ph.D)

Venue	:	Seminar Hall, Department of EEE, Sri Manakula Vinayagar Engineering College
Date & Time	:	13th September, 2022 at 10:00 A.M

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

Department of Electrical and Electronics Engineering

Minutes of 5th Meeting of BoS

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SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Department of Electrical and Electronics Engineering

Minutes of 5th Meeting of BoS (UG)

Venue	:	Seminar Hall, Department of EEE, Sri Manakula Vinayagar Engineering College
Date & Time	:	13th September, 2022 at 10:00 A.M

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Minutes of 5th Meeting of Board of Studies (UG)

The Fifth meeting of Board of Studies in Electrical and Electronics Engineering Department was held on **13th Sep 2022 at 10:00 A.M** in the Seminar Hall, Department of EEE, Sri Manakula Vinayagar Engineering College, with Head of Department in the Chair.

The following members were present for the BoS meeting

Sl. No.	Name of the Member	Designation
Head of the Department (Chairman)		
1	**Dr. S. Anbumalar, M.E., Ph.D.,** Professor and Head Specialization: Control System Years of Experience: 29 years Sri Manakula Vinayagar Engineering College saravanan.anbumalar@gmail.com 9443179533	Chairman
The entire faculty of each specialization		
2	**Dr. P. Jamuna, M.E., Ph.D.,** Professor Specialization: Power Electronics and Drives Years of Experience: 16 Sri Manakula Vinayagar Engineering College jamuna1981@gmail.com 9789544379	Member
3	**Dr. D. Raja, M.Tech., Ph.D.,** Professor Specialization: Electrical Drives and Control Years of Experience: 15 Sri Manakula Vinayagar Engineering College rajaapeee@gmail.com 9944337970	Member
4	**Dr. K. Gowrishankkar, M.Tech., Ph.D.,** Professor Specialization: Instrumentation and control Years of Experience: 16 Sri Manakula Vinayagar Engineering College gowri200@yahoo.com 9095555412	Member
5	**Dr. S. Ganesh Kumaran, M.E., Ph.D.,** Associate Professor Specialization: Electrical Machines Years of Experience:10 Sri Manakula Vinayagar Engineering College ganeshphd4u@gmail.com 9677624378	Member

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S&H Faculty		
6	**Dr. T. Gayathri** Professor, Dept. of Mathematics, SMVEC	Member
7	**Dr. K. Kathikeyan** Associate Professor, Dept. of Chemistry, SMVEC	Member
8	**Mrs. G. Namita** Associate Professor, Dept. of English, SMVEC	Member
9	**Dr. T. Jayavarthanan** Professor and Head Dept. of Physics, SMVEC, Madagadipet-605107	Member
Two subject experts from outside the Parent University nominated by the Academic Council		
10	**Dr. J. Kanagaraj, M.E., Ph.D.,** Professor & Head (In charge) Specialization: Control System Years of Experience:22 PSG College of Technology (Autonomous) Coimbatore – 641 004. Jkr.eee@psgtech.ac.in 94436 54496	Subject Expert
11	**Dr. P. Lakshmi, M.E., Ph.D.,** Professor Specialization: Electrical Engineering Years of Experience:20 College of Engineering Guindy, Anna University, Chennai. 600 025. p_lakshmi@annauniv.edu 9444266117	Subject Expert
One expert nominated by the Vice-Chancellor from a panel of six recommended by the college principal.		
12	**Dr. A. Kavitha, M.Tech., Ph.D** Professor Specialization: Electrical Engineering Years of Experience: 22 College of Engineering Guindy, Anna University, Chennai-600025 akavitha@annauniv.edu, 9444388778	Subject Expert
One representative from industry/corporate sector/allied area relating to placement.		
13	**Er. S. Selva Kumar, B.Tech.** Senior Engineer Qualcomm India Private Limited Bengaluru, Karnataka - 560001	Member
One postgraduate meritorious alumnus nominated by the Chairman, Board of Studies, with the approval of the principal of the college		
14	**Er. K. Ramraj, M.Tech** Technical Director, Specialization: Power Electronics Years of Experience:8 LED FORSE India, Poornankuppam, Puducherry – 605 007. ramrajeee@gmail.com, 9786714116	Member

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Agenda of the Meeting	
Agenda 1/ BoS/ 5 /2022 /EEE /UG	Confirmation of minutes of 4th meeting of BoS and the syllabi of B.Tech Electrical and Electronics Engineering of R-2020 Regulations – Modifications if any.
Agenda 2 / BoS/ 5 /2022 /EEE /UG	To discuss the modifications in the syllabi of III and IV year (V to VIII semesters), under Autonomous Regulations R-2020 for the B.Tech – Electrical and Electronics Engineering students admitted from the Academic Year 2020-21.
Agenda 3 / BoS/ 5 /2022 /EEE /UG	To discuss and approve the Academic Calendar for the ODD/EVEN Semester of Academic year 2022-23.
Agenda 4 / BoS/ 5 /2022 /EEE /UG	To discuss and approve the on-line SWAYAM/MOOCS courses for the IV year/ VIII semester students under R-2019 regulations during the period August 2022 to December 2022.
Agenda 5 / BoS/ 5 /2022 /EEE /UG	To approve the Professional and Open Elective courses offered to the III year/ V semester students under R-2020 regulations and IV year / VIII semester students under R-2019 regulations during the period November 2022 to March 2023
Agenda 6 / BoS/ 5 /2022 /EEE /UG	To discuss the Research activities in the department • Implementation of AICTE-MODROB during the period 2021-2023. o Power Electronics and Drives Lab o Sanctioned amount - Rs.11 Lakhs o Project started on 06.10.2021 • Patents Publications • Journal Paper publications
Agenda 7 / BoS/ 5 /2022 /EEE /UG	To discuss and recommend the panel of examiners to the Academic Council
Agenda 8 / BoS/ 5 /2022 /EEE /UG	Any other additional points to be discussed with the permission of Chair.

Minutes of the Meeting

Dr. S. Anbumalar, Chairman, BoS opened the meeting by welcoming the external members, the internal members and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

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Agenda 1/ BoS /5 /2022 /EEE /UG

Confirmation of minutes of 4th meeting of BoS and the syllabi of B.Tech Electrical and Electronics Engineering of R-2020 Regulations – Modifications if any.

Chairman, BoS, apprised the minutes of 4th BoS, its implementation and then it is confirmed with the approval in 5th BoS meeting.

Agenda 2/ BoS /5 /2022 /EEE /UG

To discuss the modifications in the syllabi of III and IV year (V to VIII semesters), under Autonomous Regulations R-2020 for the B.Tech – Electrical and Electronics Engineering students admitted from the Academic Year 2020-21.

The modifications to be carried out in the syllabi of III and IV year, (V to VIII semesters) (R-2020 Regulations) are discussed and the following suggestions are given by BoS members.

S. No.	Regulations	Semester	Course Name with Code	Unit	Changes incorporated
1	R2020	V	Control Systems U20EET514	I	• The topic "transfer function" is shifted after the topic "Open loop and Closed loop"
2	R2020	V	Transmission and Distribution U20EET515	-	• Included the Text book "Electrical Power Systems", 6th edition, New Age International (P) Limited, New Delhi, 2018.
3	R2020	V	Power Electronics and Drives Lab U20EEP510	-	• Replaced the experiment "Microcontroller based control schemes for Stepper Motor" with "Multilevel inverter using PIC microcontroller"
4	R2020	V	Control Systems Lab U20EEP511	-	• **The following three simulation experiments** 1. Simulation of RC lead / lag compensating network for the given specifications and to obtain its frequency response 2. Simulation of open loop and closed loop control of DC buck converter 3. Simulation of open loop and closed loop speed control of 3 phase induction motor **are replaced by** 1. Implementation of RC lead / lag compensating network for the given specifications and to obtain its frequency response 2. Implementation of open loop and closed loop control of DC buck converter 3. Implementation of open loop and closed loop speed control of 3 phase induction motor respectively.
5	R2020	VI	Embedded System U20EET616	IV	• The topic "Digital sensors" is removed due to repetition.
6	R2020	VI	Power System Analysis	V	• The topic "Introduction to automatic voltage regulator

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			U20EET618		systems" is included.
7	R2020	VI	Electrical Machine Design U20EET619	V	• The title of the unit "Design of synchronous machines and BLDC motors" is changed as "Design of synchronous machines"
8	R2020	VI	Embedded System Lab U20EEP612	-	• The experiment "Interfacing SPI Flash with interrupt" is replaced with "Interfacing of stepper motor"
9	R2020	VI	Power System Analysis Lab U20EEP614	-	• Replaced the experiment "Modeling and Analysis of Load frequency control" with "Analysis of power-flow problem using Fast Decoupled Load Flow method"
10	R2020	VII	Electric and Hybrid vehicle U20EET721	III	• The topic "Electric drives used in EV/HEV" is changed as "Electric drives and its Configuration used in EV/HEV"
11	R2020	VII	Industrial Automation and Control Lab U20EEP715	-	• Modifications are done in Industrial Automation and Control Lab course in order to focus more on Electrical related application experiments. • **The following two experiments** 1. Develop/ Execute ladder program for sequential control of DC motor 2. Develop/ Execute ladder program for automated car parking system or elevator system **are replaced with** 1. PLC program for Sequential Motor Control 2. PLC based automated car parking system or elevator system • **Removed the following seven experiments** 1. Multiple push button operation with delayed lamp for ON/OFF operation 2. DOL Starter and Star Delta Starter operation by using PLC 3. PLC based temperature sensing using RTD 4. Develop/ Execute ladder program for the Control of automatic bottle filling system 5. Parameter reading of PLC in SCADA 6. Temperature sensing using SCADA 7. Implementation of Distribution automation system using SCADA • **Included the following nine experiments**

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					1. Implementation of Latching and Unlatching concepts in PLC 2. DOL and Star Delta Starter operation for Three Phase Induction Motor using PLC 3. PLC program for Forward and Reverse Control of Motors 4. PLC based Stair case lighting control system 5. PLC based Traffic Light Control system 6. Design and development of solar tracking control system using PLC 7. PLC program for speed control of DC motor 8. IoT – based Street light monitoring and control 9. IoT-based Industrial pollution monitoring system
12	R2020	V (Professional Elective)	Utilization of Electrical Energy U20EEE506	I	• The topic "illumination calculation (for residential, industrial, commercial, health care, street lightings, sports, administrative complexes)" is replaced as "illumination calculation (residential, industrial, street, flood lighting)"
				V	• The topics "Domestic appliances: Electric iron, Electric toaster" are replaced as "Domestic appliances: Washing Machine, Water heater"
13	R2020	V (Professional Elective)	Industrial Electrical System U20EEE510	-	• Included the Reference book H.Joshi, "Residential Commercial and Industrial Systems", McGraw Hill Education, 2008.
14	R2020	VI (Professional Elective)	Smart Grid U20EEE611	IV	• Removed the topic "Storage technologies" • The topic "Renewable Energy Technologies" is replaced as "Introduction to Renewable Energy Technologies"
				V	• The topic "Audit" is replaced as "Energy Audit"
15	R2020	VII (Professional Elective)	Distributed Generation and Microgrids U20EEE716	-	• The reference book "Power Switching Converters: Medium and High Power" by Dorin Neacsu is replaced with Zobaa, Ahmed F., and Ramesh C.Bansal, "Handbook of renewable energy Technology", World Scientific, 2011.

The above corrections are incorporated and the Syllabi (Given in Annexure- I) are approved by the BoS members.

Agenda 3/ BoS /5 /2022 /EEE /UG

To discuss and approve the Academic Calendar for the ODD/EVEN Semester of Academic year 2022-23.

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The Academic Calendars are prepared for ODD/EVEN Semester of Academic year 2022-23 and it includes the schedule for CAT, Model Exam, QCM, Project review and Internal Marks distributions were discussed and approved **(given in Annexure-II)**

Agenda 4/ BoS /5 /2022 /EEE /UG

To discuss and approve the on-line SWAYAM/MOOCS courses for the IV year/ VIII semester students under R-2019 regulations during the period August 2022 to December 2022.

- The list of online SWAYAM / MOOCS courses chosen by IV year / VIII semester students under R-2019 regulations during the period August 2022 to December 2022 was presented and approved by the BoS members.
- The list of online SWAYAM / MOOCS courses chosen by the Faculty of EEE department during the period August 2022 to December 2022 was presented and approved by the BoS members. **(given in Annexure- III)**

Agenda 5/ BoS /5 /2022 /EEE /UG

To approve the Professional and Open Elective courses offered to the III year/ V semester students under R-2020 regulations and IV year / VIII semester students under R-2019 regulations during the period November 2022 to March 2023.

- The Professional Elective and Open Elective courses opted by III year / V semester students under R-2020 regulations and IV year / VIII semester students under R-2019 regulations during the period November 2022 to March 2023 is listed below are approved by the BoS members.

Table 1: R-2020 regulations

S. No.	Course Name	Course Code
Professional Elective – II		
1	Automotive Electronics for Electrical Engineering	U20EEE509
2	Utilization for Electrical Energy	U20EEE506
Open Elective – II		
1	Product Development and Design	U20HSO501

Table 2: R-2019 regulations

S. No.	Course Name	Course Code
Professional Elective - V		
1	Power System Economics	U19EEE80
2	Soft Computing Techniques	U19EEE83
Professional Elective - VI		
1	Robotics and Control	U19EEE89
2	EHV AC and DC transmission	U19EEE86

Agenda 6/ BoS /5 /2022 /EEE /UG

To discuss the Research activities in the department

- Implementation of AICTE-MODROB during the period 2021-2023.
  - Power Electronics and Drives Lab
  - Sanctioned amount - Rs.11 Lakhs
  - Project started on 06.10.2021
- Patents Publication
- Journal Paper publications

The efforts taken to improve the Research activities in the department were presented and the

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BoS noted the Agenda.

- Received quotations from various vendors and submitted to the MODROB program evaluation committee for placing the purchase order.
- The Department has published 10 design patents and Planned to improve in the forthcoming years.
- Each Faculty in the department is advised to publish one SCI and one Scopus Journal for this semester.

Agenda 7/ BoS /5 /2022 /EEE /UG

To discuss and recommend the panel of examiners to the Academic Council.

- The list of Question Paper Setters and Evaluators **(given in Annexure-IV)** was presented and recommended by the BoS members to the academic council.

The Fifth meeting of BoS approval was concluded at 11.45 AM by **Dr. S. Anbumalar**, Chairman, Board of Studies, Department of Electrical and Electronics Engineering, Sri Manakula Vinayagar Engineering College.

Sl.No	Name of the Member with Designation and official Address	MEMBERS AS PER UGC NORMS	Signature
1	**Dr.S.Anbumalar** Professor and Head Department of EEE SMVEC,Madagadipet-605107	Chairman	
2	**Dr.A.Kavitha** Professor, Department of EEE College of Engineering Guindy Anna University Chennai. 600 025.	Subject Expert (University Nominee)	
3	**Dr. P. Lakshmi** Professor, Department of EEE College of Engineering Guindy Anna University Chennai. 600 025.	Subject Expert (Academic Council Nominee)	
4	**Dr. J. Kanakaraj** Professor & Head Department of EEE PSG College of Technology (Autonomous) Coimbatore – 641 004.	Subject Expert (Academic Council Nominee)	
5	**Er.S. Selva Kumar** Senior Engineer Qualcomm India Private Limited Bengaluru, Karnataka - 560001	Representative from Industry	
6	**Er.K.Ramraj** Technical Director LED FORSE India Poornankuppam Puducherry – 605 007.	Postgraduate Alumnus (nominated by the Principal)	

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7	**Dr. P. Jamuna** Professor Department of EEE,SMVEC	Internal Member	
8	**Dr.D.Raja** Professor Department of EEE,SMVEC, Madagadipet-605107	Internal Member	
9	**Dr. K. Gowrishankar** Professor Department of EEE,SMVEC , Madagadipet-605107	Internal Member	
10	**Dr.S.Ganesh Kumaran** Associate Professor Department of EEE, SMVEC, Madagadipet-605107	Internal Member	
11	**Dr.T.Gayathri** Professor and Head Dept of Mathematics,SMVEC, Madagadipet-605107	Internal Member	
12	**Dr.K.Kathikeyan** Associate Professor Dept. of Chemistry, SMVEC, Madagadipet-605107	Internal Member	
13	**Mrs.G.Namita** Associate Professor Dept. of English, SMVEC Madagadipet-605107,	Internal Member	
14	**Dr. T. Jayavarthanan** Professor and Head Dept. of Physics, SMVEC, Madagadipet-605107	Internal Member (Science & Humanity)	

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Annexure – 1

U20EET514	CONTROL SYSTEMS	L	T	P	C	Hrs
		2	2	0	3	60

Course Objectives

- To provide the use of transfer function models for analysis of physical systems.
- To provide adequate knowledge in the time response of systems and error analysis.
- To provide basic knowledge for obtaining the open loop and closed-loop frequency responses of systems.
- To get an exposure in the design of P/I/D controllers.
- To introduce about the state variable representation and stability analysis.

Course Outcomes

After completion of the course, the students will be able to

CO1- Develop the transfer function for the block diagram / signal flow graph model of electrical / mechanical / electro-mechanical systems. **(K3)**

CO2- Analyze the performance of control system using time-domain approach. **(K4)**

CO3- Analyze performance characteristics of system using Frequency response methods. **(K3)**

CO4- Design P/I/D controllers for the System in order to meet design specifications. **(K4)**

CO5 -Express the control systems into state space models and analyze the performance of the system. **(K2)**

UNIT I MODELING OF LINEAR TIME INVARIANT SYSTEMS (12 Hrs)

Control systems - Open loop and Closed loop – Transfer functions - Feedback control system characteristics - Mathematical modeling of Electrical, Mechanical and Electro-Mechanical systems - electrical analogues systems - Block diagrams reduction techniques - Signal flow graphs

UNIT II TIME DOMAIN ANALYSIS (12 Hrs)

Standard test signals – Transient analysis of first and second order systems using step input - Time responses – Time domain specifications – Error Analysis - Stability analysis - Concept of stability – Routh Hurwitz stability criterion - Root locus Techniques - Effect of adding poles and zeros.

UNIT III FREQUENCY DOMAIN ANALYSIS (12 Hrs)

Frequency response analysis – Correlation between frequency response and time-response analysis - frequency domain specifications - Bode plot - Polar plot - Nyquist stability criterion.

UNIT IV CONTROLLER DESIGN (12 Hrs)

Introduction to controllers - P-I-D controllers - Tuning methods - Ziegler-Nichol's Tuning - Performance criteria – Compensator design - Lead, Lag, Lead-Lag compensation using Bode Plot.

UNIT V STATE VARIABLE ANALYSIS (12 Hrs)

State Space Representation, Concept of state variables – State models for linear and time invariant Systems – Controllable, Observable, Jordan Canonical Forms - Solution of State Equation, State Transition Matrix – controllability and observability – Transfer function to State space model.

Text Books

1. I. J. Nagarath and M. Gopal, "Control Systems Engineering", New Age International Publishers, 6th Edition (Multi colour Edition), 2018.
2. Katsuhiko Ogata, "Modern Control Engineering", Pearson, 5th Edition, 2015.

Reference Books

1. Richard C. Dorf and Robert. H. Bishop, "Modern Control Systems", Pearson Education, 12th Edition, 2011.
2. John J. D'Azzo, Constantine H. Houpis and Sttuart N. Sheldon, "Linear Control System Analysis and Design with MATLAB", CRC Taylor and Francis Reprint, 6th Edition, 2014.
3. Benjamin C. Kuo, "Automatic Control Systems", PHI Learning Private Ltd, 9th Edition 2014.

Web References

1. https://www.tutorialspoint.com/control_systems/control_systems_useful_resources.html
2. http://www.controlsystemsacademy.com/
3. https://nptel.ac.in/courses/108/102/108102043/
4. https://www.isa.org/technical-topics/control-systems/
5. https://nptel.ac.in/courses/108/106/108106098/

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	3	3	2	-	-	-	-	-	-	1	3	3	3
2	2	3	3	3	2	-	-	-	-	-	-	1	3	3	3
3	2	3	3	3	2	-	-	-	-	-	-	1	3	3	3
4	2	3	3	3	2	-	-	-	-	-	-	1	3	3	3
5	2	3	3	3	2	-	-	-	-	-	-	1	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

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U20EET515	TRANSMISSION AND DISTRIBUTION	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To provide the structure of the electrical power system with various types of A.C/D.C Transmission and distribution systems
- To explain about the classification of transmission lines and their technical parameters.
- To understand the concept of transmission line models and its performance.
- To understand the necessity and importance of various insulators and cables used in power system.
- To have an overview of the modern electrification schemes and recent technologies in Transmission and Distribution systems

Course Outcomes

After completion of the course, the students will be able to

CO1 - Summarize the structure of Generation, Transmission and Distribution with real time connection schemes. **(K2)**

CO2 - Calculate the line parameters in the transmission system and their effects in the overhead lines.**(K3)**

CO3 - Analyze on different types of transmission lines (short, medium, long) and its performance. **(K2)**

CO4 - Choose the adaptable types of insulators and cables for transmission and distribution systems. **(K3)**

CO5 - Compare various schemes of electrification and gain knowledge on High Voltage AC / DC systems **(K2)**

UNIT I DISTRIBUTION SYSTEMS **(9 Hrs)**

Structure of electric power systems - Single Line Diagram of Generation, Transmission and Distribution Systems - Comparison of distribution systems – Radial and Ring main – DC two wire, AC single phase and three phase systems – Selection of Feeders and Distributors– secondary distribution system - Kelvin's law and its limitations.

UNIT II LINE PARAMETERS AND EFFECTS ON TRANSMISSION SYSTEM **(9 Hrs)**

Resistance, inductance and capacitance of single and three phase transmission lines - symmetrical and unsymmetrical spacing – transposition - single and double circuits - stranded and bundled conductors - application of self and mutual GMD–Skin, Proximity and Corona effect - inductive and radio interference - Computation of line parameters.

UNIT III PERFORMANCE ANALYSIS ON TRANSMISSION SYSTEMS **(9 Hrs)**

Development of equivalent circuits for short, medium and long lines – Calculation of efficiency and voltage regulation – Tuned power lines - Power circle diagrams for sending and receiving ends - transmission capacity, steady state stability limit – voltage control of lines.

UNIT IV INSULATORS AND CABLES FOR DISTRIBUTION SYSTEMS **(9 Hrs)**

Insulators: types and comparison – voltage distribution in string insulator – string efficiency – Methods of improving string efficiency – Stress and sag calculations – effect of wind and ice – supports at different levels. Cables: types – capacitance of cables – insulation resistance - dielectric stress and grading - dielectric loss - thermal characteristics - capacitance of three core cables.

UNIT V RECENT TRENDS IN TRANSMISSION **(9 Hrs)**

Design of Rural distribution, planning and design of town electrification schemes – Need for power system interconnections systems – Components of a HVDC system - Types of DC links — Modern trends in DC Transmission systems – Comparison of HVDC and HVAC Transmission systems – Introduction to FACTS - FACTS controllers – Shunt and Series – Grounding methods in power stations.

Text Books

1. C.L.Wadhwa, Electrical Power Sytems, 6th edition, New Age International (P) Limited, New Delhi, 2018.
2. V. K. Metha and Rohit Metha, "Principles of Power System", S. Chand, 3rd Edition, 2005.
3. R. Padiyar, "HVDC Power Transmission Systems – Technology and System Interactions", New Age International Publishers, 2012.
4. A. K. Theraja and B. L. Theraja, "Text Book of Electrical Technology: Volume 3: Transmission, Distribution and Utilization", S. Chand, 23rd Edition, 2004.

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Reference Books

1. Hadi Saadat, 'Power System Analysis,' PSA Publishing; Third Edition, 2010.
2. J.Brian, Hardy and Colin R.Bayliss 'Transmission and Distribution in Electrical Engineering', Newnes, Fourth Edition, 2012.
3. Luces M.Fualken berry Walter Coffer, 'Electrical Power Distribution and Transmission', Pearson Education, 2007.

Web References

1. https://swayam.gov.in/nd1_noc20_ee39/preview
2. https://swayam.gov.in/nd1_noc20_ee86/preview
3. https://www.eei.org/ourissues/ElectricityTransmission/Documents/
4. https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/index.html
5. http://solareis.anl.gov/documents/docs/APT_61117_EVS_TM_08_4.pdf

COs / POs and PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	-	2	-	-	-	-	-	-	3	3	2	3
2	3	3	3	-	2	-	-	-	-	-	-	3	3	2	3
3	3	3	3	-	2	-	-	-	-	-	-	3	3	2	3
4	3	3	3	-	2	-	-	-	-	-	-	3	3	2	3
5	3	3	3	-	2	-	-	-	-	-	-	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

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U20EEP510	POWER ELECTRONICS AND DRIVES LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- To introduce the concepts involved in power semiconductor devices and its characteristics and to understand the basics of triggering circuits.
- To analyze the basic Power electronic circuit topologies including AC-DC, DC-DC, DC-AC and AC-AC converters.
- To enable the students to do simulation of Converter circuits and experimentally verify the results.
- To study and analyze the operation of the DC and AC drives.
- To introduce the industrial control of power electronic circuits as well as safe electrical connection and measurement practices.

Course Outcomes

After completion of the course, the students will be able to

CO1- Analyze the fundamental operations of power semiconductor devices and its characteristics. **(K3)**
CO2- Demonstrate the operation of various power converters circuits. **(K4)**
CO3- Illustrate the operating characteristics of AC and DC Drives. **(K4)**
CO4 - Acquire knowledge on design and implementation of Microcontroller based control schemes for electrical drives. **(K5)**
CO5- Design and implement the closed loop controllers for converters. **(K5)**

List of Experiments

1. Characteristics of SCR and TRIAC,
2. Characteristics of MOSFET and IGBT.
3. Single phase half and fully controlled converter
4. Three phase half and fully controlled converter.
5. Step Down chopper, Step up Chopper and Multi-quadrant chopper
6. Single phase AC voltage controller
7. Single phase step up and step down cycloconverter
8. Single phase and three phase IGBT based PWM inverter
9. Converter/ Chopper fed DC motor.
10. Speed control of Inverter fed Induction motor.
11. Multilevel inverter using PIC microcontroller
12. Study of microcontroller based BLDC Motor Drive.
13. Study of voltage regulation of DC buck converter

Reference Books

1. G. K. Dubey, "Fundamentals of Electrical Drives", Narosa Publishing House, 2nd Edition, 2010.
2. M. H. Rashid, "Power Electronics: Circuits, Devices and Applications", Pearson Education, PHI, New Delhi, 4th Edition, 2017
3. P. S. Bimbhra, "Power Electronics", Khanna Publishers, New Delhi, 6th Edition, 2018.
4. M. D. Singh and K. B. Khachandani, "Power Electronics", McGraw-Hill Education, 2nd Edition, 2017.
5. R .Krishnan, "Electric Motor Drives - Modeling, Analysis, and Control", Pearson Education India, 1st Edition, 2015.
6. John F. Wakerly, "Digital Design Principles and Practices", Pearson prentice hall, 4th Edition, 2009.

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4. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-334-power-electronics-spring-2007/
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2. A. 1. 20

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	3	1	-	-	2	2	-	1	3	2	3
2	3	3	2	2	3	1	-	-	2	2	-	1	3	2	3
3	3	3	2	2	3	1	-	-	2	2	-	1	3	2	3
4	3	3	2	2	3	1	-	-	2	2	-	1	3	2	3
5	3	3	2	2	3	1	-	-	2	2	-	1	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

2.A.1.21

U20EEP511	CONTROL SYSTEMS LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- To provide the concepts of modeling and simulation of physical systems.
- To provide adequate knowledge in time response of systems and error analysis.
- To give basic knowledge in obtaining the open loop and closed–loop frequency responses of systems.
- To understand the concept of stability and its analysis.
- To get adequate knowledge about practical tuning of P/I/D controllers for motors/converters.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Interpret different electrical and mechanical systems with its modeling. **(K2)**
CO2 - Use the time domain analysis, to predict stability of a system performance of the system. **(K3)**
CO3 - Demonstrate frequency domain analysis of a system. **(K3)**
CO4 - Familiarize with the tuning procedure of P/I/D controllers for converter/motor applications. **(K4)**
CO5 - Design a controller for any system to meet the desired performance. **(K4)**

List of Experiments

1. Mathematical modeling and simulation of physical systems
   - Mechanical
   - Electrical
2. Implementation of a RC lead/lag compensating network for the given specifications and to obtain its frequency response.
3. Determination of Transfer function of a separately excited DC Motor.
4. Implementation of open loop and closed loop control of DC buck converter
5. Design and implementation of PID controller for DC motor
6. Stability analysis of a system using Root Locus
7. Determination of transfer functions of a physical system using frequency response and Bode's asymptotes.
8. Position and speed control of DC servo motor
9. Design of Lead/Lag/Lead-Lag Compensator for DC Motor
10. Stability analysis using routh- hurwitz method
11. Time domain analysis of first order and second order system
12. Simulation of Controllability and Observability of a system
13. Implementation of open loop and closed loop speed control of 3 phase induction motor.

Reference Books

1. Hasan Saeed, "Automatic Control Systems (With MATLAB Programs)", S. K. Kataria & Son, 1st Edition, 2010.
2. I. J. Nagarath and M. Gopal, "Control Systems Engineering", New Age International Publishers, 6th Edition, 2018.
3. Katsuhiko Ogata, "Modern Control Engineering", Pearson, 5th Edition, 2015.
4. Benjamin C. Kuo, "Automatic Control Systems", PHI Learning Private Ltd, 9th Edition, 2014.

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2. https://www.quanser.com/solution/control-systems/
3. http://ncr.mae.ufl.edu/papers/te02.pdf
4. https://futureengineering.in/control-system-lab/
5. http://vlabs.iitb.ac.in/vlab/

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	1	-	-	3	2	-	1	2	2	3
2	3	3	3	3	3	1	-	-	3	2	-	1	2	2	3
3	3	3	3	3	3	1	-	-	3	2	-	1	2	2	3
4	3	3	3	3	3	1	-	-	3	2	-	1	2	2	3
5	3	3	3	3	3	1	-	-	3	2	-	1	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Q. A. 1. 23

U20EET616	EMBEDDED SYSTEM	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To gain knowledge about the fundamentals of embedded systems and its communication protocols.
- To understand the architectural features of ARM processor.
- To learn about the different programming techniques for ARM processor
- To impart knowledge on ARM processor peripherals with device driver and its interface circuits
- To provide a platform for the student to design, implement, integrate, and develop software and hardware applications with the real time system.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Explain the basic building process of embedded system.**(K2)**
CO2 - Analyze any type of Microcontroller Architecture in detail.**(K4)**
CO3 -Apply the instruction sets to program ARM processor using Embedded C in KEIL software/ Micro C.**(K3)**
CO4 -Provides the experience to integrate hardware and software for any microprocessor / microcontroller for product designing such as smart-phones, microcomputers etc. **(K4)**
CO5 - Impart the concepts of RTOS in accessing shared resources for optimized CPU performance, timing based operations, video streaming and audio streaming etc. **(K3)**

UNIT I OVERVIEW OF EMBEDDED SYSTEMS **(9 Hrs)**

Basics of Embedded Systems – I/O Devices: Types and Examples – Synchronous, ISO- Synchronous and Asynchronous Communication – Serial Communication devices and Protocols: I^2C, SPI, UART - Parallel Device Ports.

UNIT II ARM ARCHITECTURE **(9 Hrs)**

ARM Programmer's model - Registers – Processor modes - Pipeline - Interrupts – ARM organization - ARM processor families – Instruction sets – Thumb Instruction Set: Register Usage, Other Branch Instructions, Data Processing Instructions – ARM Memory Management Unit.

UNIT III ARM PROCESSOR PROGRAMMING **(9 Hrs)**

Writing and optimizing the embedded C Code – Profiling and Cycle Counting – Instruction Scheduling –Register Allocation – Conditional Execution – Looping Constructs – Bit Manipulation - Timers and counters - Watchdog timer. Programming Tools: IDE and Programmer Interface.

UNIT IV ARM PROCESSOR PERIPHERALS **(9 Hrs)**

Clocking and Power Management – I/O handling - SPI and I^2C – UART – Analog to Digital conversion – temperature sensor – light sensor– accelerometer - Digital to Analog conversion

UNIT V RTOS FOR EMBEDDED SYSTEMS **(9 Hrs)**

Introduction to RTOS - Task and Task Scheduler - Scheduling policies – Interrupt Service Routines – Inter process communication mechanisms – Design issues- Introduction to Microcontroller/ Operating System.

Text books

1. Agus Kurniawan, "Getting Started With STM32 Nucleo Development", Agus Kurni, 1st Edition, 2016.
2. Sepehr Naimi, Sarmad Naimi, Muhammad Ali Mazidi, "The STM32F103 Arm Microcontroller and Embedded Systems-Using Assembly and C", Microdigitaled, 1st Edition, 2020.
3. Brian Amos, "Hands-On RTOS with Microcontrollers: Building Real-time Embedded Systems Using FreeRTOS, STM32 MCUs, and SEGGER Debug Tools", Thomas Learning, 1st Edition, 2020.
4. Geoffrey Brown, "Discovering the STM32 Microcontroller", Indiana University, Free Edition, 2016.

Reference books

1. Yifeng Zhu, "Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language", E-Man Press LLC, 2nd Edition, 2016.
2. Elicia White, "Making Embedded Systems", O' Reilly Series, 1st Edition, 2011.
3. Andrew N. Sloss, Dominic Symes, Chris Wright, "ARM Systems Developer's Guides - Designing and Optimizing System Software", Elsevier, 2008.
4. Peckol, "Embedded system Design", John Wiley and Sons, 2nd Edition, 2010.
5. Frank Vahid, "Embedded System Design–A Unified Hardware and Software Introduction", John Wiley, 1st Edition, 2002.

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1. https://www.tutorialspoint.com/embedded_systems/es_overview.htm
2. https://developer.arm.com/architectures/learn-the-architecture/introducing-the-arm-architecture/single-page
3. https://www.coursera.org/lecture/iot/lecture-1-1-what-are-embedded-systems-Gah7g
4. https://nptel.ac.in/courses/108102045/
5. https://www.eeweb.com/app-notes/tags/arm
6. https://en.wikibooks.org/wiki/Embedded_Systems/Real-Time_Operating_Systems

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	3	3	2	-	-	-	-	-	2	3	3	3
2	3	2	3	3	3	2	-	-	-	-	-	2	3	3	3
3	3	2	3	3	3	2	-	-	-	-	-	2	3	3	3
4	3	2	3	3	3	2	-	-	-	-	-	2	3	3	3
5	3	2	3	3	3	2	-	-	-	-	-	2	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

2.A.1.25

U20EET618	POWER SYSTEM ANALYSIS	L	T	P	C	Hrs
		2	2	0	3	60

Course Objectives

- To create computational models for power system using per unit analysis.
- To perform load flow analysis using Gauss Seidal and Newton-Raphson methods.
- To analyze the sequence network using symmetrical components.
- To import the knowledge about symmetrical and unsymmetrical faults in power system.
- To demonstrate different methods and factors influencing on power system stability

Course Outcomes

After completion of the course, the students will be able to

CO1 - Compute the reactance diagram and network matrices. **(K4)**
CO2 - Apply the iterative techniques to solve the power flow analysis used in power system planning. **(K3)**
CO3 - Analyze the Sequence networks using positive, negative and zero sequence network. **(K4)**
CO4 - Carry out short circuit studies to design the circuit breaker ratings in power system **(K4)**
CO5 - Analyze stability problems in power system during pre-fault and post-fault conditions **(K4)**

UNIT I MODELING OF POWER SYSTEM COMPONENTS **(12 Hrs)**

Need for system planning and operational studies - Power system components – Representation - Single line diagram - Per unit quantities - P.U. impedance / reactance diagram - Formulation of network matrices for the power systems - Bus impedance and bus admittance matrices - Reduction techniques on network matrices for network changes - Z bus Building algorithm.

UNIT II LOAD FLOW STUDIES **(12 Hrs)**

Classification of buses - formulation of load flow problem - Load flow solution by Gauss - Seidal, Newton - Raphson and Fast Decoupled Load Flow (FDLF) Analysis - Comparison - Computation of slack bus power, transmission loss and line flow - Voltage Control Methods - Tap-changing and phase - shifting transformers.

UNIT III SYMMETRICAL COMPONENTS AND SEQUENCE NETWORKS **(12 Hrs)**

Symmetrical components – Simple problems to calculate symmetrical voltages and currents - Sequence networks - positive, negative and zero sequence networks - Sequence networks of Series impedance, loads and Rotating machines – Advantages and Limitations.

UNIT IV FAULT ANALYSIS **(12 Hrs)**

Need for fault analysis - Types of faults - Symmetrical fault analysis through bus impedance matrix - Analysis of unsymmetrical faults- LG, LL and LLG - Analysis of simultaneous unbalanced short circuit and open conductor faults in power systems – short circuit capacity – circuit breaker selection - Representation of various types of faults in sequence networks.

UNIT V STABILITY STUDIES **(12 Hrs)**

Definition - Importance of stability analysis- classifications - Steady state and transient stability - Angle and voltage stability - Single Machine Infinite Bus (SMIB) system - swing equation – Swing Curve - Numerical integration methods - Equal area criterion - Critical clearing angle and time - Factors affecting stability - Methods of improving transient stability. Introduction to automatic voltage regulator systems.

Text Books

1. P. Kundur, "Power System Stability and Control", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 10th Reprint, 2013.
2. D. P. Kothari and I. J. Nagrath, "Power System Engineering", Tata McGraw-Hill Education, 3rd Edition, 2019.
3. Hadi Saadat, "Power System Analysis", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 21st Reprint, 2010.

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Reference Books

1. M. A. Pai, "Computer Techniques in Power System Analysis", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2nd Edition, 2012.
2. J. Duncan Glover, Mulukutla S. Sarma, Thomas J. Overbye, "Power System Analysis and Design", Cengage Learning, 5th Edition, 2016.
3. John J. Grainger, Jr. William D. Stevenson, "Power System Analysis", McGraw Hill Education (India) Private Limited, New Delhi, 2nd Edition, 2015.

Web References

1. https://nptel.ac.in/courses/108/105/108105067/
2. https://nptel.ac.in/courses/108/107/108107127/
3. https://pserc.wisc.edu/webinars/systems_webinars.aspx
4. https://www.classcentral.com/course/swayam-power-system-analysis-14243

COs/POs/PSOs Mapping

COs	Program Outcomes(POs)												Program Specific Outcomes(PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	3	1	-	-	-	-	-	1	3	2	2
2	3	2	2	2	3	1	-	-	-	-	-	1	3	2	2
3	3	3	2	2	3	1	-	-	-	-	-	1	3	2	2
4	3	3	2	2	3	1	-	-	-	-	-	1	3	2	2
5	3	3	2	2	3	1	-	-	-	-	-	1	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

2 · A · 1.27

U20EET619	ELECTRICAL MACHINE DESIGN	L	T	P	C	Hrs
		2	2	0	3	60

Course Objectives

- To understand the design considerations, thermal rating, insulation requirements and magnetic circuit calculations of static and rotating electrical machines.
- The course refreshes the construction details and design aspects of various parts of DC machines.
- To provide the knowledge on the design aspects of transformer with minimum cost.
- The course refreshes the construction details and design aspects of various parts of induction motor.
- To equip the students with construction details and design aspects of synchronous machines and BLDC motor.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Design the machines with proper thermal rating and insulation requirements.**(K3)**

CO2 - Analyze and evaluate the various design parameters of a DC machine for variable speed motor applications in industry.**(K4)**

CO3 - Analyze the various parameters of transformer and to design distribution and power transformers for real time applications. **(K4)**

CO4- Analyze and formulate the suitable design for three phase induction motor.**(K4)**

CO5- Apply the design concepts of Synchronous machines and BLDC motors. **(K3)**

UNIT I INTRODUCTION **(12 Hrs)**

Design Factors and Limitations – Modern Trends - Major considerations in Electrical Machine Design – Biot Savart law - soft magnetic materials, Electrical steel sheets, Classification of insulating materials – Design of Magnetic circuits – Magnetizing current – Flux leakage – real and apparent flux densities -, heating and cooling curves – rating of electric machines- calculation of effective magnetic flux in a motor- Magnetic circuit and reluctance calculation with two different materials.

UNIT II DESIGN OF DC MACHINES **(12 Hrs)**

Construction - Output Equation – Main Dimensions – Choice of specific loadings –Selection of number of poles – Dimensions of yoke, main pole and air gap - Estimation of ampere turns for the magnetic circuits - Design of lap winding and wave winding – Design of Armature – Design of Commutator and brushes – Design of shunt and series field system - reduction of eddy current in conductors in rotating machine.

UNIT III DESIGN OF TRANSFORMERS **(12 Hrs)**

Construction – Output Equation (1-ϕ and 3-ϕ) – Expression for volts/ turn, estimation of no. of turns – choice of specific loadings – Overall dimensions -design of yoke, core and winding for core and shell type transformers – Estimation of No load current and Voltage regulation– Temperature rise in Transformers – Design of Tank and cooling tubes of Transformers – Expression for the leakage reactance of core type transformer with concentric coils.

UNIT IV DESIGN OF THREE PHASE INDUCTION MOTORS **(12 Hrs)**

Construction - Output equation– Main dimensions – choice of specific loadings – Design of squirrel cage rotor and wound rotor - Design of stator slots and Winding, Choice of Length Air Gap, Estimation of Number of Slots for Squirrel Cage Rotor. Design of Rotor Bars and end Ring. Magnetic leakage calculations – Operating characteristics: Magnetizing current - Short circuit current.

UNIT V DESIGN OF SYNCHRONOUS MACHINES **(12 Hrs)**

Construction - Output equations – choice of specific loadings – Design of salient pole machines – Short circuit ratio – Armature design – Estimation of air gap length – Design of salient and non-salient pole rotors – Design of damper winding – Determination of full load field MMF – Design of field winding – Design of turbo alternators.
Computer Aided Design: Design of DC machines, Design of single phase Transformer

Text Books

1. A. K. Sawhney "A Course in Electrical Machine Design", Dhanpat Rai & Sons, New Delhi, 6th Edition, 2016.
2. M. V. Deshpande, "Design and Testing of Electrical Machines", PHI learning Pvt. Ltd, 3rd Edition, 2010.
3. S. K. Sen, "Principles of Electrical Machine Designs with Computer Programmes", Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2nd Edition, 2009.

Reference Books

1. A. Shanmugasundaram, G. Gangadharan, R. Palani, "Electrical Machine Design Data Book", New Age International Pvt. Ltd., 1st Edition, 2011.
2. A.Nagoor kani, "A Simplified text in Electrical Machine Design", RBA publications, Second Edition, 2013.

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3. Thomas A. Lipo, "Introduction to AC Machine Design", John wiley & sons inc., 1st Edition, 2017.
4. K. M. Vishnumurthy, "Computer aided design of electrical machines", B S Publications, 1st Edition, 2015.

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2. https://nptel.ac.in/courses/108/106/108106023.
3. https://www.windings.com/technical-reference/basic-motor-design-tutorial.
4. https://ndl.iitkgp.ac.in/homestudy/engineering.
5. http://electrical-engineering-portal.com/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	2	2	2	1	1	-	-	-	-	1	3	2	2
2	3	2	2	3	2	1	1	-	-	-	-	1	3	2	3
3	3	3	2	3	2	1	1	-	-	-	-	1	3	3	3
4	3	3	3	3	2	1	1	-	-	-	-	1	3	2	3
5	3	3	3	2	2	1	1	-	-	-	-	1	2	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

2-A-1.29

U20EEP612	EMBEDDED SYSTEM LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- To study and Identify hardware and software components to build an embedded system.
- To demonstrate the interfacing of peripherals with ARM7 Processor.
- To understand the key concepts of embedded systems such as I/O, timers, interrupts and interaction with peripheral devices.
- To gain knowledge and design of microcontroller based embedded system.
- To create a real-time system for particular applications.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Explain the working of ARM Processor, FPGA and raspberry pi.**(K3)**

CO2 - Interface ARM7 Processor, FPGA and raspberry pi Microcontrollers with external Peripheral devices.**(K4)**

CO3 - Handle interrupts for real time control applications using ARM Processor.**(K4)**

CO4 - Generate PWM signals for motor control applications. **(K4)**

CO5 - Design and develop interface between controller and device.**(K4)**

LIST OF EXPERIMENTS

1. Study on ARM Cortex M series Controller starter kit

   Conduction of following experiments using ARM Cortex M series Controller

   2. Interfacing ADC and DAC
   3. Interfacing real time clock
   4. Interfacing Keyboard and LCD
   5. Interfacing of stepper motor
   6. Interfacing of PWM based LED lighting board
   7. Interfacing DC motor
   8. Interfacing temperature sensor
   9. Interfacing with PC via UART interface
   10. Interfacing EEPROM via I2C
11. Study on FPGA developer board for PWM generation
12. Study on Raspberry pi for IoT application
13. Study on Real Time Operating Systems

Reference Books

1. Agus Kurniawan, "Getting Started With STM32 Nucleo Development", Agus Kurni, 1st Edition, 2016.
2. Sepehr Naimi, Sarmad Naimi, Muhammad Ali Mazidi, "The STM32F103 Arm Microcontroller and Embedded Systems-Using Assembly and C", Microdigitaled, 1st Edition, 2020.
3. Brian Amos, "Hands-On RTOS with Microcontrollers: Building Real-time Embedded Systems Using FreeRTOS, STM32 MCUs, and SEGGER Debug Tools", Thomas Learning, 1st Edition, 2020.
4. Geoffrey Brown, "Discovering the STM32 Microcontroller", Indiana University, Free Edition, 2016.
5. Raj Kamal, "Embedded Systems-Architecture, Programming and Design", Tata McGraw Hill, 3rd Edition, 2017.
6. Lyla B. Das, "Embedded Systems-an integrated approach", Pearson Education, 1st Edition, 2013.
7. K.V. Shibu, "Introduction to Embedded Systems", Tata McGraw Hill, 2nd Edition, 2016.
8. Michael J. Pont, "Embedded C", Addison Wesley, 1st Edition, 2002.
9. David E. Simon, "An Embedded Software Primer", Pearson Education, 1st Edition, 2012.

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2. https://nptel.ac.in/courses/106/105/106105193/
3. https://nptel.ac.in/courses/108/105/108105057/
4. https://nptel.ac.in/courses/117/106/117106112/
5. https://nptel.ac.in/courses/106/103/106103182/
6. https://developer.arm.com/architectures/learn-the-architecture/introducing-the-arm-architecture/single-page
7. https://www.eeweb.com/app-notes/tags/arm
8. https://www.tutorialspoint.com/embedded_systems/es_overview.htm

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	3	2	-	-	2	2	-	2	3	2	3
2	3	3	2	2	3	2	-	-	2	2	-	2	3	2	3
3	3	3	2	2	3	2	-	-	2	2	-	2	3	2	3
4	3	3	2	2	3	2	-	-	2	2	-	2	3	2	3
5	3	3	2	2	3	2	-	-	2	2	-	2	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

2. A. I.31

U20EEP614	POWER SYSTEM ANALYSIS LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- To analyze the electrical power system using per unit analysis.
- To apply iterative techniques for power flow analysis of power system.
- To carry out short circuit studies and Economic load dispatch on power system.
- To analyze Load curve and Load duration curve.
- To model and analyze the voltage and frequency control loops in power system.

Course Outcomes

After completion of the course, the students will be able to

CO1- Calculate the reactance values of power system components

CO2- Formulate Bus Admittance and Impedance matrices, used in power flow analysis.

CO3- Analyze the voltage and power flow condition of power system using Gauss Seidal and Newton Raphson methods.

CO4 - Analyze Symmetrical and Unsymmetrical faults in power system used to design relays and circuit breakers.

CO5 -Develop the load and load duration curves for calculating average load, unit generated load factor, etc.

List of Experiments

1. Computation of power system components in per units.
2. Modeling and Computation of Transmission Line Parameters
3. Formulation of a bus impedance matrix and admittance Matrix
4. Symmetrical components for different case studies
5. Short circuit studies of Power System.
6. Analysis of power-flow problem using Gauss-Seidel method.
7. Analysis of power-flow problem using Newton Raphson method.
8. Analysis of power-flow problem using Fast Decoupled Load Flow method.
9. Analysis of Economic load dispatch in power system.
10. Load curve and load duration curve
11. Numerical Integration of Swing equation
12. Modeling and Analysis of Automatic Voltage Regulator system
13. Stability analysis of SMIB System

Reference Books

1. Hadi Saadat, "Power System Analysis", Tata McGraw Hill Education Pvt. Ltd., New Delhi, 21st Reprint, 2010.
2. M. A. Pai, "Computer Techniques in Power System Analysis", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2nd Edition, 2012.
3. P. Kundur, "Power System Stability and Control", Tata McGraw Hill Education Pvt.Ltd., New Delhi, 10th Reprint, 2010

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2. https://nptel.ac.in/courses/108/107/108107127/

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	3	2	2	1	1	-	-	3	2	1	2	3	2	2
2	1	3	2	2	1	1	-	-	3	2	1	2	3	2	2
3	1	3	2	2	1	1	-	-	3	2	1	2	3	2	2
4	1	3	2	2	1	1	-	-	3	2	1	2	3	2	2
5	1	3	2	2	1	1	-	-	3	2	1	2	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

U20EET721	ELECTRIC AND HYBRID VEHICLE	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To familiarize with the fundamental concept of electric vehicle
- To overview the energy storage technologies used for electric and hybrid vehicle.
- To determine various electric drives suitable for electric vehicles.
- To understand about the different power converter topologies used in electric vehicle
- To understand the concept of hybrid and electric vehicle architecture, component sizing and electric motor drive.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Summarize the basics of electric vehicle and its working principle. **(K2)**
CO2 - Combine the different energy storage technologies and its implementation in hybrid vehicle. **(K4)**
CO3 - Develop the hybrid electric vehicle with different power converter topology. **(K2)**
CO4 - Review the working of different configurations of electric vehicle and its concepts **(K2)**
CO5 - Describe the working of different configurations of hybrid vehicles. **(K2)**

UNIT I INTRODUCTION TO EV **(9 Hrs)**

History of hybrid and electric vehicles - social and environmental importance - impact of modern drive - trains on energy supplies - Fundamentals of vehicle propulsion and Braking: Dynamic Equation - Power train tractive effort - Vehicle Power Plant and Transmission Characteristics - Vehicle Performance.

UNIT II HYBRID VEHICLE **(9 Hrs)**

Classification - Series and Parallel HEVs - Series-Parallel Combination - Advantages and disadvantages Internal Combustion Engines: Reciprocating Engines - Gas Turbine Engine- Design of an HEV: Hybrid Drive train - Sizing of Components.

UNIT III ELECTRIC PROPULSION DRIVE SYSTEMS **(9 Hrs)**

Electric drives and its Configuration used in EV/HEV: Induction motor drives - DC motor drives - Permanent magnet motor drives - SRM Drives.

UNIT IV ELECTRIC VEHICLE **(9 Hrs)**

Configurations of EV - advantages - EV transmission configuration: Transmission components - gear ratio - EV motor sizing - EV market.

UNIT V ELECTRIC VEHICLE STORAGE TECHNOLOGY **(9 Hrs)**

Battery Types - Parameters - Technical characteristics – modelling and equivalent circuit - Methods of battery charging - Fuel cells: Types - Fuel cell electric vehicle – Ultra capacitors - Hydrogen storage systems – Flywheel technology.

Text Books

1. Mehrdad Ehsani, Yimin Gao, Sebastien E.Gay, Ali Emadi, "Modern Electric, Hybrid Electric and Fuel Cell Vehicles", CRC Press, 3rd Edition, 2019.
2. Iqbal Hussain, "Electric and Hybrid Vehicles – Design Fundamentals", CRC Press, 2nd Edition, 2011.

Reference Books

1. K. T. Chau, "Electric vehicle machines and drives: Design, analysis and application", John Willey and Sons Singapore pte. ltd., 1st Edition, 2015.
2. J. Larminie and J. Lowry, "Electric vehicle technology explained", John Willey & Son ltd., 2nd Edition, 2012.

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1. https://nptel.ac.in/courses/108103009/
2. https://www.evgo.com/why-evs/types-of-electric-vehicles/
3. https://www.electrichybridvehicletechnology.com/
4. http://www.ieahev.org/
5. https://www.sae.org/learn/content/acad06/
6. https://www.intechopen.com/books/electric-vehicles-modelling-and-simulations

2.A.1.34

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	-	-	3	-	-	-	-	1	2	3	2
2	2	3	3	3	-	-	3	-	-	-	-	1	2	3	2
3	3	3	2	2	-	-	3	-	-	-	-	1	2	3	2
4	3	3	3	2	-	-	3	-	-	-	-	1	2	3	2
5	2	3	3	2	-	-	3	-	-	-	-	1	2	3	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

U20EEP715	INDUSTRIAL AUTOMATION AND CONTROL LAB	L	T	P	C	Hrs
		0	0	2	1	30

Course Objectives

- To gain practical knowledge regarding the automation components.
- To perform delay operations using the PLC.
- To gain practical knowledge on interfacing of different sensors, counter, timer, RTD using PLC.
- To equip the students to provide the solution for real time industrial applications.
- To equip the students to develop a fault monitoring system using SCADA.

Course Outcomes

After completion of the course, the students will be able to

CO1 -Analyze the ladder logic programs and components used for process control.**(K2)**
CO2-Design PLC-relay logic for the real time applications **(K3)**
CO3- Implement Industrial processing system. **(K3)**
CO4-Design a SCADA monitoring system for real time applications.**(K3)**
CO5-Diagnose the fault in Power generation and distribution networks, etc. **(K3)**

List of Experiments

Programmable Logic Controller

1. Implementation of Latching and Unlatching concepts in PLC
2. Interfacing of lamp and button with PLC for ON/OFF operation.
3. Perform Delayed Operation of Lamp using Push Button.
4. Combination of Counter and Timer for Lamp ON/OFF operation.
5. PLC program for Sequential Motor Control.
6. PLC based automated car parking system or elevator system.
7. DOL and Star Delta Starter operation for Three Phase Induction Motor using PLC.
8. PLC program for Forward and Reverse Control of Motors
9. PLC based Stair case lighting control system
10. PLC based Traffic Light Control system
11. Design and development of solar tracking control system using PLC
12. PLC program for speed control of DC motor.

SCADA

1. PLC interface with SCADA and status read / Command Transfer operation
2. Alarm annunciation using SCADA
3. Experiments on Transmission Module
   a. Local Mode
   b. Simulation of Faults

Internet of Things IoT:

1. IoT – based Street light monitoring and control
2. IoT-based Industrial pollution monitoring system.

Reference Books

1. S. Mukhopadhyay, S. Sen and A. K. Deb, "Industrial Instrumentation, Control and Automation", Jaico Publishing House, 1st Edition, 2013.
2. Gary Dunning, "Introduction to Programmable Logic Controllers", Cengage Learning, 3rd India Edition, 2007.
3. Frank lamb, "Industrial Automation: Hands On", McGraw-Hill Education, 1st Edition, 2013.
4. T. Huges, "Programmable Logic Controllers", ISA press, 1994.
5. R. Krishnan, "Electric Motor Drives, Modelling, Analysis and Control", Pearson Education India, 1st Edition, 2015.
6. Viswanandham, "Performance Modeling of Automated Manufacturing Systems", PHI, 1st Edition, 2009.
7. Jose A. Romagnoli, Ahmet Palazoglu, "Introduction to Process control", CRC Taylor and Francis group, 3rd Edition, 2020.

2.A.1.36

Web References

1. https://electrical-engineering-portal.com/download-center/books-and-guides/automation-control/plc-ladder-sequential-programming
2. https://www.beckhoff.com/english.asp?start/?pk_campaign=AdWords-AdWordsSearch-IndustrialAutomationEN&pk_kwd=industrial%20automation
3. https://www.advantech.com/solutions/ifactory
4. https://www.plantautomation-technology.com/articles/an-overview-of-distributed-control-systems-dcs
5. https://www.controleng.com/articles/scada-remains-relevant-for-industrial-automation/
6. https://sw.aveva.com/monitor-and-control/scada

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
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1	3	3	3	2	3	-	-	-	3	2	-	1	3	3	3
2	3	3	3	2	3	-	-	-	3	2	-	1	3	3	3
3	3	3	3	2	3	-	-	-	3	2	-	1	3	3	3
4	3	3	3	2	3	-	-	-	3	2	-	1	3	3	3
5	3	3	3	2	3	-	-	-	3	2	-	1	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Q. A. 1.37

U20EEE506	UTILIZATION OF ELECTRICAL ENERGY	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To design optimized illumination system for domestic and industrial applications.
- To acquire knowledge about the different types of heating and welding.
- To make awareness in the usage of refrigeration and air conditioning system.
- To familiarize with the construction and working of traction systems.
- To impart the knowledge on electroplating techniques and operations of batteries.

Course Outcomes

After completion of the course, the students will be able to

CO1 -Develop a clear idea on lighting requirement for domestic and industrial needs in an efficient way. **(K3)**
CO2 - Analysis the different types of heating and welding schemes used in the industries**(K4)**
CO3 -Repair the minor faults that occurs in refrigerator and in air conditioning system**(K4)**
CO4 -Analyze the speed-time characteristics and performance of the electric traction. **(K4)**
CO5 -Calculate the power requirement and efficiency of domestic appliances.**(K4)**

UNIT I ILLUMINATION **(9 Hrs)**

Introduction – basic terminologies – laws of illumination – polar curves – Rousseau's construction – electrical lamps – Basic principles of light control – Types – Design of lighting – illumination calculation (residential, industrial, street, flood lighting) – bureau of energy efficiency star rating for lamps.

UNIT II ELECTRIC HEATING AND WELDING **(9 Hrs)**

Role of electric heating for industrial applications – Types of Heating – Resistance – Induction - Arc furnace – Dielectric - solar – heating of building, domestic water heater, Electric oven. Welding methods – Resistance – Arc - Laser – Ultrasonic - Power supply equipment's for welding.

UNIT III REFRIGERATION AND AIR CONDITIONING **(9 Hrs)**

Electrical Circuit of Refrigerator – Trouble shooting of Refrigerator – Air conditioning types and their applications – smart air conditioning systems – Trouble shooting of air conditioning.

UNIT IV ELECTRIC TRACTION **(9 Hrs)**

Traction system – Power supply – Traction drives – braking – Tractive effort calculations – speed-time characteristics. Locomotives and train – Tram ways and Trolley bus – Recent trends – Metro and Mono rail systems.

UNIT V ELECTROLYSIS AND DOMESTIC APPLIANCES(9 Hrs)

Electrolysis- Laws of Electrolysis, power supply, Efficiency – Electro Plating. Batteries-Types – Components, rating of batteries – Methods of charging and maintenance. Domestic appliances: Washing Machine, Water heater – Introduction to Green Building Concept and energy auditing.

Text Books

1. J. B. Gupta, "Utilization of Electrical Power and Traction", Kataria Publications, Reprint Edition, 2020
2. R. K. Rajput, "Utilization of Electrical Power", Lakshmi publications, 2nd Edition, 2016.
3. E. Openhshaw Taylor and V. V. L. Rao, "Utilization of Electric Energy", Orient Longman, New Delhi, 2nd Edition, 2007.

Reference Books

1. S. K. Sahdev, "Utilization of electrical energy and electric traction", New Age International Publisher, 1st Edition, 2016.
2. H. Partap, "Art and Science of Utilization of Electrical Energy", Dhanpat Rai and Sons, Delhi, 2nd Edition, 2015.
3. C. L. Wadhwa, "Generation, Distribution and Utilization of Electrical Energy", New Age International Publishers, 4th Edition, 2017.
4. Pradip Kumar Sadhu, Soumya Das, "Modern utilization of Electric Power" CBS Publisher, 1st Edition, 2018.

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3. https://nptel.ac.in/courses/112/105/112105129/
4. https://nptel.ac.in/courses/103/108/103108162/
5. https://beeindia.gov.in/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
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1	3	2	2	-	-	-	-	-	-	-	-	-	3	2	2
2	3	2	2	-	-	-	-	-	-	-	-	-	3	2	2
3	3	2	2	-	-	-	-	-	-	-	-	-	3	2	2
4	3	2	2	-	-	-	-	-	-	-	-	-	3	2	2
5	3	2	2	-	-	-	-	-	-	-	-	-	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

2.A.1.39

U20EEE510	INDUSTRIAL ELECTRICAL SYSTEM	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To import basic ideas on electrical control components and electrical safety practices
- To provide the electrical wiring for residential and commercial buildings.
- To study on various illumination systems for commercial applications.
- To explain about the various components used for installation purpose.
- To import knowledge on modern techniques used for the monitoring and control.

Course Outcomes

After completion of the course, the students will be able to

CO1 -Acquire knowledge on electrical components used in industries. **(K2)**
CO2 - Design residential and commercial wiring connection. **(K4)**
CO3 - Design the different illumination systems for industries. **(K3)**
CO4 - Acquire knowledge on selection of installation components for industries. **(K3)**
CO5 - Apply the PLC and SCADA system for the automation of industries. **(K3)**

UNIT I ELECTRICALCONTROL COMPONENTS **(9 Hrs)**

LT system wiring components - selection of cables – wires – switches - distribution box - metering system - Tariff structure - protection components – Fuse – MCB – MCCB – ELCB - inverse current characteristics – symbols - single line diagram (SLD) of a wiring system – Contactor - Isolator – Relays – MPCB - Electric shock and Electrical safety practices.

UNIT II WIRING SYSTEMS **(9 Hrs)**

Types of residential and commercial wiring - general rules and guidelines for installation – load calculation and sizing of wire - rating of main switch - distribution board and protection devices - earthing systems - requirements of commercial installation - lighting schemes - selection - sizing of components.

UNIT III ILLUMINATION SYSTEMS **(9 Hrs)**

Light – lumen – intensity - candle power - lamp efficiency - specific consumption – glare - space to height ratio- waste light factor - depreciation factor - various illumination schemes - Incandescent lamps and modern luminaries like CFL - LED and their operation - energy saving in illumination systems - design of a lighting scheme - flood lighting.

UNIT IV INDUSTRIAL INSTALLATION COMPONENTS **(9 Hrs)**

HT connection - industrial substation - Transformer selection - Industrial loads - motors - Cable and Switchgear selection - Lightning Protection - Earthing design - Power factor correction – kVAR calculations - type of compensation - Introduction to PCC- MCC panels. Specifications of LT Breakers - MCB and other LT panel components. DG (Diesel Generator) Systems - Electrical Systems for the elevator - Battery banks - Sizing the DG - UPS System - Online and OFF line UPS - Battery Banks- Selection of UPS and Battery Banks.

UNIT V INDUSTRIAL AUTOMATION **(9 Hrs)**

Study of basic PLC - Role of automation-advantages of process automation - PLC based control system design - Panel Metering - Introduction to distributed control system (DCS) and SCADA system for distribution automation.

Text Books

1. H. Partab , "Art and Science of Utilization of Electrical Energy", 2nd Edition, Dhanpat Rai and Co., 2017
2. B. P. Patil, M. A. Chaudhari, "Industrial Electrical Systems - I", 2nd Edition, Nirali Prakashan publications, 2015
3. R. K. Rajput, "Utilization of Electrical Power", Laxmi Publications., 2nd Edition, 2016.

References Books

1. Frank Lamb, "Industrial Automation: Hands On", McGraw-Hill Professional, 1st Edition, 2013.
2. C. L. Wadhwa, "Generation, Distribution and Utilization of Electrical Energy", New Age International, 4th Edition, 2017.
3. H.Joshi, "Residential Commercial and Industrial Systems", McGraw Hill Education, 2008.

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2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-061-introduction-to-electric-power-systems-spring-2011/
3. https://nptel.ac.in/courses/108/108/108108077/
4. https://nptel.ac.in/courses/108/105/108105088/
5. https://nptel.ac.in/courses/108/105/108105062/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
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1	3	2	1	-	-	2	-	-	-	-	-	2	1	2	3
2	2	2	1	-	-	2	-	-	-	-	-	1	1	1	1
3	2	2	1	-	-	2	-	-	-	-	-	1	1	1	3
4	2	2	1	-	-	2	-	-	-	-	-	1	2	2	2
5	2	2	2	-	-.	2	-	-	-	-	-	2	2	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

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U20EEE611	SMART GRID	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To familiarize with the fundamentals of smart grids technologies.
- To get exposure on Communication infrastructure and protocols.
- To study about the Wide Area Measurement Systems, Energy storage technologies for smart grid.
- To know about the various stability assessment tools in smart grid.
- To familiarize with the Power Quality issues of Grid connected Renewable Energy Sources.

Course Outcomes

After completion of the course, the students will be able to

CO1 -Compare the conventional electrical grid concepts with smart grid.**(K1)**

CO2 - Outline about the protocols and networks used in Smart grid.**(K2)**

CO3 -Explain the importance of WAM and energy storage technologies used in smart grid.**(K2)**

CO4 -Acquire knowledge on distributed generation and micro grids in smart grid.**(K3)**

CO5 - Analyze the power quality issues in smart grid. **(K3)**.

UNIT I INTRODUCTION **(9 Hrs)**

Overview of Electrical Grid – Smart Grid - Characteristics - Inventory Technologies - Operating Principles - Models of Components, Implementation - Early initiatives - Overview of technologies - Key Challenges - Self-Healing Grid - Opportunities and Barriers - Recent Research technology.

UNIT II SMART METERING AND COMMUNICATION **(9 Hrs)**

Smart meters - Communications infrastructure, protocols and hardware - Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) drivers - benefits – Power line communication (PLC) - Machine to-machine communication models - Home Area Networks (HAN), Wide Area Networks (WAN) and Neighborhood Area Networks (NAN) - Wired and Wireless communication technologies – Cryptosystem - Internet of things (IOT).

UNIT III WAMS AND ENERGY STORAGE TECHNOLOGIES(9 Hrs)

Synchro-Phasor Measurement Units (PMUs) – Wide Area Measurement Systems (WAMS) - Geographic Information system (GIS) and Google Mapping Tools, Multiagent Systems (MAS) Technology - Sensor Networks, Fault Detection - Phasor Data Concentrator (PDC) – Road Map for synchro-phasor technology – Operational experience and Blackout analysis using PMU. Batteries, Fuel cell, Flywheels, SMES systems and Super capacitors.

UNIT IV INTEGRATION, CONTROL AND OPERATION OF DISTRIBUTED GENERATION (9 Hrs)

Distributed Generation Technologies - benefits - Utilization Barriers –integration to power grid – Introduction to Renewable Energy Technologies – Micro grids – Advantages and disadvantages of DG – Vehicle to Grid technology and Grid to vehicle technology - Performance and stability analysis in smart grid.

UNIT V POWER QUALITY MANAGEMENT IN SMART GRID **(9 Hrs)**

Power Quality - issues - Conditioners - Web based monitoring – Energy Audit - Cyber Security- Power Quality Improvement methods – Introduction to EMC in smart grid.

Text Books

1. Janaka Ekanayake, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, Nick Jenkins, "Smart Grid Technology and Applications", John Wiley and Sons Publication, 1st Edition, 2015.
2. Stuart Borlase, "Smart Grids: Infra structure, Technology and Solutions", CRC Press, 1st Edition, 2013.
3. James A. Momoh, "Smart Grid: Fundamentals of Design and Analysis", Wiley-IEEE Press, 1st Edition, 2012.

Reference Books

1. Jean Claude Sabonnadiere, NouredineHadjsaid, "Smart Grids", Wiley Blackwell,1st Edition, 2012
2. Fereidoon. P. sioshansi, "Smart grid – integrating renewable, distributed and efficient energy", Academic Press, 1st Edition, 2011.
3. Tony Flick, Justin Morehouse, "Securing the Smart Grid: Next Generation Power Grid Security", Academic Press, 1st Edition, 2011.
4. Krzysztof Iniewski, "Smart Grid Infrastructure and Networking", Tata McGraw Hill, 1st Edition, 2012.
5. SawanSen, Samarjit Sengupta, Abhijit Chakrabarti, "Electricity pricing- regulated, deregulated and smart grid systems", CRC press, 1st Edition, 2018.

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2. https://onlinecourses.nptel.ac.in/noc19_ee64/preview
3. https://www.classcentral.com/course/swayam-introduction-to-smart-grid-14165
4. https://npti.gov.in/smart-grid-technologies
5. http://www.infocobuild.com/education/audio-video-courses/electronics/IntroductionToSmartGrid-IIT-Roorkee/lecture-04.html

COs/POs/PSOs Mapping

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1	3	2	2	3	1	-	-	-	-	-	-	2	2	1	2
2	3	2	2	3	1	-	-	-	-	-	-	2	2	1	2
3	3	2	2	3	1	-	-	-	-	-	-	2	2	1	2
4	3	2	2	3	1	-	-	-	-	-	-	2	2	1	2
5	3	2	2	3	1	-	-	-	-	-	-	2	2	1	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

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U20EEE716	DISTRIBUTED GENERATION AND MICROGRIDS	L	T	P	C	Hrs
		3	0	0	3	45

Course Objectives

- To study the concepts of Distributed Generation and Microgrid.
- To learn about the standards for interconnection.
- To analyze the impact of grid integration.
- To study and analyse the issues in the Microgrid.
- To learn about scenario of renewable energy scenario.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Attain knowledge on the various schemes of conventional and nonconventional power generation. **(K2)**
CO2 - Have knowledge on the topologies and energy sources of distributed generation. **(K2)**
CO3 - Learn about the requirements for Microgrid interconnection and its impact. **(K2)**
CO4 - Familiarize with the techniques of control and operation of microgrid. **(K2)**
CO5 - Comprehend the standards and regulations of distributed generation, microgrid and grid integration. **(K2)**

UNIT I INTRODUCTION **(9 Hrs)**

Distributed generation - overview and technology trends. Working principle, architecture and application of renewable based DG technologies - Non-conventional technology based DGs.

UNIT II DISTRIBUTED GENERATIONS **(9 Hrs)**

Concept of distributed generations-topologies-selection of sources- regulatory standards/framework- Standards for interconnecting Distributed resources to electric power systems: IEEE 1547. DG installation classes-security issues in DG implementations - Energy storage elements: Batteries- ultra-capacitors- flywheels-Captive power plants

UNIT III MICROGRID AND IMPACT OF GRID INTEGRATION **(9 Hrs)**

Concept and definition -microgrid drivers and benefits- review of sources of microgrids- typical structure and configuration - AC and DC microgrids- Power Electronics interfaces - Requirements for grid interconnection, limits on operational parameters: voltage, frequency- THD- islanding issues- Impact of grid integration with NCE sources on existing power system: reliability-stability.

UNIT IV OPERATION AND CONTROL OF MICROGRID **(9 Hrs)**

Modes of operation and control of microgrid: grid connected and islanded mode- Active and reactive power control- protection issues, anti-islanding schemes - microgrid communication infrastructure - regulatory standards- Microgrid economics- Introduction to smart microgrids

UNIT V POWER QUALITY ISSUES **(9 Hrs)**

Introduction, Power quality disturbances -Transients, Voltage sags and swells, Over-voltages and under-voltages, Outage, Harmonic distortion, Voltage notching, Flicker, Electrical noise. Power quality sensitive customers, power quality improvement technologies.

Text Books

1. Nick Jenkins, Janaka Ekanayake, Goran Strbac, "Distributed Generation", Institution of Engineering and Technology, London, UK, 2010.
2. S. Chowdhury, S.P. Chowdhury and P. Crossley, "Microgrids and Active Distribution Networks", The Institution of Engineering and Technology, London, United Kingdom, 2009.
3. Math H. Bollen, Fainan Hassan, "Integration of Distributed Generation in the Power System", John Wiley & Sons, New Jersey, 2011.

Reference Books

1. Zobaa, Ahmed F., and Ramesh C.Bansal, "Handbook of renewable energy Technology", World Scientific, 2011.
2. Godfrey Boyle, "Renewable Energy-Power for a sustainable future", Oxford University Press, 3rd Edition, 2013.
3. Nikos Hatziargyriou, "Microgrids: Architectures and Control", Wiley-IEEE Press, 2013

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2. https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts
3. https://www.energy.gov/eere/solar/solar-integration-distributed-energy-resources-and-microgrids
4. https://certs.lbl.gov/research-areas/distributed-energy-resource-0
5. https://www.elsevier.com/books/distributed-energy-resources-in-microgrids/chauhan/978-0-12-817774-7

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3	3	3	3	3	2	-	-	-	-	-	-	1	3	3	3
4	3	3	3	3	2	-	-	-	-	-	-	1	3	3	3
5	3	3	3	3	2	-	-	-	-	-	-	1	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

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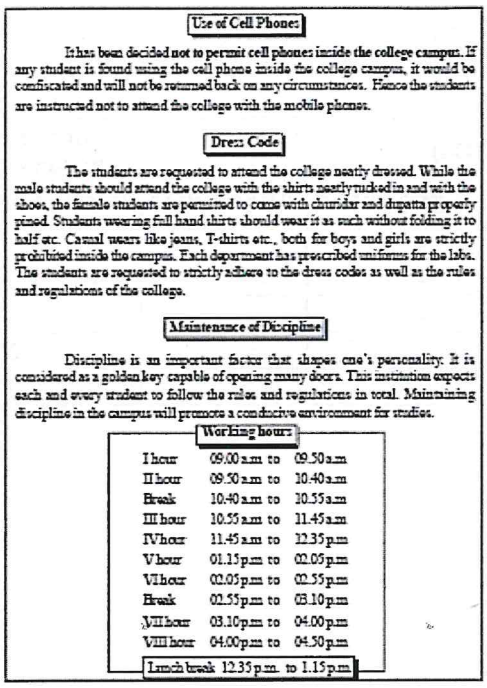
Annexure – II

Academic calendar (IV Year)



Use of Cell Phones:

It has been decided not to permit cell phones inside the college campus. If any student is found using the cell phone inside the college campus, it would be confiscated and will not be returned back on any circumstances. Hence the students are instructed not to attend the college with the mobile phones.

Dress Code

The students are requested to attend the college neatly dressed. While the male students should attend the college with the shirts neatly tucked in and with the shoes, the female students are permitted to come with churidar and dupatta properly pined. Students wearing full hand shirts should wear it as such without folding it to half etc. Casual wears like jeans, T-shirts etc., both for boys and girls are strictly prohibited inside the campus. Each department has prescribed uniforms for the labs. The students are requested to strictly adhere to the dress codes as well as the rules and regulations of the college.

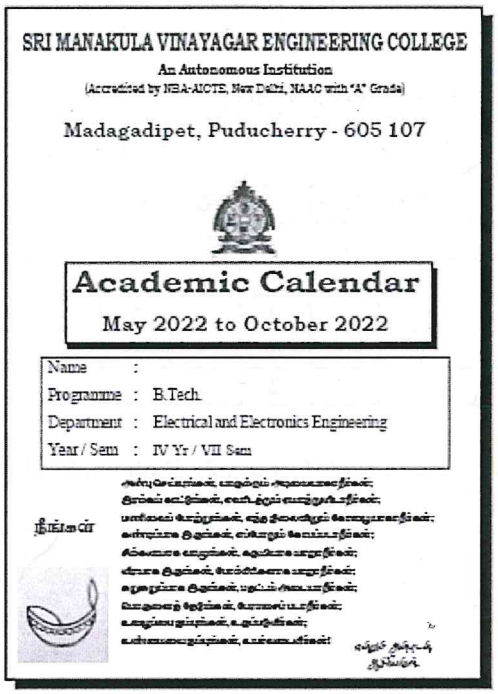
Maintenance of Discipline

Discipline is an important factor that shapes one's personality. It is considered as a golden key capable of opening many doors. This institution expects each and every student to follow the rules and regulations in total. Maintaining discipline in the campus will promote a conducive environment for studies.

Working hours

I hour	09.00 a.m to	09.50 a.m
II hour	09.50 a.m to	10.40 a.m
Break	10.40 a.m to	10.55 a.m
III hour	10.55 a.m to	11.45 a.m
IV hour	11.45 a.m to	12.35 p.m
V hour	01.15 p.m to	02.05 p.m
VI hour	02.05 p.m to	02.55 p.m
Break	02.55 p.m to	03.10 p.m
VII hour	03.10 p.m to	04.00 p.m
VIII hour	04.00 p.m to	04.50 p.m

Lunch break 12.35 p.m. to 1.15 p.m.



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

An Autonomous Institution

(Accredited by NBA-AICTE, New Delhi, NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107

Academic Calendar

May 2022 to October 2022

Name :

Programme : B.Tech.

Department : Electrical and Electronics Engineering

Year / Sem : IV Yr / VII Sem

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About Autonomous

Sri Manakula Vinayagar Engineering College has been conferred with Autonomous Status by the University Grants Commission on 26th September 2019 and the same was approved by Pondicherry University on 19th June 2020. SMVEC Autonomous Regulations R2019, is followed for the students admitted in the Academic Year 2019-20 (present Final Year). SMVEC Autonomous Regulations R2020, is followed for the students admitted from the Academic Year 2020-21 onwards (present first year & second year)

HIGHLIGHTS OF SMVEC AUTONOMOUS REGULATIONS 2019, 2020 & CURRICULUM

- Industry 4.0 ready curriculum
- Curriculum towards skill development and to create more job opportunities
- Multidisciplinary curriculum
- Oriented towards entrepreneurship development
- Choice to learn IELTS / Foreign Languages
- Department wise Gold Medals
- Results will be declared within a month after completion of examinations
- Supplementary Examination in 5th and 8th semester for the students having 2 arrears

- **Ethmotech / Mandatory course**
  The Institute has Established 17 Center of Excellence to provide 91 International Certification courses from IBM, Google, Cisco, e Plan, Microsoft, Autodesk, Texas instruments, Festo, Bentley, Schneider Electric, Amazon web services, Siemens, Tally, DELL EMC², Harita Techserv, PTC, LN an Excellence in Technology & Didactic solutions. All students should enroll in certification course from semester-I to semester-VI.

- **Industrial Training / Internship**
  Students may undergo training or internship during summer / winter vacation at Industry/ Research organization. Students are also permitted to undergo internships during their eighth semester after the completion of theory classes.

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education: To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation: To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship: To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values: To instil deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship.

MISSION

M1: Quality Education: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies.

M2: Industrial and Societal needs: To cater the dynamic needs of the industry and society by strengthening industry-institute interaction.

M3: Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.

M4: Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.

2. A. 1. 47

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Professional Knowledge

To possess strong educational foundation in Electrical and Electronics Engineering to attain successful career with professional responsibility

PEO2: Innovative Skills

To enrich the skills to design and develop innovative solutions for engineering problems in a multidisciplinary environment

PEO3: Ethics

To actively embrace leadership qualities for achieving professional goals with ethical values

PEO4: Adaptability

To enhance intellectual competency along with technical skills by adapting to the current trends through eternal learning

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Core Proficiency

Utilize the engineering core knowledge to identify, formulate, design, and investigate the complex engineering problems of power electronics, electrical machines and power systems.

PSO2: Cutting Edge Technologies

Explore the new cutting edge technologies in the field of Electric vehicle, Automation, Artificial Intelligence, Robotics and Renewable Energy to compete in global market.

PSO3: Design and Evolution

Capability to comprehend the technological advancements with the usage of modern design tools for analysing and designing systems to confront the rapid pace of industrial innovations.

October 2022

Date	Day	Schedule	Working day/ Holiday
1	Sat		
2	Sun		Holiday
3	Mon	Tentative End Semester Practicals	
4	Tue		
5	Wed	Energy Efficiency Day	
6	Thu		
7	Fri		
8	Sat		
9	Sun		Holiday
10	Mon		
11	Tue		
12	Wed		
13	Thu		
14	Fri		
15	Sat		
16	Sun		Holiday
17	Mon	Tentative End Semester Theory exam	
18	Tue		
19	Wed		
20	Thu	Bioenergy day	
21	Fri		
22	Sat		
23	Sun		Holiday
24	Mon		
25	Tue		
26	Wed		
27	Thu		
28	Fri		
29	Sat		
30	Sun		
31	Mon		

Total number of working days : -
Total number of holiday : -

[illegible]

September 2022

Date	Day	Schedule	Working day/ Holiday
1	Thu		78
2	Fri	~~Third Review, Feedback from the students~~ 3	79
3	Sat	~~Third Review, QCM 3 Report submission~~	80
4	Sun		Holiday
5	Mon	Model Exam starts / Teacher's Day	81
6	Tue		82
7	Wed		83
8	Thu		84
9	Fri	World E-vehicle Day / Ozone Day	85
10	Sat		86
11	Sun		Holiday
12	Mon		
13	Tue		
14	Wed		
15	Thu	Engineer's Day	
16	Fri		
17	Sat		Holiday
18	Sun		Holiday
19	Mon		
20	Tue		
21	Wed		
22	Thu	Electrical Motors Day	
23	Fri		
24	Sat		
25	Sun		Holiday
26	Mon	Model practicals	
27	Tue		
28	Wed		
29	Thu		
30	Fri		

Total number of working days : 09
Total number of holiday : 01

[illegible]

PROGRAMME 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.

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.

2. A. 1. 48

U19EET71 INDUSTRIAL AUTOMATION AND CONTROL

Course Outcomes

After completion of the course, the students will be able to

CO1 - Analyze the type of Automation system and its architecture in detail.(K3)

CO2 - Discuss the history of PLC, main parts and its functions. (K3)

CO3 - Illustrate the operation of Relays, contactors, Motor Starters, Switches, Sensors, Output Control Devices, etc., (K3)

CO4 - Acquire knowledge about the operation of SCADA and its sub-systems. (K3)

CO5 - Demonstrate the fundamentals of Human-Machine Interface. (K3)

U19EET72 ELECTRIC AND HYBRID VEHICLE

Course Outcomes

After completion of the course, the students will be able to

CO1 - Summarize the basics of electric vehicle and its working principle. (K2)

CO2 - Combine the different energy storage technologies and its implementation in hybrid vehicle. (K4)

CO3 - Develop the hybrid electric vehicle with different power converter topology. (K2)

CO4 - Review the working of different configurations of electric vehicle and its concepts (K2)

CO5 - Describe the working of different configurations of hybrid vehicles. (K2)

U19EEE72 DISTRIBUTED GENERATION AND MICROGRIDS

Course Outcomes

After completion of the course, the students will be able to

CO1 - Attain knowledge on the various schemes of conventional and nonconventional power generation.(K2)

CO2 - Have knowledge on the topologies and energy sources of distributed generation.(K2)

CO3 - Learn about the requirements for Microgrid interconnection and its impact. (K2)

CO4 - Familiarize with the techniques of control and operation of microgrid.(K2)

CO5 - Comprehend the standards and regulations of distributed generation, microgrid and grid integration. (K2)

U19EEE73 POWER ELECTRONICS FOR RENEWABLEENERGY SYSTEMS

Course Outcomes

After completion of the course, the students will be able to

CO1 - Design and analyze the electrical generators for renewable energy conversion.(K2)

CO2 - Interpret the applications of power electronics in wind and solar energy systems. (K2)

CO3 - Design different power converters for renewable energy systems. (K2)

CO4 - Analyze standalone and grid connected operating modes of wind, solar energy systems. (K2)

CO5 - Implement maximum power point tracking algorithm and gain knowledge on hybrid systems. (K2)

August 2022

Date	Day	Schedule	Working day/ Holiday
1	Mon		55
2	Tue		56
3	Wed		57
4	Thu		58
5	Fri	Second Review, Feedback from the students - 2	59
6	Sat	Second Review [illegible] Submission	60
7	Sun		Holiday
8	Mon	CAT - II	61
9	Tue	Moharam	Holiday
10	Wed		62
11	Thu		63
12	Fri		64
13	Sat	Guest Lecture - Solar PV Installation and testing	65
14	Sun		Holiday
15	Mon	Independance Day	Holiday
16	Tue	De Jure Transfer Day	Holiday
17	Wed		66
18	Thu		67
19	Fri	Certification course - Industrial Automation	68
20	Sat	Guest Lecture - Solar Energy /National Renewable Energy Day	69
21	Sun		Holiday
22	Mon		70
23	Tue		71
24	Wed		72
25	Thu		73
26	Fri		74
27	Sat	Certification course - Effective conference paper writing	75
28	Sun		Holiday
29	Mon		76
30	Tue		77
31	Wed	Vinayagar Chathurthi	Holiday

Total number of working days : 23

Total number of holiday : 08

[illegible]

[illegible]

2. A. 1. 49

July 2022

Date	Day	Schedule	Working day / Holiday
1	Fri		30
2	Sat	Certification course- Design of converters using MATLAB	31
3	Sun		Holiday
4	Mon		32
5	Tue		33
6	Wed		34
7	Thu		35
8	Fri	First Review, Feed back from the students - 1	36
9	Sat	First Review, QCM 1 Submission	37
10	Sun	National tesla day – A day of science around the world	Holiday
11	Mon	CAT - I	38
12	Tue		39
13	Wed		40
14	Thu		41
15	Fri		42
16	Sat		Holiday
17	Sun		Holiday
18	Mon		43
19	Tue		44
20	Wed		45
21	Thu		46
22	Fri		47
23	Sat	Certification course - Electric vehicles	48
24	Sun		Holiday
25	Mon		49
26	Tue		50
27	Wed	Guest Lecture - Role of PLC in Industrial Automation	51
28	Thu		52
29	Fri	Guest Lecture - Advancement in Industrial Automation	53
30	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	54
31	Sun		Holiday

Total number of working days : 26
Total number of holiday : 08

[illegible]

U19ECO75 IOT AND ITS APPLICATIONS

Course Outcomes

After completion of the course, the students will be able to

CO1 - Understand internet of Things and its hardware and software components (K2)
CO2 - Demonstrate the Interfacing of I/O devices, sensors and communication modules (K3)
CO3 - Understand the concepts of remotely monitor data and control devices.(K2)
CO4 - Build and deploy an various architecture with their elements.(K3)
CO5 - Can develop real time IoT based projects.(K3)

U19ADO74 ARTIFICIAL INTELLIGENCE APPLICATIONS

Course Outcomes

After completion of the course, the students will be able to

CO1 - Apply the concept of data science. (K3)
CO2 - Understand the concept of Machine learning. (K2)
CO3 - Understand the concept of Deep Learning. (K2)
CO4 - Apply the design ideas in RPA. (K3)
CO5 - Make use of NLP concepts to create chatbot. (K3)

U19EEP71 BUSINESS BASICS FOR ENTREPRENEUR

Course Outcomes

After completion of the course, the students will be able to

CO1 - Impact comprehensive knowledge of an entrepreneurial ecosystem. (K6)
CO2 - Understand the need and significance of Business Plan in the success of an Enterprise. (K2)
CO3 - Understand the ways to judge the economic and business viability of proposed venture. (K2)
CO4 - Utilize the elements of success of entrepreneurial ventures. (K3)
CO5 - Evaluate the effectiveness of different entrepreneurial strategies. (K5)

U19EEP72 INDUSTRIAL AUTOMATION AND CONTROL LAB

Course Outcomes

After completion of the course, the students will be able to

CO1 - Analyze the ladder logic programs and components used for process control (K2)
CO2 - Design PLC-relay logic for the real time applications (K3)
CO3 - Implement industrial processing system. (K3)
CO4 - Design a SCADA monitoring system for real time applications. (K3)
CO5 - Diagnose the fault in Power generation and distribution networks, etc. (K3)

U19EEP73 ELECTRIC AND HYBRID VEHICLE LAB

Course Outcomes

After completion of the course, the students will be able to

CO1 - Estimate electrical motor power requirement for hybrid electrical vehicle. (K4)
CO2 - Design and analyze the performance electric and hybrid vehicle. (K4)
CO3 - Analyze the performance of Battery in charging and discharging intervals. (K4)
CO4 - Troubleshoot and test the control circuits, sensors, actuators used in an E-Vehicle(K4)
CO5 - Evaluate the electric vehicle performance by mathematical modeling using software. (K4)

U19EEW71 PROJECT PHASE - I

Course Outcomes

After completion of the course, the students will be able to

CO1 - Identify the problem statement for the proposed work through the literature survey. (K3)
CO2 - Choose the proper components as per the requirements of the design/system. (K2)
CO3 - Apply the acquainted skills to develop final model/system. (K2)
CO4 - Estimate, plan and execute the project as a team. (K3)
CO5 - Defend the finding and conclude with oral/written reports. (K2)

June 2022

Date	Day	Schedule	Working day / Holiday
1	Wed		5
2	Thu		6
3	Fri		7
4	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	8
5	Sun		Holiday
6	Mon		9
7	Tue		10
8	Wed		11
9	Thu		12
10	Fri		13
11	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	14
12	Sun		Holiday
13	Mon		15
14	Tue	Blood Donation Day	16
15	Wed	Career Development Training Ends / National Electricity Day	17
16	Thu		18
17	Fri		19
18	Sat		Holiday
19	Sun		Holiday
20	Mon	Zeroth Review	20
21	Tue	International Yoga Day	21
22	Wed		22
23	Thu		23
24	Fri		24
25	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	25
26	Sun		Holiday
27	Mon		26
28	Tue		27
29	Wed		28
30	Thu		29

Total number of working days : 26
Total number of holiday : 05

[illegible]

2. A. 1. 50

May 2022

Date	Day	Schedule	Working days/ Holiday
1	Sun		Holiday
2	Mon		
3	Tue	Ramzan	Holiday
4	Wed		
5	Thu		
6	Fri		
7	Sat		
8	Sun		Holiday
9	Mon		
10	Tue		
11	Wed		
12	Thu		
13	Fri		
14	Sat		
15	Sun		Holiday
16	Mon		
17	Tue		
18	Wed		
19	Thu		
20	Fri		
21	Sat		
22	Sun		Holiday
23	Mon		
24	Tue		
25	Wed		
26	Thu		
27	Fri	Commencement of VII semester classes	1
28	Sat		2
29	Sun		Holiday
30	Mon	Career Development Training starts	3
31	Tue		4

Total number of working days : 04
Total number of holiday : 01

[illegible]

❖ **Supplementary Examination:**

Supplementary examination is an additional examination conducted within a month of time after declaring the results of end semester examination. In order to complete the program within 4 years, only the student with maximum of two arrears will be permitted to appear for supplementary examination. The supplementary examination will be conducted in fifth and eighth semester only. For supplementary examination, the continuous assessment marks of the last attempt will be considered.

Benefits

- ❖ More number of students will receive the degree within the stipulated time
- ❖ The industries prefers to recruit students with no standing arrear. If the supplementary examinations is conducted then more number of students will be eligible for the recruitment

❖ **Photo copy of answer book:**

After the publication of the result, photocopy of the answer books shall be provided to the student on request with stipulated fee fixed by the College from time to time

Punctuality in Attendance

The students are requested to keep up punctuality in attending the college. The late comers will be losing their attendance and in turn the internal marks. Hence all the students are requested to attend the college in time. A student shall be permitted to appear for the End Semester Examination at the end of the semester only if he / she secures not less than 75% of overall attendance.

Redo Category

A student who secures overall attendance which is less than 60% has to repeat the course with the approval, when it is next offered.

Tutor Ward System

In the tutor ward system, 30 students are allotted to a tutor who will be taking care of these students. The students are requested to utilize the facility.

2. A. 1. 51

Marks Distribution of Continuous Assessment Marks (CAM) and End Semester Examination Marks (ESM)

Scheme for Continuous Assessment Test(CAT)

S. No	Course Type	Continuous Assessment components									
		Test Marks	Average of pre/post test/ viva for each experiment	Average of marks for experiment report for each experiment	Model Exam / Report	Assignment	Review - 1	Review - 2	Review - 3	Attendance	Total
1.	Theory	15	-	-	-	5	-	-	-	5	25
2.	Practical	-	10	15	15	-	-	-	-	10	50
3.	Project work	-	-	-	-	-	10	10	20	-	40

The internal marks will be provided fully based on the continuous assessment tests

Weightage of Assessment for Theory Course

S. No.	Test	Portion for Test	Test Marks	Duration of Test	Weightage for Internal
1	CAT 1	1½ Units	50	1 ½ hours	10
2	CAT 2	1½ Units	50	1 ½ hours	
3	Model	5 Units	75	3 hours	05
		Continuous Assessment for Theory Course			15

Question Paper Pattern

Question paper for CAT and ESE will be based on the patterns shown in Table (a) and (b)

Table (a) Question Paper pattern for CAT/Model Exam

Test Type	2 Marks	5 Marks	10 Marks	Total Marks
CAT 1 to 2	5(questions) (10 Marks)	4(questions) (20 Marks)	2 (questions) (20 Marks)	50
Model	End semester Examination Question Pattern			75

Table (b) Question paper pattern for End semester Examination(ESE)

2 Marks	5 Marks	10 Marks	Total Marks
10(20 Marks)	5 (25 Marks) (one questions from each unit)	3 (30 Marks) (out of 5 questions)	75

Important points for the kind attention of the Parents

Dear Parent

The VII semester classes commences on 27th May 2022. The above mentioned semester is a very short term, including working days meant for model exam. The students have to complete a lot of work within a short period. **Hence the parents are kindly requested not to permit their wards to avail frequent leave during this semester period for the following reasons.**

VII semester(IV Year) : All the VII semester papers are considered as analytical papers. Hence, regular attendance and more concentration are required to clear these semester papers.

Marks in the continuous assessment test decide the major part of the continuous assessment marks. So, availing leave for the continuous assessment test must be avoided at any cost as this would seriously affect the continuous assessment marks.

Practicals are very important not only to score more marks but also it will help to understand the theory part of the subject, hence advice your ward not to avail leaves during practical classes.

Please spare your valuable time to talk to your son/daughter every day **and try to understand what he/she is doing in respect of his/her studies.** Kindly extend all your support to your son/daughter which will help them to come out successfully. For any assistance from our side you may always feel free to contact the respective Coordinator / HOD any time during the working hours.

Gold Medals and Top Ten Ranks

Your seniors were sincere, hard working and got the Goldmedals of the Pondicherry University and the top ten ranks in all the branches. The details of the University Goldmedals and Top Ten Ranks won by the students are given below.

Indicates the Gold medal and University First Rank.

For the Award of Gold Medal and ranks for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first five candidates in each branch of study.

Name of the Course	Year		
	2017	2018	2019
B.Tech. EEE	2, 4, 6, 7		2,3,4,6,7,8,9,10
B.Tech. ECE	2,3,4,5,6,7,8,9,10		3,4,5,6,7,9,10
B.Tech. CSE	2, 3, 4, 10		2,4,6,7,8,10
B.Tech. IT	2,3,4,5,6,7,8,9,10		2,3,5,6,8
B.Tech. ICE	2,3,4,5,6,7,8,9,10		2,3,4,5,6,7,8,9,10
B.Tech. Mech	4, 5, 7, 9, 10		3,7,8,10
B.Tech. Civil	2, 3, 10		2,3,4,6,7,10
MCA	3,4,7,9,10		2,6,7,8,9,10,11
MBA	3,4,6,7,8		2,3,4,5,7,8,10
M.Tech. CSE	2, 3, 4, 5, 7, 8, 9		7
M.Tech. ECE	2, 3, 6, 7, 8, 9		2,3,4,5
M.Tech. PED			2,3
M.Tech. NW	2, 3, 4, 5, 7, 8, 9		2,3
M.Tech(VLSI)			2,3,4
M.Tech(MF)	2		

Distribution of Attendance marks for theory : 5 marks

The distribution of 5 marks for theory class attendance is as follows :
5 marks for 95% attendance and above
4 marks for 90% attendance and above but below 95%
3 marks for 85% attendance and above but below 90%
2 marks for 80% attendance and above but below 85%
1 mark for 75% attendance and above but below 80%

Distribution of Attendance marks for practical : 10 marks

The distribution of 10 marks for practical class attendance is as follows :
10 marks for 95% attendance and above
8 marks for 90% attendance and above but below 95%
6 marks for 85% attendance and above but below 90%
4 marks for 80% attendance and above but below 85%
2 marks for 75% attendance and above but below 80%

Note :

Students should not be absent for the online classes/regular classes. Attendance for the online classes/regular classes are monitored regularly and it is recorded. Continuous assessment mark will be based on the performance of the students in the continuous assessment test, assignment and attendance percentage.

Assignments : 5 marks

Out of 25 continuous assessment marks, 5 marks will be awarded for the assignment. The assignment questions will be different for each and every student. The students have to submit 3 assignments in each subject. Best of 2 out of 3 assignments will be consider.

Women Cell

For the benefit of the girl students, a Women Cell has been constituted in the college. The girl students may approach the Chairperson / members for assistance.

Grievance Redressal Cell

There is a Grievance Redressal Cell under the Chairmanship of the Director of the institution. Students are requested to approach the Chairman / members to redress their grievances. Mail ID : grievance@smvec.ac.in

2. A. 1. 52

Importance of Continuous Assessment Marks(CAM)

The continuous assessment marks once earned are carried over to the subsequent exams also. Hence the students are requested to work hard to get the maximum continous assessment marks. If the continuous assessment marks are lower, it will pull down chances of getting the first class, distinction, gold medals and ranks.

Importance of CAT-I/CAT-II/ Model Examination

Continuous assessment marks are awarded for the performance in the CAT-I, CAT-II & Model Exam. Hence all the students are requested to prepare well for each test / examination to earn the maximum continuous assessment marks.

Undertaking Minor / Major Projects

Each student is advised to take atleast one minor project. Involving in the project will be helping to understand the basics of the subject. Some of the minor / major project will also be benefiting the society. Moreover, the Management awards cash prizes for the best projects in each department.

Participation in the Curricular / Co-curricular / Extra curricular Activities

All the students are encouraged to participate in the curricular / co-curricular / extra curricular activities. Involvement in these activities will improve their knowledge level in the subject. If a student or a team gets cash prize / award in the technical event organized by the recognized institutions, then the management of this institution will also sanction an amount equivalent to the winning award / cash prize as a token of appreciation.

Leave Account Record

For each student, leave account record has been provided. The students are instructed to show the leave record to their parents and strictly adhere to the instructions given for availing the leave. The leave account record should be maintained properly and prior approval must be obtained for availing the leave. In exceptional cases, the students are permitted to get the approval after availing the leave.

Transport Facility

61 buses have been arranged for the students to reach the college from Puducherry, Kanagachettikulam, Villupuram, Neyveli, Panruti, Cuddalore, Nellikuppam, Madukarai, Tindivanam, Tiruvannamalai and virudhachalam covering almost all the areas. Separate transport facility has been arranged for the students who remain in the college after 5p.m. for utilising computer lab, library and sports facilities. The students are requested to utilise the transport facility.

All the students are requested to avoid mobile phones and travel by two wheelers considering their safety and security.

Placement and Training Division

The placement cell functions round the clock throughout the year to establish contact with reputed multinational companies, well established industrial organizations and plays an important role in locating various job opportunities and placing large number of the students every year at these organizations.

Activities of the Training Division

- Arranges trainings for personality and interpersonal skill development.
- Assists the students to get in-plant training
- Arranges industrial visits
- Creates awareness on the opportunities open for his/her studies.
- Arranges coaching classes for GATE, GRE, TOFEL, IELTS, IAS, IES etc.

Placement Record

Academic Year	Students Placed
2013-14	85%
2014-15	95%
2015-16	95%
2016-17	98%
2017-18	95%
2018-19	95%
2019-20	95%
2020-21	96%
2021-22	95%

Details of Placed Students : 2021-22

MST Rober Services	18	Microchip	3
VL and Engg. & Const	11	TCS-Digital	9
ZOHO	8	KAAR	22
TCS-Ninja	116	Virtusa	17
CTS-Genc	190	EmbedUR	1
Wipro	147	ANI	1
Nri Sigma	31	NTT Data	4
Hexaware	4	Excelacom	3
CTS Genc-Elevate	15	Support Studio Tech	5
Ecom	1	Secure Kloud	10
Mindtree	27	CEIAS	4
Oals	1	Tech Mahendra	10
MicroChip Technologies	1	Forbes Marshall	2
Capgemini	14	RK Power Gen Pvt.	2
HCL Technology	5	Rampal Pvt. Ltd	2
Infosys	14	Adroit Soft	33
India Nippon Electrical	1	Unisys	11
Exicon	4	Skolar Academy	11
My Medical Shop	3	others	59
Volvech	16		
Appasamy Associates	2	Total	*897

*till May 2022

Wi-Fi Campus

Our campus has been enabled by high speed uninterrupted Wi-Fi connectivity. The Computer Centre is open till 8.00 p.m. on all the working days except on the dates of University examinations.

Library Working Hours

8.30 a.m. to 8.30 p.m. (On all the working days)
8.30 a.m. to 10.00 p.m. (During the examination days)

Academic calendar (II Year)

2. A. 1. 53

Use of Cell Phones

It has been decided not to permit cell phones inside the college campus. If any student is found using the cell phone inside the college campus, it would be confiscated and will not be returned back on any circumstances. Hence the students are instructed not to attend the college with the mobile phones.

Dress Code

The students are requested to attend the college neatly dressed. While the male students should attend the college with the shirts neatly tucked in and with the shoes, the female students are permitted to come with churidar and dupatta properly pined. Students wearing full hand shirts should wear it as such without folding it to half etc. Casual wears like jeans, T-shirts etc., both for boys and girls are strictly prohibited inside the campus. Each department has prescribed uniforms for the labs. The students are requested to strictly adhere to the dress codes as well as the rules and regulations of the college.

Maintenance of Discipline

Discipline is an important factor that shapes one's personality. It is considered as a golden key capable of opening many doors. This institution expects each and every student to follow the rules and regulations in total. Maintaining discipline in the campus will promote a conducive environment for studies.

Working hours

I hour	09.00 a.m	09.50 a.m
II hour	09.50 a.m	10.40 a.m
Break	10.40 a.m	10.55 a.m
III hour	10.55 a.m	11.45 a.m
IV hour	11.45 a.m	12.35 p.m
V hour	01.15 p.m	02.05 p.m
VI hour	02.05 p.m	02.55 p.m
Break	02.55 p.m	03.10 p.m
VII hour	03.10 p.m	04.00 p.m
VIII hour	04.00 p.m	04.50 p.m

Lunch break 12.35 p.m. to 1.15 p.m.

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

An Autonomous Institution

(Accredited by NBA-AICTE, New Delhi, NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107

Academic Calendar

May 2022 to September 2022

Name :

Programme : B.Tech.

Department : Electrical and Electronics Engineering

Year / Sem : II Yr / IV Sem

நிர்வாகம்

About Autonomous

Sri Manakula Vinayagar Engineering College has been conferred with Autonomous Status by the University Grants Commission on 26th September 2019 and the same was approved by Pondicherry University on 19th June 2020. SMVEC Autonomous Regulations R2019, is followed for the students admitted in the Academic Year 2019-20 (present final Year). SMVEC Autonomous Regulations R2020, is followed for the students admitted from the Academic Year 2020-21 onwards (present first year & second year)

HIGHLIGHTS OF SMVEC AUTONOMOUS REGULATIONS 2019, 2020 & CURRICULUM

- Industry 4.0 ready curriculum
- Curriculum towards skill development and to create more job opportunities
- Multidisciplinary curriculum
- Oriented towards entrepreneurship development
- Choice to learn IELTS / Foreign Languages
- Department wise Gold Medals
- Results will be declared within a month after completion of examinations
- Supplementary Examination in 5th and 8th semester for the students having 2 arrears

- **Edutech / Mandatory course**

  The Institute has Established 17 Center of Excellence to provide 91 International Certification courses from IBM, Google, Cisco, e Plan, Microsoft, Autodesk, Texas instruments, Festo, Bentley, Schneider Electric, Amazon web services, Siemens, Tally, DELL EMC², Harita Techserv, PTC, LN an Excellence in Technology & Didactic solutions. All students should enroll in certification course from semester-I to semester-VI.

- **Industrial Training / Internship**

  Students may undergo training or internship during summer / winter vacation at Industry / Research organization. Students are also permitted to undergo internships during their eighth semester after the completion of theory classes.

September 2022

Date	Day	Schedule	Working day/ Holiday
1	Thu		70
2	Fri		71
3	Sat		72
4	Sun		Holiday
5	Mon	Teacher's Day	73
6	Tue		74
7	Wed		75
8	Thu	Model Practicals	
9	Fri	World E-vehicle Day	
10	Sat		
11	Sun		Holiday
12	Mon		
13	Tue		
14	Wed	Tentative ES practical	
15	Thu	Engineer's Day	
16	Fri	World Ozone Day	
17	Sat		Holiday
18	Sun		Holiday
19	Mon		
20	Tue		
21	Wed		
22	Thu	Electrical Motors Day	
23	Fri		
24	Sat		
25	Sun		Holiday
26	Mon		
27	Tue		
28	Wed		
29	Thu		
30	Fri	Tentative End Semester Theory exam starts	

Total number of working days : 66
Total number of holiday : 01

2. A. 1. 54

August 2022

Date	Day	Schedule	Working day/ Holiday
1	Mon	Certification course - Practical approach in selection of microcontrollers	47
2	Tue		48
3	Wed		49
4	Thu		50
5	Fri		51
6	Sat	Guest lecture - Electric safety	52
7	Sun		Holiday
8	Mon	Certificate course - PIC Microcontroller applications	53
9	Tue	Moharam	Holiday
10	Wed		54
11	Thu		55
12	Fri	Feedback from the students - 3	56
13	Sat	[illegible]	57
14	Sun		Holiday
15	Mon	Independance Day	Holiday
16	Tue	De Jure Transfer Day	Holiday
17	Wed	Model Exam starts	58
18	Thu		59
19	Fri		60
20	Sat	National Renewable Energy Day	61
21	Sun		Holiday
22	Mon		62
23	Tue	Model Exam ends	63
24	Wed		64
25	Thu	Certificate course - SQL	65
26	Fri		66
27	Sat	Guest lecture - Wind energy technology	67
28	Sun		Holiday
29	Mon		68
30	Tue		69
31	Wed	Vinayagar Chathurthi	Holiday

Total number of working days : 23
Total number of holiday : 08

[illegible]

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education: To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation: To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship: To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values: To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship.

MISSION

M1: Quality Education: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies.

M2: Industrial and Societal needs: To cater the dynamic needs of the Industry and society by strengthening industry-institute interaction.

M3: Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.

M4: Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Professional Knowledge
To possess strong educational foundation in Electrical and Electronics Engineering to attain successful career with professional responsibility.

PEO2: Innovative Skills
To enrich the skills to design and develop innovative solutions for engineering problems in a multidisciplinary environment.

PEO3: Ethics
To actively embrace leadership qualities for achieving professional goals with ethical values.

PEO4: Adaptability
To enhance intellectual competency along with technical skills by adapting to the current trends through eternal learning.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Core Proficiency
Utilize the engineering core knowledge to identify, formulate, design, and investigate the complex engineering problems of power electronics, electrical machines and power systems.

PSO2: Cutting Edge Technologies
Explore the new cutting edge technologies in the field of Electric vehicle, Automation, Artificial Intelligence, Robotics and Renewable Energy to compete in global market.

PSO3: Design and Evolution
Capability to comprehend the technological advancements with the usage of modern design tools for analysing and designing systems to confront the rapid pace of industrial innovations.

July 2022

Date	Day	Schedule	Working day/ Holiday
1	Fri		22
2	Sat	Certification course - Battery Technology	23
3	Sun		Holiday
4	Mon		24
5	Tue		25
6	Wed		26
7	Thu		27
8	Fri		28
9	Sat	Guest lecture - Advanced Software Technologies used in Industries	29
10	Sun	National tesla day – A day of science around the world	Holiday
11	Mon		30
12	Tue		31
13	Wed	Certification course - Occupational Health and Safety	32
14	Thu	Feedback from the students - 2	33
15	Fri	UCM2 SUBMISSION	34
16	Sat		Holiday
17	Sun		Holiday
18	Mon	CAT - II	35
19	Tue		36
20	Wed		37
21	Thu		38
22	Fri		39
23	Sat	Guest lecture - Advanced Microcontrollers for Drives	40
24	Sun		Holiday
25	Mon	Guest lecture - Energy Storage System and its applications	41
26	Tue		42
27	Wed		43
28	Thu		44
29	Fri	Industrial Visit	45
30	Sat	Industrial Visit	46
31	Sun		Holiday

Total number of working days : 26
Total number of holiday : 06

[illegible]

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June 2022

Date	Day	Schedule	Working day/ Holiday
1	Wed		Holiday
2	Thu		Holiday
3	Fri		Holiday
4	Sat		Holiday
5	Sun		Holiday
6	Mon		3
7	Tue		4
8	Wed		5
9	Thu		6
10	Fri		Holiday
11	Sat		Holiday
12	Sun		Holiday
13	Mon		7
14	Tue	Blood Donation Day	8
15	Wed	National Electricty Day	9
16	Thu		10
17	Fri		11
18	Sat		Holiday
19	Sun		Holiday
20	Mon		12
21	Tue	International Yoga Day	13
22	Wed		14
23	Thu		15
24	Fri	Feedback from the students - 1	16
25	Sat	Industrial Visit	17
26	Sun		Holiday
27	Mon	CAT - I	18
28	Tue		19
29	Wed		20
30	Thu		21

Total number of working days : 19
Total number of holiday : 11

[illegible]

PROGRAMME 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.

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.

U20BST430 PROBABILITY AND STATISTICS

Course Outcomes

After completion of the course, the students will be able to

CO1 - Apply the concept of probability in random variables.(K3)
CO2 - Apply the basic rules of continuous random variables.(K3)
CO3 - Understand the basic concepts of Statistics.(K2)
CO4 - Derive the inference for various problems using testing of hypothesis in large samples. (K3)
CO5 - Solve the problems related to testing of hypothesis in small samples. (K3)

U20EST467 PROGRAMMING IN JAVA

Course Outcomes

After completion of the course, students will be able to

CO1 - Write a maintainable java Program for a given algorithm and implement the same. (K2)
CO2 - Demonstrate the use of inheritance, interface and package in relevant applications. (K3)
CO3 - Create java applications using exception handling, thread and generic programming. (K3)
CO4 - Build java distributed applications using Collections and IO streams.(K3)
CO5 - Exemplify simple graphical user interfaces using GUI components and database programs. (K3)

U20EET411 MEASUREMENTS AND INSTRUMENTATION FOR ELECTRICAL ENGINEERING

Course Outcomes

After completion of the course, the students will be able to

CO1 - Acquire knowledge on the characteristics of measuring instruments and their classification.(K2)
CO2 - Conversant in construction, working of A.C / D.C meters and their proficient use. (K3)
CO3 - Acquire knowledge in various methods of digital meters and its measurement. (K3)
CO4 - Acquire knowledge on construction and working principle of various types of display devices and bridge comparison methods for R, L and C measurement. (K3)
CO5 - Demonstrate the various types of transducers used for physical measurements. (K3)

U20EET412 MICROPROCESSOR AND MICROCONTROLLER

Course Outcomes

After completion of the course, the students will be able to

CO1 - Illustrate the architecture of microprocessor and to develop skills in writing assembly language program.(K3)
CO2 - Have a clear understanding of microcontroller architecture with functional details of each pin.(K3)
CO3 - Write and debug Assembly and C programs for 8 bit Microcontroller.(K3)
CO4 - Interface input/output peripheral devices and to implement the advanced communication protocol like I²C and SPI using PIC Microcontroller. (K4)
CO5 - Design and develop microcontroller based real-time applications. (K4)

May 2022

Date	Day	Schedule	Working day/ Holiday
1	Sun		Holiday
2	Mon		
3	Tue	Ramzan	Holiday
4	Wed		
5	Thu		
6	Fri		
7	Sat		
8	Sun		Holiday
9	Mon		
10	Tue		
11	Wed		
12	Thu		
13	Fri		
14	Sat		
15	Sun		Holiday
16	Mon		
17	Tue		
18	Wed		
19	Thu		
20	Fri		
21	Sat		
22	Sun		Holiday
23	Mon		
24	Tue		
25	Wed		
26	Thu		
27	Fri	Commencement of IV semester classes	1
28	Sat		2
29	Sun		Holiday
30	Mon		Holiday
31	Tue		Holiday

Total number of working days : 02
Total number of holiday : 03

[illegible]

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Important points for the kind attention of the Parents

Dear Parent

The IV semester classes commences on 27th May 2022. The above mentioned semester is a very short term, including working days meant for model exam. The students have to complete a lot of work within a short period. **Hence the parents are kindly requested not to permit their wards to avail frequent leave during this semester period for the following reasons.**

IV semester (II Year) : All the IV semester papers are considered as analytical papers. Hence, regular attendance and more concentration are required to clear these semester papers.

Marks in the **continuous assessment test** decide the major part of the continuous assessment marks. So, availing leave for the continuous assessment test must be avoided at any cost as this would seriously affect the continuous assessment marks.

Practicals are very important not only to score more marks but also it will help to understand the theory part of the subject, hence advice your ward not to avail leaves during practical classes.

Please spare your valuable time to talk to your son/daughter every day and try to understand what he/she is doing in respect of his/her studies. Kindly extend all your support to your son/daughter which will help them to come out successfully. For any assistance from our side you may always feel free to contact the respective Coordinator / HOD any time during the working hours.

U20EEE401 ELECTRICAL SAFETY ENGINEERING

Course Outcomes

After completion of the course, the students will be able to

CO1 - Describe the Indian Electricity (IE) acts and various rules for electrical safety.(K1)
CO2 - Expose safety measures to prevent electrical shock in handling of domestic electrical appliances. (K2)
CO3 - Evaluate the safety aspects during installation of plant and equipment. (K3)
CO4 - Describe the various hazardous area and application of electrical safety in various places. (K1)
CO5 - Acquire knowledge about importance of electrical safety training to improve quality management in electrical systems. (K2)

U20EEE405 ENERGY STORAGE TECHNOLOGY

Course Outcomes

After completion of the course, the students will be able to

CO1 - Familiarize the need for energy storing.(K2)
CO2 - Analyze the various energy storage techniques in the form of electrical, magnetic and chemical systems. (K3)
CO3 - Analyze the different batteries and its characteristics used for storing the energy in electric vehicles, nano-tubes etc.(K4)
CO4 - Impart the concepts of Superconducting Magnet Energy Storage Systems and super-capacitors in digital cameras, PC cards, electric vehicles, medical applications etc.(K3)
CO5 - Analyze the various energy storage techniques used in Electric vehicles and its hybridization concepts, power grid stabilization, rail-system power models etc.(K4)

U20ECO401 ENGINEERING COMPUTATION WITH MATLAB

Course Outcomes

After completion of the course, the students will be able to

CO1 - State the basics of MATLAB. (K1)
CO2 - Explain how to work with matrices, and their operations. (K2)
CO3 - Use the MATLAB functions relevant to communication engineering. (K3)
CO4 - Demonstrates various file operations in MATLAB. (K3)
CO5 - Applying the plotting capabilities of MATLAB effectively to various systems. (K3)

U20CSO401 WEB DEVELOPMENT

Course Outcomes

After completion of the course, the students will be able to

CO1 - Develop basic web applications. (K5)
CO2 - Design the web applications using CSS. (K5)
CO3 - Validate the web pages using java scripts functions. (K5)
CO4 - Demonstrate the web 2.0 application to advance scripts. (K3)
CO5 - Update the knowledge of XML Data. (K4)

9. A. 1. 57

- **Supplementary Examination:**

Supplementary examination is an additional examination conducted within a month of time after declaring the results of end semester examination. In order to complete the program within 4 years, only the student with maximum of two arrears will be permitted to appear for supplementary examination. The supplementary examination will be conducted in fifth and eighth semester only. For supplementary examination, the continuous assessment marks of the last attempt will be considered.

Benefit:

- More number of students will receive the degree within the stipulated time
- The industries prefers to recruit students with no standing arrear. If the supplementary examinations is conducted then more number of students will be eligible for the recruitment

- **Photo copy of answer book:**

After the publication of the result, photocopy of the answer books shall be provided to the student on request with stipulated fee fixed by the College from time to time

Punctuality in Attendance

The students are requested to keep up punctuality in attending the college. The late comers will be losing their attendance and in turn the internal marks. Hence all the students are requested to attend the college in time. A student shall be permitted to appear for the End Semester Examination at the end of the semester only if he / she secures **not less than 75% of overall attendance.**

Redo Category

A student who secures overall attendance which is less than 60% has to repeat the course with the approval, when it is next offered.

Tutor Ward System

In the tutor ward system, 30 students are allocted to a tutor who will be taking care of these students. The students are requested to utilize the facility.

Gold Medals and Top Ten Ranks

Your seniors were sincere, hard working and got the Gold medals of the Pondicherry University and the top ten ranks in all the branches. The details of the University Goldmedals and Top Ten Ranks won by the students are given below:

🏅 Indicates the Gold medal and University First Rank.

For the Award of Gold Medal and ranks for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first five candidates in each branch of study.

Name of the Course	Year		
	2017	2018	2019
B.Tech. EEE	2, 4, 6, 7	🏅	🏅 2,3,4,6,7,8,9,10
B.Tech. ECE	2,3,4,5,6,7,8,9,10		🏅 3,4,5,6,7,9,10
B.Tech. CSE	🏅 ,2, 3, 4, 10		🏅 2,4,6,7,8,10
B.Tech. IT	🏅 ,2,3,4,5,6,7,8,9,10	🏅	🏅 2,3,5,6,8
B.Tech. ICE	🏅 ,2,3,4,5,6,7,8,9,10	🏅	🏅 2,3,4,5,6,7,8,9,10
B.Tech. Mech	🏅 ,4, 5, 7, 9, 10		3,7,8,10
B.Tech. Civil	2, 3, 10		2,3,4,6,7,10
MCA	3,4,7,9,10	🏅	🏅 2,6,7,8,9,10,11
MBA	🏅 3,4,6,7,8		🏅 2,3,4,5,7,8,10
M.Tech. CSE	🏅 2, 3,4,5,7,8,9		🏅 7
M.Tech. ECE	2, 3, 6, 7, 8, 9		2,3,4,5
M.Tech. PED	🏅		🏅 2,3
M.Tech. NW	🏅 2, 3,4,5,7,8,9		🏅 2,3
M.Tech(VLSI)	🏅		🏅 ,2,3,4
M.Tech(MF)	🏅 ,2		🏅

Placement and Training Division

The placement cell functions round the clock throughout the year to establish contact with reputed multinational companies, well established industrial organizations and plays an important role in locating various job opportunities and placing large number of the students every year at these organizations.

Activities of the Training Division

- Arranges trainings for personality and interpersonal skill development.
- Assists the students to get in-plant training
- Arranges industrial visits
- Creates awareness on the opportunities open for higher studies.
- Arranges coaching classes for GATE, GRE, TOFEL, IELTS, IAS, IES etc.

Placement Record

Academic Year	Students Placed
2013-14	85%
2014-15	95%
2015-16	95%
2016-17	93%
2017-18	95%
2018-19	95%
2019-20	95%
2020-21	96%
2021-22	95%

Details of Placed Students : 2021-22

MST Rebar Services	18	Microchip	3
VL and Engg. & Const	11	TCS-Digital	9
ZOHO	8	KAAR	22
TCS - Ninja	116	Virtusa	17
CTS-Genc	190	EmbedUR	1
Wipro	147	ANII	1
Mu Sigma	31	NTT Data	4
Harman	4	Excelacom	3
CTS Genc-Elevate	13	Support Studio Tech	5
Econ	1	Secure Kloud	10
Mindtree	27	CETAS	4
Oals	1	Tech Mahendra	10
MicroChip Technologies	1	Forbes Marshall	2
Capgemini	14	RK Power Gen Pvt.	2
HCL Technology	5	Rampal Pvt. Ltd	2
Infosys	14	Adroit Soft	33
India Nippon Electrical	1	Unisys	11
Eaton	4	Skolar Academy	11
My Medical Shop	3	others	59
Veltech	16		
Appasamy Associates	2	Total	*897

* till May 2022

Wi-Fi Campus

Our campus has been enabled by high speed uninterrupted Wi-Fi connectivity. The Computer Centre is open till 8.00 p.m. on all the working days except on the dates of University examinations.

Library Working Hours

8.30 a.m. to 8.30 p.m. (On all the working days)
8.30 a.m. to 10.00 p.m. (During the examination days)

Marks Distribution of Continuous Assessment Marks (CAM) and End Semester Examination Marks (ESM)

Scheme for Continuous Assessment Test(CAT)

S. No	Course Type	Continues Assessment components									
		Test Marks	Average of pre/post test/ viva for each experiment	Average of marks for experiment report for each experiment	Model Exam / Report	Assignment	Review - 1	Review - 2	Review - 3	Attendance	Total
1.	Theory	15	-	-	-	5	-	-	-	5	25
2.	Practical	-	10	15	15	-	-	-	-	10	50
3.	Project work	-	-	-	-	-	20	20	20	-	40

The internal marks will be provided fully based on the continuous assessment tests

Weightage of Assessment for Theory Course

S. No.	Test	Portion for Test	Test Marks	Duration of Test	Weightage for Internal
1	CAT 1	1½ Units	50	1 ½ hours	10
2	CAT 2	1½ Units	50	1 ½ hours	
3	Model	5 Units	75	3 hours	05
		Continuous Assessment for Theory Course			15

Question Paper Pattern

Question paper for CAT and ESE will be based on the patterns shown in Table (a) and (b)

Table (a) Question Paper pattern for CAT/Model Exam

Test Type	2 Marks	5 Marks	10 Marks	Total Marks
CAT 1 to 2	5(questions) (10 Marks)	4(questions) (20 Marks)	2 (questions) (20 Marks)	50
Model	End semester Examination Question Pattern			75

Table (b) Question paper pattern for End semester Examination(ESE)

2 Marks	5 Marks	10 Marks	Total Marks
10(20 Marks)	5 (25 Marks) (one questions from each unit)	3 (30 Marks) (out of 5 questions)	75

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Distribution of Attendance marks for theory : 5 marks

The distribution of 5 marks for theory class attendance is as follows :
5 marks for 95% attendance and above
4 marks for 90% attendance and above but below 95%
3 marks for 85% attendance and above but below 90%
2 marks for 80% attendance and above but below 85%
1 mark for 75% attendance and above but below 80%

Distribution of Attendance marks for practical : 10 marks

The distribution of 10 marks for practical class attendance is as follows :
10 marks for 95% attendance and above
8 marks for 90% attendance and above but below 95%
6 marks for 85% attendance and above but below 90%
4 marks for 80% attendance and above but below 85%
2 marks for 75% attendance and above but below 80%

Note :

Students should not be absent for the online classes/regular classes. Attendance for the online classes/regular classes are monitored regularly and it is recorded. Continuous assessment mark will be based on the performance of the students in the continuous assessment test, assignment and attendance percentage.

Assignments : 5 marks

Out of 25 continuous assessment marks, 5 marks will be awarded for the assignment. The assignment questions will be different for each and every student.The students have to submit 3 assignments in each subject. Best of 2 out of 3 assignments will be consider.

Women Cell

For the benefit of the girl students, a Woman Cell has been constituted in the college. The girl students may approach the Chairperson / members for assistance.

Grievance Redressal Cell

There is a Grievance Redressal Cell under the Chairmanship of the Director of the institution. Students are requested to approach the Chairman / members to redress their grievances. Mail ID : grievance@smvec.ac.in

Importance of Continuous Assessment Marks(CASM)

The continuous assessment marks once earned are carried over to the subsequent exams also. Hence the students are requested to work hard to get the maximum continous assessment marks. If the continuous assessment marks are lower, it will pull down chances of getting the first class, distinction, gold medals and ranks.

Importance of CAT-I/CAT-II/Model Examination

Continuous assessment marks are awarded for the performance in the CAT-I, CAT-II & Model Exam. Hence all the students are requested to prepare well for each test / examination to earn the maximum continuous assessment marks.

Undertaking Minor / Major Projects

Each student is advised to take atleast one minor project. Involving in the project will be helping to understand the basics of the subject. Some of the minor / major project will also be benefiting the society. Moreover, the Management awards cash prizes for the best projects in each department.

Participation in the Curricular / Co-curricular / Extra curricular Activities

All the students are encouraged to participate in the curricular / co-curricular / extra curricular activities. Involvement in these activities will improve their knowledge level in the subject. If a student or a team gets cash prize / award in the technical event organized by the recognised institutions, then the management of this institution will also sanction an amount equivalent to the winning award / cash prize as a token of appreciation.

Leave Account Record

For each student, leave account record has been provided. The students are instructed to show the leave record to their parents and strictly adhere to the instructions given for availing the leave. The leave account record should be maintained properly and prior approval must be obtained for availing the leave. In exceptional cases, the students are permitted to get the approval after availing the leave.

Transport Facility

61 buses have been arranged for the students to reach the college from Puducherry, Kanagachettikulam, Villupuram, Neyveli, Panruti, Cuddalore, Nellikuppam, Madukarai, Tindivanam, Tiruvannamalai and virudhachalam covering almost all the areas. Separate transport facility has been arranged for the students who remain in the college after 5 p.m. for utilising computer lab, library and sports facilities. The students are requested to utilise the transport facility.

All the students are requested to avoid mobile phones and travel by two wheelers considering their safety and security.

Academic calendar (I Year)

2. A. 1. 59

Use of Cell Phones

It has been decided not to permit cell phones inside the college campus. If any student is found using the cell phone inside the college campus, it would be confiscated and will not be returned back on any circumstances. Hence the students are instructed not to attend the college with the mobile phones.

Dress Code

The students are requested to attend the college neatly dressed. While the male students should attend the college with the shirts neatly tucked in and with the shoes, the female students are permitted to come with churidar and dupatta properly pined. Students wearing full hand shirts should wear it as such without folding it to half etc. Casual wears like jeans, T-shirts etc., both for boys and girls are strictly prohibited inside the campus. Each department has prescribed uniforms for the labs. The students are requested to strictly adhere to the dress codes as well as the rules and regulations of the college.

Maintenance of Discipline

Discipline is an important factor that shapes one's personality. It is considered as a golden key capable of opening many doors. This institution expects each and every student to follow the rules and regulations in total. Maintaining discipline in the campus will promote a conducive environment for studies.

Working hours

I hour	08.45 a.m	to 09.35 a.m
II hour	09.35 a.m	to 10.25 a.m
III hour	10.25 a.m	to 11.15 a.m
Break	11.15 a.m	to 11.30 a.m
IV hour	11.30 a.m	to 12.20 p.m
V hour	12.20 p.m	to 01.10 p.m
VI hour	01.50 p.m	to 02.40 p.m
VII hour	02.40 p.m	to 03.30 p.m
VIII hour	03.30 p.m	to 04.20 p.m

Lunch break 1.10 p.m. to 1.50 p.m.

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

An Autonomous Institution

(Accredited by NBA-AICTE, New Delhi, NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107

Academic Calendar

May 2022 to September 2022

Name :

Programme : B.Tech.

Department : Electrical and Electronics Engineering

Year / Sem : I Yr / II Sem

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About Autonomous

Sri Manakula Vinayagar Engineering College has been conferred with Autonomous Status by the University Grants Commission on 26th September 2019 and the same was approved by Pondicherry University on 19th June 2020. SMVEC Autonomous Regulations R2019, is followed for the students admitted in the Academic Year 2019-20 (present final Year). SMVEC Autonomous Regulations R2020, is followed for the students admitted from the Academic Year 2020-21 onwards (present first year & second year)

HIGHLIGHTS OF SMVEC AUTONOMOUS REGULATIONS 2020

- Industry 4.0 ready curriculum
- Updated towards skill development to create more job opportunities
- Multidisciplinary curriculum
- More entrepreneurship opportunities
- IELTS model curriculum / Foreign Language learning opportunities
- Department wise Gold Medals
- Results will be declared within a month after completion of examinations
- **Ethnotech / Mandatory course**

  The Institute has Established 17 Center of Excellence to provide 91 International Certification courses from IBM, Google, Cisco, E Plan, Microsoft, Autodesk, Texas instruments, Festo, Bentley, Schneider Electric, Amazon web services, Siemens, Tally, DELL EMC², Harita Techserv, PTC, LN an Excellence in Technology & Didactic solutions. All students should enroll in one of the certification course in every semester
- **Industrial Training / Internship**

  Students may undergo training or internship during summer / winter vacation at Industry/ Research organization. students are also permitted to undergo internships during their eighth semester after the theory classes are over

September 2022

Date	Day	Schedule	Working day/ Holiday
1	Thu		76
2	Fri		77
3	Sat		78
4	Sun		Holiday
5	Mon	Teacher's Day	79
6	Tue		80
7	Wed		81
8	Thu	Model practicals	
9	Fri	World E-vehicle Day	
10	Sat		
11	Sun		Holiday
12	Mon		
13	Tue		
14	Wed	Tentative End Semester Practicals	
15	Thu	Engineer's Day	
16	Fri	World Ozone Day	
17	Sat		Holiday
18	Sun		Holiday
19	Mon		
20	Tue		
21	Wed		
22	Thu	Electrical Motors Day	
23	Fri		
24	Sat		
25	Sun		Holiday
26	Mon		
27	Tue		
28	Wed		
29	Thu	Tentative End Semester Theory	
30	Fri		

Total number of working days : 66
Total number of holiday : 01

2. A. 1. 60

August 2022

Date	Day	Schedule	Working day/ Holiday
1	Mon	Certification course - Testing of DC machines	53
2	Tue		54
3	Wed		55
4	Thu		56
5	Fri	Guest Lecture - Electric Machines in Industries	57
6	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	58
7	Sun		Holiday
8	Mon	Certification course - Testing of transformers	59
9	Tue	Moharam	Holiday
10	Wed		60
11	Thu		61
12	Fri	Feedback from the students - 3	62
13	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities / QCM submission	63
14	Sun		Holiday
15	Mon	Independance Day	Holiday
16	Tue	De Jure Transfer Day	Holiday
17	Wed	Model Exam starts	64
18	Thu		65
19	Fri		66
20	Sat	National Renewable Energy Day	67
21	Sun		Holiday
22	Mon		68
23	Tue	Model Exam ends	69
24	Wed		70
25	Thu		71
26	Fri		72
27	Sat	Guest Lecture - Emerging controller	73
28	Sun		Holiday
29	Mon		74
30	Tue		75
31	Wed	Vinayagar Chathurthi	Holiday

Total number of working days : 23
Total number of holiday : 08

[illegible]

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education: To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation: To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship: To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values: To instil deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship.

MISSION

M1: Quality Education: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies.

M2: Industrial and Societal needs: To cater the dynamic needs of the Industry and society by strengthening industry-institute interaction.

M3: Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.

M4: Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Professional Knowledge
To possess strong educational foundation in Electrical and Electronics Engineering to attain successful career with professional responsibility

PEO2: Innovative Skills
To enrich the skills to design and develop innovative solutions for engineering problems in a multidisciplinary environment

PEO3: Ethics
To actively embrace leadership qualities for achieving professional goals with ethical values

PEO4: Adaptability
To enhance intellectual competency along with technical skills by adapting to the current trends through eternal learning

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Core Proficiency
Utilize the engineering core knowledge to identify, formulate, design, and investigate the complex engineering problems of power electronics, electrical machines and power systems.

PSO2: Cutting Edge Technologies
Explore the new cutting edge technologies in the field of Electric vehicle, Automation, Artificial Intelligence, Robotics and Renewable Energy to compete in global market.

PSO3: Design and Evolution
Capability to comprehend the technological advancements with the usage of modern design tools for analysing and designing systems to confront the rapid pace of industrial innovations.

July 2022

Date	Day	Schedule	Working day/ Holiday
1	Fri		28
2	Sat	Certification course - Testing of electronic devices	29
3	Sun		Holiday
4	Mon		30
5	Tue		31
6	Wed		32
7	Thu		33
8	Fri	Feedback from the students - 2	34
9	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities / QCM submission	35
10	Sun	National tesla day – A day of science around the world	Holiday
11	Mon	CAT - II	36
12	Tue		37
13	Wed		38
14	Thu		39
15	Fri	Guest Lecture - Electric Vehicles	40
16	Sat		Holiday
17	Sun		Holiday
18	Mon		41
19	Tue		42
20	Wed		43
21	Thu	Guest Lecture - Battery management system	44
22	Fri		45
23	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	46
24	Sun		Holiday
25	Mon		47
26	Tue		48
27	Wed		49
28	Thu		50
29	Fri	Industrial Visit	51
30	Sat	Industrial Visit	52
31	Sun		Holiday

Total number of working days : 26
Total number of holiday : 06

[illegible]

2. A. 1. 61

June 2022

Date	Day	Schedule	Working day/ Holiday
1	Wed		5
2	Thu		6
3	Fri		7
4	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	8
5	Sun		Holiday
6	Mon		9
7	Tue		10
8	Wed		11
9	Thu		12
10	Fri		Holiday
11	Sat		Holiday
12	Sun		Holiday
13	Mon		13
14	Tue	Blood Donation Day	14
15	Wed	National Electricity Day	15
16	Thu	Feedback from the students - 1	16
17	Fri	QCM 1 submission	17
18	Sat		Holiday
19	Sun		Holiday
20	Mon	CAT - I	18
21	Tue	International Yoga Day	19
22	Wed		20
23	Thu		21
24	Fri		22
25	Sat	Industrial Visit	23
26	Sun		Holiday
27	Mon		24
28	Tue		25
29	Wed		26
30	Thu		27

Total number of working days : 23
Total number of holiday : 07

[illegible]

PROGRAMME 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.

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.

2. A. 1. 62

U20BST215 ENGINEERING MATHEMATICS - II MULTIPLE INTEGRALS AND TRANSFORMS

Course Outcomes: *After completion of the course, the students will be able to*

CO1 -Understand the concept of double and triple integrals. (K2)
CO2 - Apply Laplace transform and inverse Laplace transform of simple functions. (K3)
CO3 -Convert a periodic function into series form. (K3)
CO4 -Compute Fourier transforms of various functions. (K3)
CO6 -Solve difference equations using Z – transforms. (K3)

U20EST238 BASIC ENGINEERING SCIENCE FOR ELECTRICAL ENGINEERING

Course Outcomes: *After completion of the course, the students will be able to*

CO1 -Identify, analyze the properties and applications of magnetic and dielectric materials. (K2)
CO2 -List the properties and applications of modern engineering materials. (K1)
CO3 - Appreciate concepts of conservation of mass, conservation of energy, and the Laws of thermodynamics. (K2)
CO4 -Understand the construction and functioning of IC engines, refrigeration system. (K2)
CO6 - Attain knowledge about types of pumps and turbines. (K2)

U20EET203 ELECTRIC CIRCUIT ANALYSIS

Course Outcomes: *After completion of the course, the students will be able to*

CO1- Analyze and solve DC networks using various network theorems. (K4)
CO2- Analyze and solve AC networks using various network theorems. (K4)
CO3- Analyze the behavior of three phase circuits using network topology for different type of loads under balanced and unbalanced conditions. (K4)
CO4- Analyze the steady state and transient behavior of RL, RC and RLC circuit using Laplace transformations for DC and AC excitations. (K4)
CO5- Analyze the resonance and tuned circuits for series and parallel connections. (K4)

U20EET204 ELECTRICAL MACHINES – I

Course Outcomes: *After completion of the course, the students will be able to*

CO1-Analyze the performance of DC machines under various operating conditions using their characteristics. (K4)
CO2-Interpret the efficiency of DC machines by conducting Suitable tests. (K4)
CO3 -Inspect the performance of single phase transformers using phasor diagrams and equivalent circuits and understand the characteristics of special transformers. (K4)
CO4-Outline the different types of connections in three phase transformers and savings of copper in autotransformers. (K2)
CO5-Interpret the efficiency of Transformers by conducting Suitable tests. (K4)

U20EET205 ELECTRONIC CIRCUITS

Course Outcomes: *After completion of the course, the students will be able to*

CO1 - Design the transistor Amplifiers using its small signal model. (K4)
CO2 -Design cascade amplifiers and sweep circuits. (K3)
CO3- Evaluate the performance analysis of large signal amplifier. (K4)
CO4- Design the feedback amplifiers and analyze frequency response. (K4)
CO5- Design oscillators for different types of signal generation. (K3)

U20EET206 DIGITAL ELECTRONICS

Course Outcomes: *After completion of the course, the students will be able to*

CO1- Use the Boolean laws to simplify the logical functions. (K3)
CO2- Design 'n' bit counters and shift registers. (K4)

May 2022

Date	Day	Schedule	Working day/ Holiday
1	Sun		Holiday
2	Mon		
3	Tue	Ramzan	Holiday
4	Wed		
5	Thu		
6	Fri		
7	Sat		
8	Sun		Holiday
9	Mon		
10	Tue		
11	Wed		
12	Thu		
13	Fri		
14	Sat		
15	Sun		Holiday
16	Mon		
17	Tue		
18	Wed		
19	Thu		
20	Fri		
21	Sat		
22	Sun		Holiday
23	Mon		
24	Tue		
25	Wed		
26	Thu		
27	Fri	Commencement of II semester classes	1
28	Sat		2
29	Sun		Holiday
30	Mon		3
31	Tue		4

Total number of working days : 04
Total number of holiday : 01

[illegible]

Important points for the kind attention of the Parents

Dear Parent

The II semester classes commences on 27th May 2022. The above mentioned semester is a very short term, including working days meant for model exam. The students have to complete a lot of work within a short period. **Hence the parents are kindly requested not to permit their wards to avail frequent leave during this semester period for the following reasons.**

II semester (I Year) : All the II semester papers are considered as analytical papers. Hence, regular attendance and more concentration are required to clear these semester papers.

Marks in the continuous assessment test decide the major part of the continuous assessment marks. So, availing leave for the continuous assessment test must be avoided at any cost as this would seriously affect the continuous assessment marks.

Practicals are very important not only to score more marks but also it will help to understand the theory part of the subject, hence advice your ward not to avail leaves during practical classes.

Please spare your valuable time to talk to your son/daughter every day and try to understand what he/she is doing in respect of his/her studies. Kindly extend all your support to your son/ daughter which will help them to come out successfully. For any assistance from our side you may always feel free to contact the respective Coordinator / HOD any time during the working hours.

CO3 - Design and analyze the synchronous and asynchronous sequential circuits. (K4)
CO4 - Gain knowledge on the design and fabrications of semiconductor memories. (K2)
CO5- Design, debug and test digital logic circuits using VHDL. (K4)

U20EEP203 ELECTRIC CIRCUIT ANALYSIS LAB

Course Outcomes: *After completion of the course, the students will be able to*

CO1- Verify the basic laws and simplify more complicated circuits into simple equivalent circuits using network theorems to compute various parameters of typical DC and AC electrical circuits. (K4)
CO2- Evaluate the solution of three phase AC balanced and unbalanced circuits with different types of loads. (K4)
CO3- Analyze the transient response of RL, RC and RLC circuits with DC and AC input used in power converters, choppers and sweep circuits. (K4)
CO4- Design tuned circuit for given frequency used in radio amplifiers for frequency tuning (K5)
CO5- Make use of simulation software for simulating various electrical circuits. (K5)

U20EEP204 ELECTRICAL MACHINES LAB - I

Course Outcomes: *After completion of the course, the students will be able to*

CO1- Test the performance of any DC machine (shunt, series or compound) and transformer by conducting suitable experiments and report the results. (K5)
CO2- Predetermine the different performance characteristics of DC machines and transformers. (K5)
CO3-Experiment and analyze the various speed control techniques for DC motors. (K5)
CO4-Experiment the parallel operation and analyze the load sharing of single phase transformers. (K4)
CO5-Develop any prototype modules implementing different control techniques in DC machine and transformers for various applications. (K5)

U20EEP205 ELECTRONICS LAB - II

Course Outcomes: *After completion of the course, the students will be able to*

CO1-Evaluate the frequency response of amplifier circuits.(K4)
CO2 - Design oscillator circuits for different types of signal generation. (K3)
CO3 -Implement projects using amplifiers and oscillator circuits. (K4)
CO4 - Design and verify the combinational circuits using K-Map. (K3)
CO5- Design and verify the different sequential circuits. (K3)
CO6 - Design and verify counters, shift registers and display devices. (K3)

U20EES201 SKILL DEVELOPMENT COURSE 1: DEMONSTRATION OF BASIC ENGINEERING SCIENCE

Course Outcomes: *After completion of the course, the students will be able to*

CO1 - Distinguish between tools of various trades such as carpentry, fitting, sheet metal, welding, and foundry.(K2)
CO2 - Describethe use of carpentry and fitting joints such as lap, butt, mortise joint, various sheet metal modelsand casting processes. (K2)
CO3 - Illustrate on centrifugal pump, Air conditioner. (K2)
CO4 - Apply on hand tools used in carpentry and preparation. (K4)
CO5 - Analyze of machine tools used in sheet metal work and fabrication work. (K5)

2. A. 1.63.

❖ **Supplementary Examinations**

Supplementary examination is an additional examination conducted within a month of time after declaring the results of end semester examination. In order to complete the program within 4 years, only the student with maximum of two arrears will be permitted to appear for supplementary examination. The supplementary examination will be conducted in fifth and eighth semester only. For supplementary examination, the continuous assessment marks of the last attempt will be considered.

Benefits

- ❖ More number of students will receive the degree within the stipulated time
- ❖ The industries prefers to recruit students with no standing arrear. If the supplementary examinations is conducted then more number of students will be eligible for the recruitment

❖ **Photo copy of answer book**

After the publication of the result, photocopy of the answer books shall be provided to the student on request with stipulated fee fixed by the College from time to time

Punctuality in Attendance

The students are requested to keep up punctuality in attending the college. The late comers will be losing their attendance and in turn the internal marks. Hence all the students are requested to attend the college in time. A student shall be permitted to appear for the End Semester Examination at the end of the semester only if he / she secures **not less than 75% of overall attendance.**

Redo Category

A student who secures overall attendance which is less than 60% has to repeat the course with the approval, when it is next offered.

Tutor Ward System

In the tutor ward system, 30 students are allotted to a tutor who will be taking care of these students. The students are requested to utilize the facility.

Gold Medals and Top Ten Ranks

Your seniors were sincere, hard working and got the Gold medals of the Pondicherry University and the top ten ranks in all the branches. The details of the University Goldmedals and Top Ten Ranks won by the students are given below:

🏅 Indicates the Gold medal and University First Rank.

For the Award of Gold Medal and ranks for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first five candidates in each branch of study.

Name of the Course	Year 2017	2018	2019
B.Tech. EEE	2,4, 6, 7	🏅	🏅 2,3,4,6,7,8,9,10
B.Tech. ECE	2,3,4,5,6,7,8,9,10		🏅 ,3,4,5,6,7,9,10
B.Tech. CSE	🏅 ,2, 3, 4, 10		🏅 ,2,4,6,7,8,10
B.Tech. IT	🏅 ,2,3,4,5,6,7,8,9,10	🏅	🏅 2,3,5,6,8
B.Tech. ICE	🏅 ,2,3,4,5,6,7,8,9,10	🏅	🏅 2,3,4,5,6,7,8,9,10
B.Tech. Mech	🏅 ,4, 5, 7, 9, 10		3,7,8,10
B.Tech. Civil	2, 3, 10		2,3,4,6,7,10
MCA	3,4,7,9,10	🏅	🏅 2,6,7,8,9,10,11
MBA	🏅 3,4,6,7,8		🏅 2,3,4,5,7,8,10
M.Tech. CSE	🏅 2, 3,4,5,7,8,9		🏅 ,7
M.Tech. ECE	2, 3, 6, 7, 8, 9		2,3,4,5
M.Tech. PED	🏅		🏅 2,3
M.Tech. NW	🏅 2, 3,4,5,7,8,9		🏅 2,3
M.Tech(VLSI)	🏅		🏅 ,2,3,4
M.Tech(MF)	🏅 ,2		🏅

Placement and Training Division

The placement cell functions round the clock throughout the year to establish contact with reputed multinational companies, well established industrial organizations and plays an important role in locating various job opportunities and placing large number of the students every year at these organizations.

Activities of the Training Division

- ★ Arranges trainings for personality and interpersonal skill development.
- ★ Assists the students to get in-plant training
- ★ Arranges industrial visits
- ★ Creates awareness on the opportunities open for higher studies.
- ★ Arranges coaching classes for GATE, GRE, TOFEL, IELTS, IAS, IES etc.

Placement Record

Academic Year	Students Placed
2013-14	83%
2014-15	95%
2015-16	95%
2016-17	93%
2017-18	95%
2018-19	95%
2019-20	95%
2020-21	96%
2021-22	95%

Details of Placed Students : 2021-22

MST Rebar Services	18	Microchip	3
VL and Engg. & Const	11	TCS-Digital	9
ZOHO	8	KAAR	22
TCS - Ninja	116	Virtusa	17
CTS-Genc	190	EmbedUR	1
Wipro	147	AMI	1
Mu Sigma	31	NTT Data	4
Harman	4	Excelacom	3
CTS Genc-Elevate	15	Support Studio Tech	5
Ezon	1	Secure Kloud	10
Mindtree	27	CETAS	4
Ola	1	Tech Mahendra	10
MicroChip Technologies	1	Forbes Marshall	2
Capgemini	14	RK Power Gen Pvt.	2
HCL Technology	5	Rampal Pvt. Ltd	2
Infosys	14	Adroit Soft	33
India Nippon Electrical	1	Unisys	11
Eaton	4	Skolar Academy	11
My Medical Shop	3	others	59
Voltech	16		
Appasamy Associates	2	Total	*897

* till May 2022

Wi-Fi Campus

Our campus has been enabled by high speed uninterrupted Wi-Fi connectivity. The Computer Centre is open till 8.00 p.m. on all the working days except on the dates of University examinations.

Library Working Hours

8.30 a.m. to 8.30 p.m. (On all the working days)
8.30 a.m. to 10.00 p.m. (During the examination days)

Marks Distribution of Continuous Assessment Marks (CAM) and End Semester Examination Marks (ESM)

Scheme for Continuous Assessment Test(CAT)

S. No	Course Type	Continuous Assessment components									
		Test Marks	Average of pre/post test/ viva for each experiment	Average of marks for experiment report for each experiment	Model Exam / Report	Assignment	Review - 1	Review - 2	Review - 3	Attendance	Total
1.	Theory	15	-	-	-	5	-	-	-	5	25
2.	Practical	-	10	15	15	-	-	-	-	10	50
3.	Project work	-	-	-	-	-	10	10	20	-	40

The internal marks will be provided fully based on the continuous assessment tests

Weightage of Assessment for Theory Course

S. No.	Test	Portion for Test	Test Marks	Duration of Test	Weightage for Internal
1	CAT 1	1½ Units	50	1 ½ hours	10
2	CAT 2	1½ Units	50	1 ½ hours	
3	Model	5 Units	75	3 hours	05
Continuous Assessment for Theory Course					15

Question Paper Pattern

Question paper for CAT and ESE will be based on the patterns shown in Table (a) and (b)

Table (a) Question Paper pattern for CAT/Model Exam

Test Type	2 Marks	5 Marks	10 Marks	Total Marks
CAT 1 to 2	5(questions) (10 Marks)	4(questions) (20 Marks)	2 (questions) (20 Marks)	50
Model	End semester Examination Question Pattern			75

Table (b) Question paper pattern for End semester Examination(ESE)

2 Marks	5 Marks	10 Marks	Total Marks
10(20 Marks)	5 (25 Marks) (one questions from each unit)	3 (30 Marks) (out of 5 questions)	75

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Distribution of Attendance marks for theory : 5 marks

The distribution of 5 marks for theory class attendance is as follows :
5 marks for 95% attendance and above
4 marks for 90% attendance and above but below 95%
3 marks for 85% attendance and above but below 90%
2 marks for 80% attendance and above but below 85%
1 mark for 75% attendance and above but below 80%

Distribution of Attendance marks for practical : 10 marks

The distribution of 10 marks for practical class attendance is as follows :
10 marks for 95% attendance and above
8 marks for 90% attendance and above but below 95%
6 marks for 85% attendance and above but below 90%
4 marks for 80% attendance and above but below 85%
2 marks for 75% attendance and above but below 80%

Note :

Students should not be absent for the online classes/regular classes. Attendance for the online classes/regular classes are monitored regularly and it is recorded. Continuous assessment mark will be based on the performance of the students in the continuous assessment test, assignment and attendance percentage.

Assignments : 5 marks

Out of 25 continuous assessment marks, 5 marks will be awarded for the assignment. The assignment questions will be different for each and every student. The students have to submit 3 assignments in each subject. Best of 2 out of 3 assignments will be consider.

Women Cell

For the benefit of the girl students, a Women Cell has been constituted in the college. The girl students may approach the Chairperson / members for assistance.

Grievance Redressal Cell

There is a Grievance Redressal Cell under the Chairmanship of the Director of the institution. Students are requested to approach the Chairman / members to redress their grievances. Mail ID : grievance@smvec.ac.in

Importance of Continuous Assessment Marks(CAM)

The continuous assessment marks once earned are carried over to the subsequent exams also. Hence the students are requested to work hard to get the maximum continuous assessment marks. If the continuous assessment marks are lower, it will pull down chances of getting the first class, distinction, gold medals and ranks.

Importance of CAT-I/CAT-II/ Model Examination

Continuous assessment marks are awarded for the performance in the CAT-I, CAT-II & Model Exam. Hence all the students are requested to prepare well for each test / examination to earn the maximum continuous assessment marks.

Undertaking Minor / Major Projects

Each student is advised to take atleast one minor project. Involving in the project will be helping to understand the basics of the subject. Some of the minor / major project will also be benefiting the society. Moreover, the Management awards cash prizes for the best projects in each department.

Participation in the Curricular / Co-curricular / Extra curricular Activities

All the students are encouraged to participate in the curricular / co-curricular / extra curricular activities. Involvement in these activities will improve their knowledge level in the subject. If a student or a team gets cash prize / award in the technical event organized by the recognized institutions, then the management of this institution will also sanction an amount equivalent to the winning award / cash prize as a token of appreciation.

Leave Account Record

For each student, leave account record has been provided. The students are instructed to show the leave record to their parents and strictly adhere to the instructions given for availing the leave. The leave account record should be maintained properly and prior approval must be obtained for availing the leave. In exceptional cases, the students are permitted to get the approval after availing the leave.

Transport Facility

61 buses have been arranged for the students to reach the college from Puducherry, Kanagachettikulam, Villupuram, Neyveli, Panruti, Cuddalore, Nellikuppam, Madukarai, Tindivanam, Tiruvannamalai and virudhachalam covering almost all the areas. Separate transport facility has been arranged for the students who remain in the college after 5p.m. for utilising computer lab, library and sports facilities. The students are requested to utilise the transport facility.

All the students are requested to avoid mobile phones and travel by two wheelers considering their safety and security.

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ANNEXURE - 3

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

LIST OF STUDENTS AND FACULTIES REGISTERED FOR NPTEL/MOOC COURSES FOR ACADEMIC YEAR 2022-2023

PERIOD	DEPARTMENT	FACULTIES	STUDENTS
JULY-OCT 2022	EEE	11	110
Total Enrollment		**121**	

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

List of faculty enrolled for NPTEL exam for July – October 2022

S.No	Name	Designation	Name of the course registered
1	Dr.P.Jamuna	Professor	Solar Energy Engineering and Technology [12 Weeks]
2	Dr.D.Raja	Professor	
3	Dr.K.Gowrishankar	Professor	
4	Dr.G.GaneshKumaran	Associate Professor	
5	Dr.M.Jayachandran	Assistant Professor	
6	Dr.D.Sivaraj	Assistant Professor	
7	Mr.K.Thangaraj	Assistant Professor	
8	Mr.J.Muruganandam	Assistant Professor	
9	Mr.C.Adrien Perianayagam	Assistant Professor	
10	Mr.R.Ragupathy	Assistant Professor	
11	Mr.I.Shivashankar	Assistant Professor	

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

List of students enrolled for NPTEL/MOOC Courses July – October 2022

Sl. No.	Name of the certification course	NPTEL/ Edx / Coursera, etc
1.	Fundamentals of Electrical Engineering	NPTEL
2.	Analog Circuits	NPTEL
3.	Microprocessor And Microcontrollers	NPTEL
4.	Power System Engineering	NPTEL
5.	Fuzzy Sets, Logic and Systems & Applications	NPTEL
6.	Data Science for Engineers	NPTEL
7.	Product Design and Development	NPTEL
8.	AI For Everyone: Master the Basics	EDX
9.	Business Consideration for Edge Computing	EDX
10.	Introduction to Cloud Development with HTML,CSS and Java Script	EDX
11.	Electric Cars: Technology	EDX
12.	Understanding Nuclear Energy	EDX
13.	Introduction to Cloud Computing	EDX
14.	Deep learning Fundamentals with Keras	EDX
15.	Python Basics For Data Science	EDX

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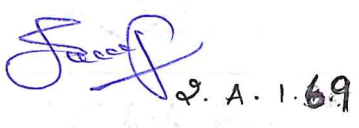
16.	Migrating to the AWS Cloud	EDX
17.	Getting Started with Cloud Security	EDX
18.	Product management: Fundamentals	EDX
19.	Amazon Sage Maker: Simplifying machine Learning Application Development	EDX
20.	Introduction to Linux	EDX
21.	Introduction to Kubernetes	EDX
22.	Solar Energy	EDX
23.	Introduction to Data Science	EDX
24.	Python Fundamentals for Beginners	Great Learning
25.	Multilayer Perceptron	Great Learning
26.	Introduction to Deep Learning	Great Learning
27.	Introduction to Digital Marketing	Great Learning
28.	Probability for Data Science	Great Learning
29.	Introduction to Cyber Security	Great Learning
30.	AWS Mobile App Development	Great Learning
31.	Basics of Machine learning	Great Learning
32.	Python Project Ideas	Great Learning
33.	Types of Cyber Security	Great Learning
34.	Probability	Great Learning
35.	Introduction to R	Great Learning
36.	Introduction to Machine Learning	Great Learning
37.	Python for Machine Learning	Great Learning
38.	Firewall	Great Learning
39.	Java Programming	Great Learning



40.	Data Visualization using Python	Great Learning
41.	Data Visualization Using Tableau	Great Learning
42.	Statistical methods for decision making	Great Learning
43.	Marketing & Retail analytics – Advanced	Great Learning
44.	Data Science Foundations	Great Learning
45.	Logistic Regression	Great Learning
46.	Instagram marketing fundamentals	Great Learning
47.	Basics of Managing Money	TRAININDIA
48.	Learn the Art of Hacking Through Programming	NIIT
49.	C Course	SoloLearn
50.	Beginner to Advanced WordPress Course	Just Web Infotech
51.	Maven Crash Course	Udemy

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Annexure – IV

List of Examiners

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DETAILS OF EXAMINER

Specialization		**Power Electronics and Drives**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1.	Dr.J.Ramesh Rahul	Assistant Professor / EEE, National institute of Technology, Andhra Pradesh	7989923036	rahuljammy1925@gmail.com
2.	Dr.K.K.Saravanan	Assistant Professor / EEE, University College of Engineering, Thirukuvalai campus, Nagapattinam	9789695832	saravanan.santi@gmail.com
3.	Dr. S. Jeyasudha	Professor / EEE, K.Ramakrishnan College of Technology, Trichy,	9629054969	jeayasudhas.eee@krct.ac.in
4.	Dr.S.A.Elankurisil	Professor & Head / EEE, Adhiparasakthi Engineering College, Melmaruvathur.	9442936797	saelankurisil@gmail.com
5.	Dr.V.Vasan Prabhu	Assistant Professor / Department of Automotive Electronics, SRM Institute of Science and Technology, Chennai.	7358682007	vasanprv@srmist.edu.in
6.	Dr.V.Krishna kumar	Associate Professor / EEE, St.Joseph's college of Engineering, Chennai	9944235196	v.krishnakumarsjce@gmail.com
7.	Dr.R.Raja Singh	Associate Professor / Department of Energy and Power Electronics, VIT, Vellore.	9894250650	rrajasingh@vit.ac.in
8.	Dr.C. Kumar	Professor and Head / EEE M Kumarasamy College of Engineering Thalavapalayam Post, Karur Tk,	9994942022	kumarc@bitsathy.ac.in
9.	Dr.Srinivasan Pradabane	Assistant Professor / EEE, National institute of Technology, Warangal, Telegana	8639352033	spradabane@nitw.ac.in
10.	Dr.P.Velmurugan	Associate Professor / EEE, St.Joseph's College of Engineering, Chennai	9976949243	velupriya10@gmail.com

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11.	Dr.N.Shobanadevi	Professor , University College of Engineering, Ariyalur.	8778149535	shobanadevi1975@gmail.com
12.	Dr.D.Zamrooth	Asst.Professor, Department of EEE, University college of Engineering, Kanchipuram	9176773605	zam.shireen@gmail.com
13.	Dr.A.Saraswathi	Asst.Professor, Department of EEE, University college of Engineering - Villupuram	9994549910	saraswathiask@gmail.com
14.	Dr.S.Prabhu	Associate Professor, Department of EEE, SreeVidyanikethan Engineering College, SreeSainath Nagar, Tirupati.	9600646211	prabhutajmahal6@gmail.com
15.	Dr.R.Natarajan	Associate Professor / EEE Fatima Michael College of Engineering and Technology, Madurai	9655986026	natarajanrajavel369@gmail.com
16.	Mr.C.Nandakumar	Assistant Professor / EEE Arunai Engineering College, Velu Nagar, Mathur, Tiruvannamalai	9865714571	nandha30electra@gmail.com
17.	Dr.PadmajaSankala	Asst. Professor / EEE, All India Shri Shivaji memorial Society's College of Engineeirng,Pune	9923669024	pksankala@aissmscoe.com
18.	Dr.S.Priyadharashni,	Assistant Professor / EEE, Arunai Engineering College, Velu Nagar, Mathur, Tiruvannamalai, Tamilnadu.	9994576791	priyamshanmugam@gmail.com
19.	Dr.R.Thamaraiselvi	Assistant Professor/EEE, University College of Engineering, Villupuram	9487363388	r.thamaraiselvi1@gmail.com
20.	Dr.R.Murugesan	Asst. Professor, Department of EEE, Annamacharya Institute of Technology and Sciences Thirupati	9944228455	rmurugesandr@gmail.com
21.	Dr.T.S.BalajiDamodhar	Associate Professor / EEE, Ranipettai Engineering College, Walajah, Vellore	9944665102	balajidamodhar@gmail.com
22.	Dr.C.Kannan	Associate Professor / EEE, Arunai Engineering College, Thiruvannamalai.	9841005438	kannanc305@gmail.com
23.	Dr.K.Sedhuraman	Associate Professor / EEE, Manakula Vinayagar Institute of Technology, Kalitheerthalkuppam, Puducherry.	9092882883	sedhuramaneee@mvit.edu.in
24.	Mr.S.Rajkumar	Assistant Professor / EEE, Manakula Vinayagar Institute	9952628247	rajkumareee@mvit.edu.in

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		of Technology, Kalitheerthalkuppam, Puducherry.		
25.	Mr.M.Saravanakumar	Assistant Professor / EEE, Mailam Engineering College, Mailam	9786863566	saravanakumareee@mailamengg.com
26.	Mr.G.G.Muthukumar	Assistant Professor / EEE, Mailam Engineering College, Mailam	9894762505	muthukumareee@mailamengg.com
27.	Dr.S.Satthiyaraj	Associate Professor / EEE, University College of Engineering, Panruti	9500405949	satthiya@gmail.com
28.	Dr. N. Arunkumar	Associate Professor / EEE, DhanalakshmiSrinivasanEngineeringCollege, Perambalur	9894949670	narunme26@gmail.com
29.	Mr.A.Vinothkumar	Assistant Professor / EEE, SRI College of Engineering and Technology, Vandavasi.	6379224893	vinothkumareee91@gmail.com
30.	Dr.G.Madhusudanan	Professor / EEE, SRM Nagar, Kattankulathur, Chengalpattu.	9884413903	madhusudanang.eee@valliammai.co.in
31.	Dr.G.Haridoss	Associate Professor/EEE, M. A. M College of Engineering and Technology, Siruganur, Trichy	9865481065	haridossg@gmail.com
32.	Dr.S.Albert Alexander	Associate Professor / EEE, Kongu Engineering College, Perundurai, Erode.	9865931597	ootyalex@gmail.com
33.	Dr.K.Arul Kumar	Assistant Professor / EEE, Madanapalle Institute of Technology & Science, Madanapalle-Chittoor District, Andhra Pradesh	9994822651	karuleee@gmail.com
34.	Dr.Mahendran Nagalingam	Professor / HOD, SAINTGITS College of Engineering Kottayam, Kerala	9894243719	drnmpower@gmail.com
35.	Dr.R.Natarajan	Associate Professor /EEE Fatima Michael College of Engineering and Technology, Madurai	9655986026	natarajanrajavel369@gmail.com
36.	Dr.T Suresh Padmanabhan	Associate Professor, Department of ECE, E.G.S Pillay Engineering College, Nagapattinam.	9444025552	drtsp@egspec.org
37.	Dr.Ra.Selvaganapathy	Assistant Professor / EEE, AVC College of Engineering Mayiladuthurai.	9940621275	selvaganapathyeee@avcceng.net
38.	Dr.S.S.Kumaresh	Asst.Prof / EEE, University college of Engineering, Kanchipuram.	9940545961	kumareshlive@gmail.com

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39.	Dr.R.Murugesan	Assistant Professor / EEE, Annamacharya Institute of Technology and Sciences, Tirupati	9944228455	rmurugesandr@gmail.com

Specialization		**Power systems**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1.	Dr.N.Chidambararaj	Associate Professor / EEE, St.Joseph's College of Engineering, OMR, Chennai	9840826431	chidambararajn@stjosephs.ac.in
2.	Dr.A.Ragavendiran	Asst.Professor / EEE, AVC College of Engineering, Mannampandal Mayiladudurai	8248781797	ragavendiran.as@gmail.com
3.	Dr. V. Subha Seethalakshmi	Associate Professor / EEE, Dhanalakshmi Srinivasan Engineering College, Perambalur	9865724662	vsubha05@gmail.com
4.	Dr.S.P.Mangaiyarkarasi	Asst.Professor , Department of EEE, University college of Engineering, Panruti.	8903678363	mangaisowmeya@gmail.com
5.	Dr.R.Karthikeyan	Asst.Professor, Department of EEE, University college of Engineering, Pattukottai.	9047656765	kar_thamarai82@yahoo.com
6.	Dr.Arul Murugan	Professor & Head / EEE Excel Group of Institutions Erode, TamilNadu	9842909393	arulpvp@gmail.com
7.	Dr.P.Sathish Babu	Asst.Professor, Department of EEE, University college of Engineering, Panruti	8667313405	psathishbabu@yahoo.co.in
8.	Dr.V.Arun	Associate Professor, Department of EEE, Sree Vidyanikethan Engineering College, SreeSainath Nagar, Tirupati.	8667244175	arunphd1986@gmail.com
9.	Dr.S.Durai	Assistant Professor, Department of EEE, Annamalai University	8667264066	abcddurai@gmail.com
10.	Dr.S.Karthikeyan	Assistant Professor Department of EEE, Annamalai University	8825793371	karthikaueee79@gmail.com
11.	Dr.M.Sathya	Assistant Professor, Department of EEE, Government college of Engineering,Srirangam,Trichy	7010271378	mrsathyaa@gces.edu.in
12.	Dr. R. Suresh	Associate Professor / EEE, SKP Engineering College , Thiruvannamalai	9943863622	rsureshskp@gmail.com

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13.	Dr.P.Ajay.D.Vimal Raj	Associate Professor Department of EEE, Pondicherry Engineering College.	9486142839	ajayvimal@pec.edu
14.	Ms.V.Logeshwari	Assistant Professor Department of EEE, Government College of Engineering, Srirangam.	8778727201	logulagam@gmail.com
15.	Dr. S. A.Elankurisil	Professor and Head/ EEE Adhiprasakthi Engineering College, Melmaruvathur,	9442936797	saelankurisil@gmail.com

Specialization		**Electrical Drives and Control**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1	Dr.A.Venkadesan,	Assistant Professor / EEE, National Institute of Technology , NH32, Karaikal, Puducherry.	7598566739	venkadesan@nitpy.ac.in
2	Dr. R .Gunabalan	Associate Professor, School of Electrical Engineering, VIT,Vandalur-Kelambakkam Road, Chennai.	9894919269	gunabalan.r@vit.ac.in
3	Dr.V.Krishnakumar	Associate Professor / EEE St.Joseph college of Engineering Chennai.	9944235136	v.krishnakumarjce@gmail.com
4	Dr.D.Lenine	Professor/EEE R.G.M College of Engg. & Tech. Nandyal, Andhra Pradesh.	9866723784	lenine.eee@gmail.com
5.	Dr.C.Carunaiselvane	Assistant Professor, Department of Automobile Engineering SRM Institute of Science and Technology, KTR Campus, Chennai	8265804594	carunaic@srmist.edu.in

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Specialization		Electrical Engineering		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr.S.Senthikumar	Associate Professor / EEE University College of Engineering, Ariyalur.	7810062427	senthil21575@gmail.com
2	Dr.S.R.Sivarasu,	Professor / EEE, Sri Eshwar College of Engineering (Autonomous) Coimbatore.	8056719372 / 9942029372	sivarasu.s.r@sece.ac.in

Specialization		Image Processing		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr. S. Karthick	Associate Professor / EEE, Sengunthar Engineering College, Thudupathi Post, Perundurai, Erode	9486937253	resumekarthick@gmail.com

Specialization		Very Large Scale Integration		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr.T.Venishkunmar	Associate Professor / EEE, Sethu Institute of Technology, Pulloor, Kariapatti – Virudhunagar, Tamilnadu	9095577477	tvenishkumar@gmail.com

Specialization		Control System and Instrumentation		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr.S.N.Sivaraj	Associate Professor/ EEE Velammal Engineering College, Chennai	9944238133/ 9080801268	sivarajsn@gmail.com
2	Dr. P. Manikannan	Professor / EEE, AKT Memorial College of Engineering and	9786658571	p.manikannan@gmail.com

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		Technology, Kallakurichi		
4	Mr.P.Jekan	Assistant Professor / EEE, SRM University, Kattankulathur, Chengalpattu.	9884937734	jeganp@srmist.edu.in

Specialization		**Applied Electronics**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1	Dr. J.P.Srividhya	Associate Professor / EEE, Arunai Engineering College, Tiruvannamalai	9486985422	sriviprakash2007@gmail.com

Specialization		**Automotive Technology, Material Science**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1	Dr. S. Roseline	Professor / EEE, M. A. M College of Engineering and Technology, Siruganur, Trichy	9443435493	roselines1969@gmail.com

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SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Department of Electrical and Electronics Engineering

Minutes of 5th Meeting of BoS (PG and Ph.D)

Venue	:	Seminar Hall, Department of EEE, Sri Manakula Vinayagar Engineering College
Date & Time	:	13th September, 2022 at 11.00 A.M

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
M.Tech – Power Electronics and Drives
Ph.D – Electrical and Electronics Engineering

Minutes of 5th Meeting of Board of Studies (PG and Ph.D)

The Fifth meeting of Board of Studies in Electrical and Electronics Engineering Department was held on **13th Sep 2022 at 11:00 A.M** in the Seminar Hall, Department of EEE, Sri Manakula Vinayagar Engineering College, with Head of Department in the Chair.

The following members were present for the BoS meeting

Sl. No.	Name of the Member	Designation
Head of the Department (Chairman)		
1	**Dr. S. Anbumalar, M.E., Ph.D.,** Professor and Head Specialization: Control System Years of Experience: 29 years Sri Manakula Vinayagar Engineering College saravanan.anbumalar@gmail.com 9443179533	Chairman
The entire faculty of each specialization		
2	**Dr. P. Jamuna, M.E., Ph.D.,** Professor Specialization: Power Electronics and Drives Years of Experience: 16 Sri Manakula Vinayagar Engineering College jamuna1981@gmail.com 9789544379	Member
3	**Dr. D. Raja, M.Tech., Ph.D.,** Professor Specialization: Electrical Drives and Control Years of Experience: 15 Sri Manakula Vinayagar Engineering College rajaapeee@gmail.com 9944337970	Member
4	**Dr. K. Gowrishankkar, M.Tech., Ph.D.,** Professor Specialization: Instrumentation and control Years of Experience: 16 Sri Manakula Vinayagar Engineering College gowri200@yahoo.com 9095555412	Member
5	**Dr. S. Ganesh Kumaran, M.E., Ph.D.,** Associate Professor Specialization: Electrical Machines Years of Experience:10 Sri Manakula Vinayagar Engineering College ganeshphd4u@gmail.com 9677624378	Member

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S&H Faculty		
6	**Dr. T. Gayathri** Professor, Dept. of Mathematics, SMVEC	Member
7	**Dr. K. Kathikeyan** Associate Professor, Dept. of Chemistry, SMVEC	Member
8	**Mrs. G. Namita** Associate Professor, Dept. of English, SMVEC	Member
9	**Dr. T. Jayavarthanan** Professor and Head Dept. of Physics, SMVEC, Madagadipet-605107	Member
Two subject experts from outside the Parent University nominated by the Academic Council		
10	**Dr. J. Kanagaraj, M.E., Ph.D.,** Professor & Head (In charge) Specialization: Control System Years of Experience:22 PSG College of Technology (Autonomous) Coimbatore – 641 004. Jkr.eee@psgtech.ac.in 94436 54496	Subject Expert
11	**Dr. P. Lakshmi, M.E., Ph.D.,** Professor Specialization: Electrical Engineering Years of Experience:20 College of Engineering Guindy, Anna University, Chennai. 600 025. p_lakshmi@annauniv.edu 9444266117	Subject Expert
One expert nominated by the Vice-Chancellor from a panel of six recommended by the college principal.		
12	**Dr. A. Kavitha, M.Tech., Ph.D** Professor Specialization: Electrical Engineering Years of Experience: 22 College of Engineering Guindy, Anna University, Chennai-600025 akavitha@annauniv.edu, 9444388778	Subject Expert
One representative from industry/corporate sector/allied area relating to placement.		
13	**Er. S. Selva Kumar, B.Tech.** Senior Engineer Qualcomm India Private Limited Bengaluru, Karnataka - 560001	Member
One postgraduate meritorious alumnus nominated by the Chairman, Board of Studies, with the approval of the principal of the college		
14	**Er. K. Ramraj, M.Tech** Technical Director, Specialization: Power Electronics Years of Experience:8 LED FORSE India, Poornankuppam, Puducherry – 605 007. ramrajeee@gmail.com, 9786714116	Member

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Agenda of the Meeting	
Agenda 1/ BoS/ 5 /2022 /EEE /PG	Confirmation of minutes of 4th meeting of BoS.
Agenda 2 / BoS/ 5 /2022 /EEE /PG	To discuss and approve the Academic Calendar for the ODD/EVEN Semester of Academic year 2022-23.
Agenda 3 / BoS/ 5 /2022 /EEE /PG	To discuss and recommend the panel of examiners to the Academic Council
Agenda 4 / BoS/ 5 /2022 /EEE /PG	To discuss and approve the on-line SWAYAM/MOOCS courses for the II year/ III semester student under R-2020 regulations during the period November 2022 to March 2023.
Agenda 5 / BoS/ 5 /2022 /EEE /PG	To approve the course work for the Research scholar admitted in the academic year 2022 - 2023.
Agenda 6 / BoS/ 5 /2022 /EEE /PG	To approve the Evaluation procedure adopted for the course work for the Research scholar admitted in the academic year 2022-2023.
Agenda 7 / BoS/ 5 /2022 /EEE /PG	Any other additional points to be discussed with the permission of Chair.

Minutes of the Meeting

Dr. S. Anbumalar, Chairman, BoS opened the meeting by welcoming the external members, the internal members and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Agenda 1/ BoS /5 /2022 /EEE /PG

Confirmation of minutes of 4th meeting of BoS.

Chairman, BoS, apprised the minutes of 4th BoS.

Agenda 2/ BoS /5 /2022 /EEE /PG

To discuss and approve the Academic Calendar for the ODD/EVEN Semester of Academic year 2022-23. The classes commenced from 27.05.2022.

The Academic Calendars are prepared for ODD/EVEN Semester of Academic year and it includes the schedule for CAT, Model Exam, QCM, Project review and Internal Marks distributions were discussed and approved **(given in Annexure-I)**

Agenda 3/ BoS /5 /2022 /EEE /PG

To discuss and recommend the panel of examiners to the Academic Council.

The list of Question Paper Setters and Evaluators **(given in Annexure-II)** was presented and recommended by the BoS members to the academic council.

Agenda 4/ BoS /5 /2022 /EEE /PG

To discuss and approve the on-line SWAYAM/MOOCS courses for the II year/ III semester students under R-2020 regulations during the period November 2022 to March 2023.

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The list of online SWAYAM / MOOCS courses **(given in Annexure- III)** offered for **II** year / III semester student under R-2020 regulations during the November 2022 to March 2023 was presented and approved by the BoS members.

Agenda 5/ BoS /5 /2022 /EEE /PG

To approve the course work for the Research scholar admitted in the academic year 2022 - 2023.

List of Approved DC members and Course work papers are presented and approved by the BoS members**.** The details of Course work papers are given in **Annexure-IV**.

Name of the Supervisor	Dr. S.Anbumalar
Name of the Ph.D Scholar	Mr. V.Anandakumar
Title of the Research Work	Performance Investigation of Electric Vehicles Charging Station Using Different AI-Techniques

Approved DC members:

Member	Name and address	E mail and Mobile Number
Supervisor/Convener	Dr.S.Anbumalar, Dean Academics & HOD-EEE, SMVEC.	Email: deanacademic@smvec.ac.in Ph.No:9443179533
External Member-1	Dr.M.Sudhakaran, Professor, Dept.of EEE, Puducherry Technological University.	Email: sudhakaran@ptuniv.edu.in Ph.No:9994071997
External Member-2	Dr.J.Raja, Assistant Director National Power Training Institute.	Email: jraja.npti@gov.in Ph.No:8800124789
Internal Member	Dr.J.Madhusudanan, Professor & Head, Dept.of AI & DS, SMVEC.	Email: madhu@smvec.ac.in Ph.No:9003739274

Course Work Papers:

Sl. No	Course	Title of the Course	Credits	Max.Marks		
				CAM	ESM	Total
1	I	Research Methodology	4	-	100	100
2	II	Research and Publication Ethics	4	-	100	100
3	III	Advanced Course – Intelligent Controllers	4	40	60	100
4	IV	Advanced Course – Electric and Hybrid vehicle	4	40	60	100

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Agenda 6/ BoS /5 /2022 /EEE /PG

To approve the Evaluation procedure adopted for the course work for the Research scholar admitted in the academic year 2022-2023.

Evaluation procedure adopted for the course work to Ph.D research scholar was presented and approved by the BoS members. The details are given in **Annexure-V.**

The meeting for Fifth BoS approval was concluded at 11.45 A.M by Dr. S. Anbumalar, Chairman, Board of Studies, Department of Electrical and Electronics Engineering, Sri Manakula Vinayagar Engineering College.

Sl.No	Name of the Member with Designation and official Address	MEMBERS AS PER UGC NORMS	Signature
1	**Dr.S.Anbumalar** Professor and Head Department of EEE SMVEC,Madagadipet-605107	Chairman	
2	**Dr.A.Kavitha** Professor, Department of EEE College of Engineering Guindy Anna University Chennai. 600 025.	Subject Expert (University Nominee)	
3	**Dr. P. Lakshmi** Professor, Department of EEE College of Engineering Guindy Anna University Chennai. 600 025.	Subject Expert (Academic Council Nominee)	
4	**Dr. J. Kanakaraj** Professor & Head Department of EEE PSG College of Technology (Autonomous) Coimbatore – 641 004.	Subject Expert (Academic Council Nominee)	
5	**Er.S. Selva Kumar** Senior Engineer Qualcomm India Private Limited Bengaluru, Karnataka - 560001	Representative from Industry	
6	**Er.K.Ramraj** Technical Director LED FORSE India Poornankuppam Puducherry – 605 007.	Postgraduate Alumnus (nominated by the Principal)	
7	**Dr. P. Jamuna** Professor Department of EEE,SMVEC	Internal Member	
8	**Dr.D.Raja** Professor Department of EEE,SMVEC, Madagadipet-605107	Internal Member	
9	**Dr. K. Gowrishankar** Professor Department of EEE,SMVEC , Madagadipet-605107	Internal Member	

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10	**Dr.S.Ganesh Kumaran** Associate Professor Department of EEE, SMVEC, Madagadipet-605107	Internal Member	
11	**Dr.T.Gayathri** Professor and Head Dept of Mathematics,SMVEC, Madagadipet-605107	Internal Member	
12	**Dr.K.Kathikeyan** Associate Professor Dept. of Chemistry, SMVEC, Madagadipet-605107	Internal Member	
13	**Mrs.G.Namita** Associate Professor Dept. of English, SMVEC Madagadipet-605107,	Internal Member	
14	**Dr. T. Jayavarthanan** Professor and Head Dept. of Physics, SMVEC, Madagadipet-605107	Internal Member (Science & Humanity)	

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Annexure – I

M.Tech – Power Electronics and Drives

Academic calendar (I Year)

Use of Cell Phones:

It has been decided not to permit cell phones inside the college campus. If any student is found using the cell phone inside the college campus, it would be confiscated and will not be returned back on any circumstances. Hence the students are instructed not to attend the college with the mobile phones.

Dress Code

The students are requested to attend the college neatly dressed. While the male students should attend the college with the shirts neatly tucked in and with the shoes, the female students are permitted to come with churidar and dupatta properly pinned. Students wearing full hand shirts should wear it as such without folding it to half etc. Casual wears like jeans, T-shirts etc., both for boys and girls are strictly prohibited inside the campus. Each department has prescribed uniforms for the labs. The students are requested to strictly adhere to the dress codes as well as the rules and regulations of the college.

Maintenance of Discipline

Discipline is an important factor that shapes one's personality. It is considered as a golden key capable of opening many doors. This institution expects each and every student to follow the rules and regulations in total. Maintaining discipline in the campus will promote a conducive environment for studies.

Working hours

I hour	08.45 a.m	to	09.35 a.m
II hour	09.35 a.m	to	10.25 a.m
III hour	10.25 a.m	to	11.15 a.m
Break	11.15 a.m	to	11.30 a.m
IV hour	11.30 a.m	to	12.20 p.m
V hour	12.20 p.m	to	01.10 p.m
VI hour	01.50 p.m	to	02.40 p.m
VII hour	02.40 p.m	to	03.30 p.m
VIII hour	03.30 p.m	to	04.20 p.m

Lunch break 1.10 p.m. to 1.50 p.m.

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

An Autonomous Institution

(Accredited by NBA-AICTE, New Delhi, NAAC with "A" Grade)

Madagadipet, Puducherry - 605 107

Academic Calendar

May 2022 to September 2022

Name :

Programme : M.Tech.

Department : Electrical and Electronics Engineering

Year / Sem : I Yr / II Sem

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About Autonomous

Sri Manakula Vinayagar Engineering College has been conferred with Autonomous Status by the University Grants Commission on 26th September 2019 and the same was approved by Pondicherry University on 19th June 2020. SMVEC Autonomous Regulations R2019, is followed for the students admitted in the Academic Year 2019-20 (present final Year). SMVEC Autonomous Regulations R2020, is followed for the students admitted from the Academic Year 2020-21 onwards (present first year & second year)

HIGHLIGHTS OF SMVEC AUTONOMOUS REGULATIONS 2020

- Industry 4.0 ready curriculum
- Updated towards skill development to create more job opportunities
- Multidisciplinary curriculum
- More entrepreneurship opportunities
- IELTS model curriculum / Foreign Languages learning opportunities
- Department wise Gold Medals
- Results will be declared within a month after completion of examinations

- **Edunotech / Mandatory course**

  The Institute has Established 17 Center of Excellence to provide 91 International Certification courses from IBM, Google, Cisco, E Plan, Microsoft, Autodesk, Texas instruments, Festo, Bentley, Schneider Electric, Amazon web services, Siemens, Tally, DELL EMC, Harita Techserv, PTC, LN an Excellence in Technology & Didactic solutions. All students should enroll in one of the certification course in every semester

- **Industrial Training / Internship**

  Students may undergo training or internship during summer / winter vacation at Industry/ Research organization. students are also permitted to undergo internships during their eighth semester after the theory classes are over

September 2022

Date	Day	Schedule	Working day/ Holiday
1	Thu		76
2	Fri		77
3	Sat		78
4	Sun		Holiday
5	Mon	Teacher's Day	79
6	Tue		80
7	Wed		81
8	Thu	Model practicals	
9	Fri	World E-vehicle Day	
10	Sat		
11	Sun		Holiday
12	Mon		
13	Tue		
14	Wed	Tentative End Semester Practicals	
15	Thu	Engineer's Day	
16	Fri	World Ozone Day	
17	Sat		Holiday
18	Sun		Holiday
19	Mon		
20	Tue		
21	Wed		
22	Thu	Electrical Motors Day	
23	Fri		
24	Sat		
25	Sun		Holiday
26	Mon		
27	Tue		
28	Wed		
29	Thu	Tentative End Semester Theory	
30	Fri		

Total number of working days : 06
Total number of holiday : 01

[illegible]

August 2022

Date	Day	Schedule	Working day/ Holiday
1	Mon	Certification course - Testing of DC machines	53
2	Tue		54
3	Wed		55
4	Thu		56
5	Fri	Guest Lecture - Electric Machines in Industries	57
6	Sat	Special coaching class / GF / Seminar / GL / Placement / Academic Activities	58
7	Sun		Holiday
8	Mon	Certification course - Testing of transformers	59
9	Tue	Moharam	Holiday
10	Wed		60
11	Thu		61
12	Fri	Feedback from the students - 3	62
13	Sat	Special coaching class / GF / Seminar / GL / Placement / Academic Activities / [illegible]	63
14	Sun		Holiday
15	Mon	Independance Day	Holiday
16	Tue	De Jure Transfer Day	Holiday
17	Wed	Model Exam starts	64
18	Thu		65
19	Fri		66
20	Sat	National Renewable Energy Day	67
21	Sun		Holiday
22	Mon		68
23	Tue	Model Exam ends	69
24	Wed		70
25	Thu		71
26	Fri		72
27	Sat	Guest Lecture - Emerging controller	73
28	Sun		Holiday
29	Mon		74
30	Tue		75
31	Wed	Vinayagar Chathurthi	Holiday

Total number of working days : 23
Total number of holiday : 08

[illegible]

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education: To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation: To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship: To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values: To instil deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship.

MISSION

M1: Quality Education: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies.

M2: Industrial and Societal needs: To cater the dynamic needs of the industry and society by strengthening industry-institute interaction.

M3: Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.

M4: Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.

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PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Professional Knowledge

To possess strong educational foundation in Electrical and Electronics Engineering to attain successful career with professional responsibility

PEO2: Innovative Skills

To enrich the skills to design and develop innovative solutions for engineering problems in a multidisciplinary environment

PEO3: Ethics

To actively embrace leadership qualities for achieving professional goals with ethical values

PEO4: Adaptability

To enhance intellectual competency along with technical skills by adapting to the current trends through eternal learning

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Core Proficiency

Utilize the engineering core knowledge to identify, formulate, design, and investigate the complex engineering problems of power electronics, electrical machines and power systems.

PSO2: Cutting Edge Technologies

Explore the new cutting edge technologies in the field of Electric vehicle, Automation, Artificial intelligence, Robotics and Renewable Energy to compete in global market.

PSO3: Design and Evolution

Capability to comprehend the technological advancements with the usage of modern design tools for analysing and designing systems to confront the rapid pace of industrial innovations.

July 2022

Date	Day	Schedule	Working day/ Holiday
1	Fri		28
2	Sat	Certification course - Testing of electronic devices	29
3	Sun		Holiday
4	Mon		30
5	Tue		31
6	Wed		32
7	Thu		33
8	Fri	Feedback from the students - 2	34
9	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities / [illegible] submission	35
10	Sun	National tesla day – A day of science around the world	Holiday
11	Mon	CAT - II	36
12	Tue		37
13	Wed		38
14	Thu		39
15	Fri	Guest Lecture - Electric Vehicles	40
16	Sat		Holiday
17	Sun		Holiday
18	Mon		41
19	Tue		42
20	Wed		43
21	Thu	Guest Lecture - Battery management system	44
22	Fri		45
23	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	46
24	Sun		Holiday
25	Mon		47
26	Tue		48
27	Wed		49
28	Thu		50
29	Fri	Industrial Visit	51
30	Sat	Industrial Visit	52
31	Sun		Holiday

Total number of working days : 25
Total number of holiday : 06

[illegible]

June 2022

Date	Day	Schedule	Working day/ Holiday
1	Wed		5
2	Thu		6
3	Fri		7
4	Sat	Special coaching class / GP / Seminar / GL / Placement / Academic Activities	8
5	Sun		Holiday
6	Mon		9
7	Tue		10
8	Wed		11
9	Thu		12
10	Fri		Holiday
11	Sat		Holiday
12	Sun		Holiday
13	Mon		13
14	Tue	Blood Donation Day	14
15	Wed	National Electricity Day	15
16	Thu	Feedback from the students - 1	16
17	Fri	QCM 1 submission	17
18	Sat		Holiday
19	Sun		Holiday
20	Mon	CAT - I	18
21	Tue	International Yoga Day	19
22	Wed		20
23	Thu		21
24	Fri		22
25	Sat	Industrial Visit	23
26	Sun		Holiday
27	Mon		24
28	Tue		25
29	Wed		26
30	Thu		27

Total number of working days : 23
Total number of holiday : 07

[illegible]

PROGRAMME 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.

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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U20BST215 ENGINEERING MATHEMATICS - II MULTIPLE INTEGRALS AND TRANSFORMS

Course Outcomes: *After completion of the course, the students will be able to*

CO1 -Understand the concept of double and triple integrals. (K2)
CO2 - Apply Laplace transform and inverse Laplace transform of simple functions. (K3)
CO3 -Convert a periodic function into series form. (K3)
CO4 -Compute Fourier transforms of various functions. (K3)
CO5 -Solve difference equations using Z – transforms. (K3)

U20EST238 BASIC ENGINEERING SCIENCE FOR ELECTRICAL ENGINEERING

Course Outcomes: *After completion of the course, the students will be able to*

CO1 -Identify, analyze the properties and applications of magnetic and dielectric materials. (K2)
CO2 -List the properties and applications of modern engineering materials. (K1)
CO3 - Appreciate concepts of conservation of mass, conservation of energy, and the Laws of thermodynamics. (K2)
CO4 -Understand the construction and functioning of IC engines, refrigeration system. (K2)
CO5 - Attain knowledge about types of pumps and turbines. (K2)

U20EET203 ELECTRIC CIRCUIT ANALYSIS

Course Outcomes: *After completion of the course, the students will be able to*

CO1- Analyze and solve DC networks using various network theorems. (K4)
CO2- Analyze and solve AC networks using various network theorems. (K4)
CO3- Analyze the behavior of three phase circuits using network topology for different type of loads under balanced and unbalanced conditions. (K4)
CO4- Analyze the steady state and transient behavior of RL, RC and RLC circuit using Laplace transformations for DC and AC excitations. (K4)
CO5- Analyze the resonance and tuned circuits for series and parallel connections. (K4)

U20EET204 ELECTRICAL MACHINES – I

Course Outcomes: *After completion of the course, the students will be able to*

CO1-Analyze the performance of DC machines under various operating conditions using their characteristics. (K4)
CO2-Interpret the efficiency of DC machines by conducting Suitable tests. (K4)
CO3 -Inspect the performance of single phase transformers using phasor diagrams and equivalent circuits and understand the characteristics of special transformers. (K4)
CO4-Outline the different types of connections in three phase transformers and savings of copper in autotransformers. (K2)
CO5-Interpret the efficiency of Transformers by conducting Suitable tests.(K4)

U20EET205 ELECTRONIC CIRCUITS

Course Outcomes: *After completion of the course, the students will be able to*

CO1 - Design the transistor Amplifiers using its small signal model. (K4)
CO2 -Design cascade amplifiers and sweep circuits. (K3)
CO3- Evaluate the performance analysis of large signal amplifier. (K4)
CO4- Design the feedback amplifiers and analyze frequency response. (K4)
CO5- Design oscillators for different types of signal generation. (K3)

U20EET206 DIGITAL ELECTRONICS

Course Outcomes: *After completion of the course, the students will be able to*

CO1- Use the Boolean laws to simplify the logical functions. (K3)
CO2- Design 'n' bit counters and shift registers. (K4)

May 2022

Date	Day	Schedule	Working day/ Holiday
1	Sun		Holiday
2	Mon		
3	Tue	Ramzan	Holiday
4	Wed		
5	Thu		
6	Fri		
7	Sat		
8	Sun		Holiday
9	Mon		
10	Tue		
11	Wed		
12	Thu		
13	Fri		
14	Sat		
15	Sun		Holiday
16	Mon		
17	Tue		
18	Wed		
19	Thu		
20	Fri		
21	Sat		
22	Sun		Holiday
23	Mon		
24	Tue		
25	Wed		
26	Thu		
27	Fri	Commencement of II semester classes	1
28	Sat		2
29	Sun		Holiday
30	Mon		3
31	Tue		4

Total number of working days : 04
Total number of holiday : 01

தீ வெற்றியடைவதே உன்னைத் தவிர, வேறு யாராலும் தடுக்க முடியாது - பிரேம்

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Important points for the kind attention of the Parents

Dear Parent

The II semester classes commences on 27th May 2022. The above mentioned semester is a very short term, including working days meant for model exam. The students have to complete a lot of work within a short period. Hence the parents are kindly requested not to permit their wards to avail frequent leave during this semester period for the following reasons.

II semester (I Year) : All the II semester papers are considered as analytical papers. Hence, regular attendance and more concentration are required to clear these semester papers.

Marks in the continuous assessment test decide the major part of the continuous assessment marks. So, availing leave for the continuous assessment test must be avoided at any cost as this would seriously affect the continuous assessment marks.

Practicals are very important not only to score more marks but also it will help to understand the theory part of the subject, hence advice your ward not to avail leaves during practical classes.

Please spare your valuable time to talk to your son/daughter every day and try to understand what he/she is doing in respect of his/her studies. Kindly extend all your support to your son/daughter which will help them to come out successfully. For any assistance from our side you may always feel free to contact the respective Coordinator / HOD any time during the working hours.

CO3 - Design and analyze the synchronous and asynchronous sequential circuits. (K4)
CO4 - Gain knowledge on the design and fabrications of semiconductor memories. (K2)
CO5- Design, debug and test digital logic circuits using VHDL. (K4)

U2EEP203 ELECTRIC CIRCUIT ANALYSIS LAB

Course Outcomes:*After completion of the course, the students will be able to*
CO1- Verify the basic laws and simplify more complicated circuits into simple equivalent circuits using network theorems to compute various parameters of typical DC and AC electrical circuits. (K4)
CO2- Evaluate the solution of three phase AC balanced and unbalanced circuits with different types of loads. (K4)
CO3- Analyze the transient response of RL, RC and RLC circuits with DC and AC input used in power converters, choppers and sweep circuits. (K4)
CO4- Design tuned circuit for given frequency used in radio amplifiers for frequency tuning. (K5)
CO5- Make use of simulation software for simulating various electrical circuits. (K5)

U2EEP204 ELECTRICAL MACHINES LAB - I

Course Outcomes:*After completion of the course, the students will be able to*
CO1- Test the performance of any DC machine (shunt, series or compound) and transformer by conducting suitable experiments and report the results. (K5)
CO2- Predetermine the different performance characteristics of DC machines and transformers. (K5)
CO3-Experiment and analyze the various speed control techniques for DC motors. (K5)
CO4-Experiment the parallel operation and analyze the load sharing of single phase transformers. (K4)
CO5-Develop any prototype modules implementing different control techniques in DC machine and transformers for various applications. (K5)

U2EEP205 ELECTRONICS LAB - II

Course Outcomes:*After completion of the course, the students will be able to*
CO1-Evaluate the frequency response of amplifier circuits.(K4)
CO2 - Design oscillator circuits for different types of signal generation. (K3)
CO3 -Implement projects using amplifiers and oscillator circuits. (K4)
CO4 - Design and verify the combinational circuits using K-Map. (K3)
CO5- Design and verify the different sequential circuits. (K3)
CO6 - Design and verify counters, shift registers and display devices. (K3)

U2EES201 SKILL DEVELOPMENT COURSE 1:
DEMONSTRATION OF BASIC ENGINEERING SCIENCE

Course Outcomes:*After completion of the course, the students will be able to*
CO1 - Distinguish between tools of various trades such as carpentry, fitting, sheet metal, welding, and foundry.(K2)
CO2 - Describe the use of carpentry and fitting joints such as lap, butt, mortise joint, various sheet metal models and casting processes. (K2)
CO3 - Illustrate on centrifugal pump, Air conditioner. (K2)
CO4 - Apply on hand tools used in carpentry and preparation. (K4)
CO5 - Analyze of machine tools used in sheet metal work and fabrication work. (K5)

❖ **Supplementary Examinations:**

Supplementary examination is an additional examination conducted within a month of time after declaring the results of end semester examination. In order to complete the program within 4 years, only the student with maximum of two arrears will be permitted to appear for supplementary examination. The supplementary examination will be conducted in fifth and eighth semester only. For supplementary examination, the continuous assessment marks of the last attempt will be considered.

Benefit:

- ❖ More number of students will receive the degree within the stipulated time
- ❖ The industries prefers to recruit students with no standing arrear. If the supplementary examinations is conducted then more number of students will be eligible for the recruitment

❖ **Photo copy of answer book:**

After the publication of the result, photocopy of the answer books shall be provided to the student on request with stipulated fee fixed by the College from time to time

Punctuality in Attendance

The students are requested to keep up punctuality in attending the college. The late comers will be loking their attendance and in turn the internal marks. Hence all the students are requested to attend the college in time. A student shall be permitted to appear for the End Semester Examination at the end of the semester only if he / she secures not less than 75% of overall attendance.

Redo Category

A student who secures overall attendance which is less than 60% has to repeat the course with the approval, when it is next offered.

Tutor Ward System

In the tutor ward system, 30 students are allotted to a tutor who will be taking care of these students. The students are requested to utilize the facility.

Gold Medals and Top Ten Ranks

Your seniors were sincere, hard working and got the Gold medals of the Pondicherry University and the top ten ranks in all the branches. The details of the University Gold medals and Top Ten Ranks won by the students are given below:

Indicates the Gold medal and University First Rank.

For the Award of Gold Medal and ranks for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first five candidates in each branch of study.

Name of the Course	Year		
	2017	2018	2019
BTech. EEE	2,4,6,7		2,3,4,6,7,8,9,10
BTech. ECE	2,3,4,5,6,7,8,9,10		3,4,5,6,7,9,10
BTech. CSE	,2, 3, 4, 10		,2,4,6,7,8,10
BTech. IT	,2,3,4,5,6,7,8,9,10		2,3,5,6,8
BTech. ICE	,2,3,4,5,6,7,8,9,10		2,3,4,5,6,7,8,9,10
BTech. Math	,4, 5, 7, 9, 10		3,7,8,10
BTech. Civil	2, 3, 10		2,3,4,6,7,10
MCA	3,4,7,9,10		2,6,7,8,9,10,11
MBA	3,4,6,7,8		2,3,4,5,7,8,10
MTech. CSE	2, 3,4,5,7,8,9		,7
MTech. ECE	2, 3, 6, 7, 8, 9		2,3,4,5
MTech. PED			,2,3
MTech NW	2, 3,4,5,7,8,9		,2,3
MTech(MSI)			,2,3,4
MTech(MF)	,2		

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Placement and Training Division

The placement cell functions round the clock throughout the year to establish contact with reputed multinational companies, well established industrial organizations and plays an important role in locating various job opportunities and placing large number of the students every year at these organizations.

Activities of the Training Division

- Arranges trainings for personality and interpersonal skill development.
- Assists the students to get in-plant training
- Arranges industrial visits
- Creates awareness on the opportunities open for higher studies.
- Arranges coaching classes for GATE, GRE, TOFEL, IELTS, IAS, IES etc.

Placement Record

Academic Year	Students Placed
2013-14	89%
2014-15	95%
2015-16	95%
2016-17	98%
2017-18	99%
2018-19	99%
2019-20	99%
2020-21	96%
2021-22	99%

Details of Placed Students : 2021-22

MST Rebar Services	18	Microchip	3
VL and Engg. & Const	11	TCS-Digital	9
ZOHO	8	KAAR	22
TCS - Ninja	116	Virtusa	17
CTS-Genc	190	EmbeduR	1
Wipro	147	AMI	1
Mu Sigma	31	NTT Data	4
Harman	4	Excelsoft	3
CTS Genc-Elevate	15	Support Studio Tech	5
Ecom	1	Secure Kloud	10
Mindtree	27	CETAS	+
Oala	1	Tech Mahendra	10
MicroChip Technologies	1	Forbes Marshall	2
Capgemini	14	RR Power Gen Pvt.	2
HCL Technology	5	Rampal Pvt. Ltd	2
Infosys	14	Adroit Soft	33
Mitsu Nippon Electrical	1	Univrs	11
Exton	+	Skolar Academy	11
My Medical Shop	3	others	59
Voltech	16		
Appasamy Associates	2	Total	*897

* till May 2022

Wi-Fi Campus

Our campus has been enabled by high speed uninterrupted Wi-Fi connectivity. The Computer Centre is open till 8.00 p.m. on all the working days except on the dates of University examinations.

Library Working Hours

8.30 a.m. to 8.30 p.m. (On all the working days)
8.30 a.m. to 10.00 p.m. (During the examination days)

Marks Distribution of Continuous Assessment Marks (CAM) and End Semester Examination Marks (ESM)

Scheme for Continuous Assessment Test(CAT)

S. No	Course Type	Continuous Assessment components									
		Test Marks	Average of viva/oral test/ viva for each experiment	Average of marks for experiment report for each experiment	Model Exam / Report	Assignment	Review - 1	Review - 2	Review - 3	Attendance	Total
1.	Theory	15	-	-	-	5	-	-	-	5	25
2.	Practical	-	10	15	15	-	-	-	-	10	50
3.	Project work	-	-	-	-	-	10	10	20	-	40

The internal marks will be provided fully based on the continuous assessment tests

Weightage of Assessment for Theory Course

S. No.	Test	Portion for Test	Test Marks	Duration of Test	Weightage for Internal
1	CAT 1	1½ Units	50	1 ½ hours	
2	CAT 2	1½ Units	50	1 ½ hours	10
3	Model	5 Units	75	3 hours	05
Continuous Assessment for Theory Course					15

Question Paper Pattern

Question paper for CAT and ESE will be based on the patterns shown in Table (a) and (b)

Table (a) Question Paper pattern for CAT/Model Exam

Test Type	2 Marks	5 Marks	10 Marks	Total Marks
CAT 1 to 2	5(questions) (10 Marks)	4(questions) (20 Marks)	2 (questions) (20 Marks)	50
Model	End semester Examination Question Pattern			75

Table (b) Question paper pattern for End semester Examination(ESE)

2 Marks	5 Marks	10 Marks	Total Marks
10(20 Marks)	5 (25 Marks) (one questions from each unit)	3 (30 Marks) (out of 5 questions)	75

Distribution of Attendance marks for theory : 5 marks

The distribution of 5 marks for theory class attendance is as follows :
5 marks for 95% attendance and above
4 marks for 90% attendance and above but below 95%
3 marks for 85% attendance and above but below 90%
2 marks for 80% attendance and above but below 85%
1 mark for 75% attendance and above but below 80%

Distribution of Attendance marks for practical : 10 marks

The distribution of 10 marks for practical class attendance is as follows :
10 marks for 95% attendance and above
8 marks for 90% attendance and above but below 95%
6 marks for 85% attendance and above but below 90%
4 marks for 80% attendance and above but below 85%
2 marks for 75% attendance and above but below 80%

Note :

Students should not be absent for the online classes/regular classes. Attendance for the online classes/regular classes are monitored regularly and it is recorded. Continuous assessment mark will be based on the performance of the students in the continuous assessment test, assignment and attendance percentage.

Assignments : 5 marks

Out of 25 continuous assessment marks, 5 marks will be awarded for the assignment. The assignment questions will be different for each and every student. The students have to submit 3 assignments in each subject. Best of 2 out of 3 assignments will be consider.

Women Cell

For the benefit of the girl students, a Women Cell has been constituted in the college. The girl students may approach the Chairperson / members for assistance.

Grievance Redressal Cell

There is a Grievance Redressal Cell under the Chairmanship of the Director of the institution. Students are requested to approach the Chairman / members to redress their grievances. Mail ID : grievance@smvec.ac.in

Importance of Continuous Assessment Marks(CAM)

The continuous assessment marks once earned are carried over to the subsequent exams also. Hence the students are requested to work hard to get the maximum continous assessment marks. If the continuous assessment marks are lower, it will pull down chances of getting the first class, distinction, gold medals and ranks.

Importance of CAT-I/CAT-II/Model Examination

Continuous assessment marks are awarded for the performance in the CAT-I, CAT-II & Model Exam. Hence all the students are requested to prepare well for each test / examination to earn the maximum continuous assessment marks.

Undertaking Minor / Major Projects

Each student is advised to take atleast one minor project. Involving in the project will be helping to understand the basics of the subject. Some of the minor / major project will also be benefiting the society. Moreover, the Management awards cash prizes for the best projects in each department.

Participation in the Curricular / Co-curricular / Extra curricular Activities

All the students are encouraged to participate in the curricular / co-curricular / extra curricular activities. Involvement in these activities will improve their knowledge level in the subject. If a student or a team gets cash prize / award in the technical event organized by the recognised institutions, then the management of this institution will also sanction an amount equivalent to the winning award / cash prize as a token of appreciation.

Leave Account Record

For each student, leave account record has been provided. The students are instructed to show the leave record to their parents and strictly adhere to the instructions given for availing the leave. The leave account record should be maintained properly and prior approval must be obtained for availing the leave. In exceptional cases, the students are permitted to get the approval after availing the leave.

Transport Facility

61 buses have been arranged for the students to reach the college from Puducherry, Kanagachettikulam, Villupuram, Neyveli, Panruti, Cuddalore, Nellikuppam, Mathakarai, Tindivanam, Tiruvannamalai and virudhachalam covering almost all the areas. Separate transport facility has been arranged for the students who remain in the college after 5 p.m. for utilising computer lab, library and sports facilities. The students are requested to utilise the transport facility.

All the students are requested to avoid mobile phones and travel by two wheelers considering their safety and security.

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2. A. 1. 93.

Annexure – II

List of Examiners

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
M.Tech Power Electronics and Drives

DETAILS OF EXAMINER

Specialization		Power Electronics and Drives		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1.	Dr.J.Ramesh Rahul	Assistant Professor / EEE, National institute of Technology, Andhra Pradesh	7989923036	rahuljammy1925@gmail.com
2.	Dr.K.K.Saravanan	Assistant Professor / EEE, University College of Engineering, Thirukuvalai campus, Nagapattinam	9789695832	saravanan.santi@gmail.com
3.	Dr. S. Jeyasudha	Professor / EEE, K.Ramakrishnan College of Technology, Trichy,	9629054969	jeayasudhas.eee@krct.ac.in
4.	Dr.S.A.Elankurisil	Professor & Head / EEE, Adhiparasakthi Engineering College, Melmaruvathur.	9442936797	saelankurisil@gmail.com
5.	Dr.V.Vasan Prabhu	Assistant Professor / Department of Automotive Electronics, SRM Institute of Science and Technology, Chennai.	7358682007	vasanprv@srmist.edu.in
6.	Dr.V.Krishna kumar	Associate Professor / EEE, St.Joseph's college of Engineering, Chennai	9944235196	v.krishnakumarsjce@gmail.com
7.	Dr.R.Raja Singh	Associate Professor / Department of Energy and Power Electronics, VIT, Vellore.	9894250650	rrajasingh@vit.ac.in
8.	Dr.C. Kumar	Professor and Head / EEE M Kumarasamy College of Engineering Thalavapalayam Post, Karur Tk,	9994942022	kumarc@bitsathy.ac.in
9.	Dr.Srinivasan Pradabane	Assistant Professor / EEE, National institute of Technology, Warangal, Telegana	8639352033	spradabane@nitw.ac.in
10.	Dr.P.Velmurugan	Associate Professor / EEE, St.Joseph's College of Engineering, Chennai	9976949243	velupriya10@gmail.com

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11.	Dr.N.Shobanadevi	Professor , University College of Engineering, Ariyalur.	8778149535	shobanadevi1975@gmail.com
12.	Dr.D.Zamrooth	Asst.Professor, Department of EEE, University college of Engineering, Kanchipuram	9176773605	zam.shireen@gmail.com
13.	Dr.A.Saraswathi	Asst.Professor, Department of EEE, University college of Engineering - Villupuram	9994549910	saraswathiask@gmail.com
14.	Dr.S.Prabhu	Associate Professor, Department of EEE, SreeVidyanikethan Engineering College, SreeSainath Nagar, Tirupati.	9600646211	prabhutajmahal6@gmail.com
15.	Dr.R.Natarajan	Associate Professor / EEE Fatima Michael College of Engineering and Technology, Madurai	9655986026	natarajanrajavel369@gmail.com
16.	Mr.C.Nandakumar	Assistant Professor / EEE Arunai Engineering College, Velu Nagar, Mathur, Tiruvannamalai	9865714571	nandha30electra@gmail.com
17.	Dr.PadmajaSankala	Asst. Professor / EEE, All India Shri Shivaji memorial Society's College of Engineeirng,Pune	9923669024	pksankala@aissmscoe.com
18.	Dr.S.Priyadharashni,	Assistant Professor / EEE, Arunai Engineering College, Velu Nagar, Mathur, Tiruvannamalai, Tamilnadu.	9994576791	priyamshanmugam@gmail.com
19.	Dr.R.Thamaraiselvi	Assistant Professor/EEE, University College of Engineering, Villupuram	9487363388	r.thamaraiselvi1@gmail.com
20.	Dr.R.Murugesan	Asst. Professor, Department of EEE, Annamacharya Institute of Technology and Sciences Thirupati	9944228455	rmurugesandr@gmail.com
21.	Dr.T.S.BalajiDamodhar	Associate Professor / EEE, Ranipettai Engineering College, Walajah, Vellore	9944665102	balajidamodhar@gmail.com
22.	Dr.C.Kannan	Associate Professor / EEE, Arunai Engineering College, Thiruvannamalai.	9841005438	kannanc305@gmail.com
23.	Dr.K.Sedhuraman	Associate Professor / EEE, Manakula Vinayagar Institute of Technology, Kalitheerthalkuppam, Puducherry.	9092882883	sedhuramaneee@mvit.edu.in
24.	Mr.S.Rajkumar	Assistant Professor / EEE, Manakula Vinayagar Institute	9952628247	rajkumareee@mvit.edu.in

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		of Technology, Kalitheerthalkuppam, Puducherry.		
25.	Mr.M.Saravanakumar	Assistant Professor / EEE, Mailam Engineering College, Mailam	9786863566	saravanakumareee@mailamengg.com
26.	Mr.G.G.Muthukumar	Assistant Professor / EEE, Mailam Engineering College, Mailam	9894762505	muthukumareee@mailamengg.com
27.	Dr.S.Satthiyaraj	Associate Professor / EEE, University College of Engineering, Panruti	9500405949	satthiya@gmail.com
28.	Dr. N. Arunkumar	Associate Professor / EEE, DhanalakshmiSrinivasanEngineeringCollege, Perambalur	9894949670	narunme26@gmail.com
29.	Mr.A.Vinothkumar	Assistant Professor / EEE, SRI College of Engineering and Technology, Vandavasi.	6379224893	vinothkumareee91@gmail.com
30.	Dr.G.Madhusudanan	Professor / EEE, SRM Nagar, Kattankulathur, Chengalpattu.	9884413903	madhusudanang.eee@valliammai.co.in
31.	Dr.G.Haridoss	Associate Professor/EEE, M. A. M College of Engineering and Technology, Siruganur, Trichy	9865481065	haridossg@gmail.com
32.	Dr.S.Albert Alexander	Associate Professor / EEE, Kongu Engineering College, Perundurai, Erode.	9865931597	ootyalex@gmail.com
33.	Dr.K.Arul Kumar	Assistant Professor / EEE, Madanapalle Institute of Technology & Science, Madanapalle-Chittoor District, Andhra Pradesh	9994822651	karuleee@gmail.com
34.	Dr.Mahendran Nagalingam	Professor / HOD, SAINTGITS College of Engineering Kottayam, Kerala	9894243719	drnmpower@gmail.com
35.	Dr.R.Natarajan	Associate Professor /EEE Fatima Michael College of Engineering and Technology, Madurai	9655986026	natarajanrajavel369@gmail.com
36.	Dr.T Suresh Padmanabhan	Associate Professor, Department of ECE, E.G.S Pillay Engineering College, Nagapattinam.	9444025552	drtsp@egspec.org
37.	Dr.Ra.Selvaganapathy	Assistant Professor / EEE, AVC College of Engineering Mayiladuthurai.	9940621275	selvaganapathyeee@avccengg.net
38.	Dr.S.S.Kumaresh	Asst.Prof / EEE, University college of Engineering, Kanchipuram.	9940545961	kumareshlive@gmail.com

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39.	Dr.R.Murugesan	Assistant Professor / EEE, Annamacharya Institute of Technology and Sciences, Tirupati	9944228455	rmurugesandr@gmail.com

Specialization		**Power systems**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1.	Dr.N.Chidambararaj	Associate Professor / EEE, St.Joseph's College of Engineering, OMR, Chennai	9840826431	chidambararajn@stjosephs.ac.in
2.	Dr.A.Ragavendiran	Asst.Professor / EEE, AVC College of Engineering, Mannampandal Mayiladudurai	8248781797	ragavendiran.as@gmail.com
3.	Dr. V. Subha Seethalakshmi	Associate Professor / EEE, Dhanalakshmi Srinivasan Engineering College, Perambalur	9865724662	vsubha05@gmail.com
4.	Dr.S.P.Mangaiyarkarasi	Asst.Professor , Department of EEE, University college of Engineering, Panruti.	8903678363	mangaisowmeya@gmail.com
5.	Dr.R.Karthikeyan	Asst.Professor, Department of EEE, University college of Engineering, Pattukottai.	9047656765	kar_thamarai82@yahoo.com
6.	Dr.Arul Murugan	Professor & Head / EEE Excel Group of Institutions Erode, TamilNadu	9842909393	arulpvp@gmail.com
7.	Dr.P.Sathish Babu	Asst.Professor, Department of EEE, University college of Engineering, Panruti	8667313405	psathishbabu@yahoo.co.in
8.	Dr.V.Arun	Associate Professor, Department of EEE, Sree Vidyanikethan Engineering College, SreeSainath Nagar, Tirupati.	8667244175	arunphd1986@gmail.com
9.	Dr.S.Durai	Assistant Professor, Department of EEE, Annamalai University	8667264066	abcddurai@gmail.com
10.	Dr.S.Karthikeyan	Assistant Professor Department of EEE, Annamalai University	8825793371	karthikaueee79@gmail.com
11.	Dr.M.Sathya	Assistant Professor, Department of EEE, Government college of Engineering,Srirangam,Trichy	7010271378	mrsathyaa@gces.edu.in
12.	Dr. R. Suresh	Associate Professor / EEE, SKP Engineering College , Thiruvannamalai	9943863622	rsureshskp@gmail.com

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13.	Dr.P.Ajay.D.Vimal Raj	Associate Professor Department of EEE, Pondicherry Engineering College.	9486142839	ajayvimal@pec.edu
14.	Ms.V.Logeshwari	Assistant Professor Department of EEE, Government College of Engineering, Srirangam.	8778727201	logulagam@gmail.com
15.	Dr. S. A.Elankurisil	Professor and Head/ EEE Adhiprasakthi Engineering College, Melmaruvathur,	9442936797	saelankurisil@gmail.com

Specialization		**Electrical Drives and Control**		
S.No	**Name of the Examiner**	**Designation & Institution Name**	**Mobile No**	**Mail ID**
1	Dr.A.Venkadesan,	Assistant Professor / EEE, National Institute of Technology , NH32, Karaikal, Puducherry.	7598566739	venkadesan@nitpy.ac.in
2	Dr. R .Gunabalan	Associate Professor, School of Electrical Engineering, VIT,Vandalur-Kelambakkam Road, Chennai.	9894919269	gunabalan.r@vit.ac.in
3	Dr.V.Krishnakumar	Associate Professor / EEE St.Joseph college of Engineering Chennai.	9944235136	v.krishnakumarjce@gmail.com
4	Dr.D.Lenine	Professor/EEE R.G.M College of Engg. & Tech. Nandyal, Andhra Pradesh.	9866723784	lenine.eee@gmail.com
5.	Dr.C.Carunaiselvane	Assistant Professor, Department of Automobile Engineering SRM Institute of Science and Technology, KTR Campus, Chennai	8265804594	carunaic@srmist.edu.in

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Specialization		Electrical Engineering		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr.S.Senthikumar	Associate Professor / EEE University College of Engineering, Ariyalur.	7810062427	senthil21575@gmail.com
2	Dr.S.R.Sivarasu,	Professor / EEE, Sri Eshwar College of Engineering (Autonomous) Coimbatore.	8056719372 / 9942029372	sivarasu.s.r@sece.ac.in

Specialization		Image Processing		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr. S. Karthick	Associate Professor / EEE, Sengunthar Engineering College, Thudupathi Post, Perundurai, Erode	9486937253	resumekarthick@gmail.com

Specialization		Very Large Scale Integration		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr.T.Venishkunmar	Associate Professor / EEE, Sethu Institute of Technology, Pulloor, Kariapatti – Virudhunagar, Tamilnadu	9095577477	tvenishkumar@gmail.com

Specialization		Control System and Instrumentation		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr.S.N.Sivaraj	Associate Professor/ EEE Velammal Engineering College, Chennai	9944238133/ 9080801268	sivarajsn@gmail.com
2	Dr. P. Manikannan	Professor / EEE, AKT Memorial College of Engineering and Technology, Kallakurichi	9786658571	p.manikannan@gmail.com
4	Mr.P.Jekan	Assistant Professor / EEE, SRM University, Kattankulathur, Chengalpattu.	9884937734	jeganp@srmist.edu.in

2. A. 1. 99

Specialization		Applied Electronics		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr. J.P.Srividhya	Associate Professor / EEE, Arunai Engineering College, Tiruvannamalai	9486985422	sriviprakash2007@gmail.com

Specialization		Automotive Technology, Material Science		
S.No	Name of the Examiner	Designation & Institution Name	Mobile No	Mail ID
1	Dr. S. Roseline	Professor / EEE, M. A. M College of Engineering and Technology, Siruganur, Trichy	9443435493	roselines1969@gmail.com

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ANNEXURE - III

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
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Madagadipet, Puducherry - 605 107

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

M.Tech Power Electronics and Drives

LIST OF STUDENTS AND FACULTIES REGISTERED FOR NPTEL/MOOC COURSES FOR ACADEMIC YEAR 2022-2023

PERIOD	DEPARTMENT	STUDENTS
JULY-OCT 2022	EEE	01

List of student enrolled for NPTEL/MOOC Courses July – October 2022

Sl. No.	Name of the certification course	NPTEL/ Edx / Coursera, etc
1.	Introduction to smart grid	NPTEL

2. A. 1. 101

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
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Madagadipet, Puducherry - 605 107

(COMMON TO ALL ENGINEERING & TECHNOLOGY STREAMS AND SCIENCE & HUMANITIES)

COURSE CODE	COURSE TITLE	L	T	P	C
PHD21RMT101	RESEARCH METHODOLOGY	3	1	0	4

Course Category: Foundation Course

a. Preamble:

Today research is of immense importance in every field of life. Hence students need sound initiation in the world of research. Thus, this syllabus is prepared to equip students with the basics of research methodology and also provide them acquaintance with the main ingredients of collection of data, analysis of data, quantitative methods, optimization IPR and report writing.

b. Prerequisite Courses:

This course has no prerequisites

c. Related Courses:

Research and Publication Ethics.

d. Course educational objectives:

To impart knowledge and skills required for research:

- Problem formulation, analysis and solutions.
- Technical paper writing / presentation without violating professional ethics
- Be able to read and interpret statistical information
- Know the basics of different evolutionary algorithms.
- Patent drafting and filing patents.

e. Course Outcomes:

Upon the successful completion of the course, scholar will be able to:

CO Nos.	Course Outcomes	Knowledge level (Based on revised Bloom's Taxonomy)
CO1	Formulate the research problem through fundamentals of research and literature review.	K3
CO2	Identify and apply research design principles and make use of data collection and analysis techniques.	K3
CO3	Apply quantitative methods to solve research problem.	K3
CO4	Analyze the optimization techniques in solving the real problem.	K3
CO5	Interpret the research problem into registering IPR and filing patents.	K2

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f. Course Content

UNIT I – INTRODUCTION AND RESEARCH FORMULATION **L-9 + T-2**

Introduction to Research: Definitions and Characteristics of Research, Motivation and Objectives, Research Methods *vs.* Methodology. Types of Research: Descriptive *vs.* Analytical, Applied *vs.* Fundamental, Quantitative *vs.* Qualitative, Conceptual *vs.* Empirical, Concept of Applied and Basic Research Process, Criteria of Good Research.

Defining and Formulating the Research Problem: Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

Literature Review: Objectives of Review of Literature, Importance of Literature Review in Defining a Problem, Primary and Secondary Sources, Reviews, Treatise, Monographs, Patents, Web as a Source, searching in the Web, Critical Literature Review, Identifying Gap Areas from Literature Review and Research Database, Development of Working Hypothesis.

UNIT II – RESEARCH DESIGN, DATA COLLECTION AND ANALYSIS **L-9 + T-4**

Research Design: Basic Principles, Need of Research Design, Features of Good Design, Different Research Designs, Experimental Designs, Research Databases, Development of Models, Developing a Research Plan, Exploration, Description, Diagnosis, and Experimentation.

Data Collection and Analysis: Primary and Secondary Data, Methods of Data Collection, Sampling Methods, Data Processing and Analysis Strategies and Tools, Data Analysis with Statistical Packages (Sigma STAT, SPSS for Student's t-test), Testing of Hypothesis (Student's t-test), ANOVA Technique.

UNIT III – QUANTITATIVE METHODS FOR PROBLEM SOLVING **L-9 + T-3**

Basic Statistical Distributions and their Applications (No Derivations): Binomial, Poisson, Normal and their Applications in Research Studies. Fundamentals of Statistical Analysis and Inference, Multivariate methods, Concepts of Correlation and Regression Analysis, Fundamentals of Time Series Analysis and Spectral Analysis.

UNIT IV – OPTIMIZATION TECHNIQUES IN SOFT COMPUTING **L-9 + T-4**

Optimization Definition, Need and Application, Formulation of Optimization Problems. Introduction to Evolutionary Algorithms, Fundamentals of Genetic Algorithms, Particle Swarm Optimization, Simulated Annealing, Introduction to Neural Networks, Neural Network Based Optimization, Introduction to Fuzzy Sets and Fuzzy Logic, Optimization of Fuzzy Logic.

UNIT V – IPR AND REPORT WRITING **L-9 + T-2**

IPR: Intellectual Property Rights and Patent Law, Commercialization, Copy Right, Royalty, Trade Related aspects of Intellectual Property Rights (TRIPS).

Report Writing: Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Oral Presentation, Design of Research Paper, Citation, Plagiarism, Basic Knowledge of funding agencies, Proposal Submission for Funding Agencies.

Total: 60 Hours

g. Learning Resources

i. Reference Books:

1. Jeannette Lawrence, Introduction to Neural Networks: Design, Theory, and Applications, California Scientific Software, sixth edition, 1994.
2. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, An introduction to Research Methodology, RBSA Publishers, U.K., 2002.
3. Fink, A., Conducting Research Literature Reviews: From the Internet to Paper, Sage Publications, 5th edition, 2009.
4. Dr P M Bulakh, Dr P. S. Patki and Dr A S Chodhary, Research Methodology, Expert Trading Corporation Dahisar West, Mumbai, 2010.
5. Paolo Brandimarte, Quantitative Methods: An Introduction for Business Management, John Wiley & Sons, 2011.
6. Douglas C. Montgomery and George C. Runger. Applied Statistics and Probability for Engineers, 5th edition, John Wiley and Sons, Inc., New York, 2011.
7. Panneerselvam, R. Research Methodology, PHI Publications, Second edition, 2014.
8. Priya Rai, R.K. Sharma, P.K. Jain and Akash Singh, Transforming Dimension of IPR Challenges for New Age Libraries, National Law University Delhi Press, 2015.
9. Timothy J. Ross, Fuzzy Logic with Engineering Applications, Wiley publications, 4th Edition, 2016.
10. C.R. Kothari and Gaurav Garg, "Research Methodology: Methods and Techniques", New Age International (P) Ltd., Publishers, Fourth Multi Colour Edition, 2020.
11. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical statistics, Sultan Chand & Sons, New Delhi, 12th Revised Edition, 2020.
12. Lawrence M. Leemis, Mathematical Statistics, Ascended Ideas, UK, 2020.
13. Sukanta Nayak, Fundamentals of Optimization Techniques with Algorithms, Academic Press,2020.
14. Singiresu S. Rao, Engineering Optimization: Theory and Practice, New Age International Publishers, 5th edition 2020.

ii. Online resources:

1. https://www.soas.ac.uk/cedep-demos/000_P506_RM_3736-Demo/module/pdfs/p506_unit_01.pdf
2. https://repository.up.ac.za/bitstream/handle/2263/27704/01chapter1.pdf?sequence=2&isAllowed=y
3. http://egyankosh.ac.in/bitstream/123456789/41939/1/Unit-4.pdf
4. https://www.formpl.us/blog/data-collection-method
5. https://www.questionpro.com/blog/data-collection/
6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4485510/
7. https://www.questionpro.com/blog/quantitative-research/
8. https://hls.harvard.edu/content/uploads/2011/12/quantitative_methods.pdf
9. https://libguides.usc.edu/writingguide/quantitative
10. https://mech.iitm.ac.in/nspch52.pdf
11. https://www.kdd.org/kdd2016/topics/view/optimization-techniques
12. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217699/
13. https://iare.ac.in/sites/default/files/M.Tech-RM%20%26%20IPR%20%28ECE%29%20PPTS.pdf

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(COMMON TO ALL ENGINEERING & TECHNOLOGY STREAMS

AND

SCIENCE& HUMANITIES)

COURSE CODE	COURSE TITLE	L	T	P	C
PHD21RPT102	RESEARCH AND PUBLICATION ETHICS	2	1	1	4

Course Category: Foundation Course

a. Preamble:

Today research is of immense importance in every field of life. Hence students need sound initiation in the world of research. The ethical pursuit of research in humanities, social sciences and other scientific disciplines is essential to the achievement of robust goals and research outcomes within the academe and it promotes systemic contributions in the field of advanced learning and knowledge generation.

b. Prerequisite Courses:

The course is primarily open to all Ph.D. scholars.

c. Related Courses:

Research Methodology

d. Course educational objectives:

To impart knowledge and skills required for research:

- Provide students with the fundamental knowledge of basics of philosophy of science and ethics, research integrity, publication ethics.
- Hands-on sessions are designed to identify research misconduct and predatory publications.
- Indexing and citation databases, open access publications, research metrics (citations, index, Impact Factor etc.).

e. Course Outcomes:

Upon the successful completion of the course, scholar will be able to:

CO Nos.	Course Outcomes	Knowledge level (Basedon revised Bloom's Taxonomy)
CO1	Apply theories and methods in ethics, research ethics and scientific conduct.	K3
CO2	Understand the philosophy of science and ethics, research integrity and publication ethics.	K2

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CO3	Identify software tools in open access publishing to check publisher copyright, predatory publications andjournal suggestions.	K3
CO4	Acquire skills of presenting arguments and results of ethical inquiries and understand the usage of plagiarism tools.	K3
CO5	Utilize the indexing, citation databases and research metrics (citations, h-index, impact Factor, etc.).	K2

f. Course Content

Unit I: PHILOSOPHY, ETHICS AND SCIENTIFIC CONDUCT **L-8 + T-0**

Philosophy, Ethics (3 Hrs.): Introduction to philosophy: definition, nature and scope, concept, branches - **Ethics**: definition, moral philosophy, nature of moral judgments and reactions.

Scientific Conduct (5 Hrs.): Ethics with respect to science and research - Intellectual honesty and research integrity - Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP) - Redundant Publications: duplicate and overlapping publications, salami slicing - Selective reporting and misrepresentation of data.

Unit II: PUBLICATION ETHICS **L-7 + T-0**

Publication ethics: definition, introduction and importance - Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. - Conflicts of interest - Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types - Violation of publication ethics, authorship and contributor ship - Identification of publication misconduct, complaints and appeals - Predatory publisher and journals.

Unit III: OPEN ACCESS PUBLISHING **L-0 + T-4**

Open access publications and initiatives - SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies - Software tool to identify predatory publications developed by SPPU - Journal finger / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer, Journal Suggester, etc.

Unit IV: PUBLICATION MISCONDUCT **L-0 + T-2+P-2**

Group Discussion (2 Hrs.): a) Subject specific ethical issues, FFP, authorship b) Conflicts of interest c) Complaints and appeals: examples and fraud from India and abroad.

Software tools (2 Hrs.): Use of plagiarism software like Turnitin, Urkund and other open source software tools.

Unit V: DATABASES AND RESEARCH METRICS **L-0 + T-4+P-3**

Databases (4 Hrs): Indexing databases, Citation databases: Web of Science, Scopus, etc.

Research Metrics (3 Hrs.): Impact Factor of journal as per Journal Citations Report, SNIP, SJR, IPP, and Cite Score - Metrics: h-index, g index, i10 Index, altmetrics.

***Units 1and 2 are** to be covered via Theory mode and Units **3, 4 and 5** are to be covered via Tutorial practice mode.

Total: 30 Hours

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g. Learning Resources

i. Reference Books:

1. Sidney Hook, Miro Todorovich, Paul Kurtz, The Ethics of Teaching and Scientific Research. Weldon Beckner ,1978.
2. Barbara H. Stanley; Joan E. Sieber; Gary B. Melton, Research Ethics: A Psychological Approach, University of Nebraska Press, 1996.
3. Anderson B.H, Dursaton and Poole M, Thesis and assignment writing, Wiley Eastern, 1997.
4. Paul Oliver, The Student's Guide to Research Ethics, Open University Press, 2003.
5. Adil E. Shamoo, David B. Resnik, Responsible Conduct of Research, Oxford University Press, 2003.
6. Bird, A, Philosophy of Science. Routledge, 2006.
7. Nicholas H. Steneck. Introduction to the Responsible Conduct of Research. Office of Research Integrity. 2007.
8. Graziano, A., M., and Raulin, M.,L, Research Methods – A Process of Inquiry, Sixth Edition, Pearson, 2007.
9. Bijorn Gustavii, How to write and illustrate scientific papers, Cambridge University Press.2008.
10. Bordens K.S. and Abbott, B.b, Research Design and Methods, Mc Graw Hill, 2008.
11. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. On Being Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies Press. 2009.
12. Jeffrey A. Gliner; George A. Morgan Lawrence Erlbaum Associates, Research Methods in Applied Settings: An Integrated Approach to Design and Analysis, Routledge,2009.
13. Resnik, D. B. What is ethics in research & why is it Important. National Institute of Environmental Health Sciences, 2011.
14. Joel Lefkowitz, Ethics and Values in Industrial-Organizational Psychology, Routledge ,2017.
15. P. Chaddah, Ethics in Competitive Research: Do not get scooped; do not get plagiarized,2018.
16. Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance. 2019.
17. Kambadur Muralidhar, AmitGhosh Ashok Kumar Singhvi, Ethics in Science Education, Research and Governance. Indian National Science Academy, 2019.

ii. Online resources:

1. https://www.enago.co.kr/academy/wp-content/uploads/2018/05/Research_Ethics.pub_V2.pdf
2. https://www.frontiersin.org/about/policies-and-publication-ethics
3. https://www.researchgate.net/publication/340807930_RESEARCH_AND_PUBLICATION_ETHICS
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5508450/
5. https://www.iieta.org/Journals/IJSDP/Publication%20Ethics%20and%20Malpractice%20Statement
6. http://ignca.gov.in/short-term-certification-course/research-and-publication-ethics/

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INTELLIGENT CONTROLLERS

Credit 4

Course Objectives

- To get expertise about the design of ANN and Fuzzy set theory.
- To familiarize with the analysis and implementation of ANN and Fuzzy logic for modelling and control of non-linear system.
- To get familiarize with the MAT-LAB tool box.
- To impart the knowledge of various optimization techniques and hybrid schemes with the ANFIS tool box.
- To familiarize about machine learning and its applications

Course Outcomes

After completion of the course, the students will be able to

CO1- Familiarize with the basic architectures of ANN and Fuzzy sets.
CO2- Design and implement ANN architectures, algorithms and know their limitations.
CO3- Identify and work with different operations on the Fuzzy sets.
CO4- Develop ANN and Fuzzy logic based models and control schemes for non-linear systems.
CO5- Apply the machine learning algorithms for an applications

UNIT-I OVERVIEW OF ARTIFICIAL NEURAL NETWORK (ANN) AND FUZZY LOGIC

Review of Fundamentals- Biological neuron, Artificial neuron, Activation function, Single layer Perceptron- Limitations- Multi layer Perceptron- Back propagation algorithm (BPA); Fuzzy set theory- Fuzzy sets- Operation on Fuzzy sets- Scalar cardinality, Fuzzy cardinality, union and intersection, complement (yager and sugeno), Equilibrium points, aggregation, projection, composition, fuzzy relation- Fuzzy membership functions.

UNIT-II NEURAL NETWORKS FOR MODELLING AND CONTROL

Generation of training data- Optimal architecture- Model validation- Control of non-linear system using ANN- Direct and Indirect neuro control schemes- Adaptive neuro controller- Case study- Familiarization of Neural Network Control Tool Box.

UNIT-III FUZZY LOGIC FOR MODELLING AND CONTROL

Modelling of non-linear systems using fuzzy models (Mamdani and Sugeno)- TSK model- Fuzzy Logic controller- Fuzzification- Knowledge base- Decision making logic- Defuzzification- Adaptive Fuzzy systems- Case study- Familiarization of Fuzzy logic Tool Box- Fuzzification and rule base using ANN- Neuro Fuzzy Systems- ANFIS- Case study- Familiarization of ANFIS Tool Box.

UNIT-IV GENETIC ALGORITHM

Basic concept of Genetic algorithm and detail algorithmic steps, adjustment of free parameters- Solution of typical control problems using genetic algorithm- Concept on some other search techniques like Tabu search, Ant-Colony search and Particle Swarm Optimization- Optimization of membership function and rule base using Genetic Algorithm and Particle Swarm Optimization.

UNIT V INTRODUCTION TO MACHINE LEARNING

Basics of machine Learning –Types of Machine Learning - Data Pre-processing and Feature Engineering – Introduction to Regression Algorithms – Linear Regression –Multivariate Linear Regression – Applications.

Text Books

1. Lawrence Fausatt, "Fundamental of Neural Networks", Prentice Hall of India, New Delhi, 1994.
2. Timothy J.Ross, "Fuzzy Logic with Engineering Apllications", Wiley, 3rd Edition, 2010.
3. David E.Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Pearson Education, 2009.

Reference Books

1. Jacek.M.Zurada, "Introduction to Artificial Neural Systems", Jaico Publishing House, 1999.
2. Yung C. Shin and Chengying Xu, "Intelligent System-Modelling, Optimization and Control", CRC Press, 2009.
3. Driankov, Hellendroon, "Introduction to Fuzzy Control", Speringer-Verlag Berlin, 2nd Edition, 1996.

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Web References

1. https://nptel.ac.in/courses/111/105/111105100/
2. https://nptel.ac.in/courses/110/106/110106062/
3. https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ma23/
4. https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-ma22/
5. https://www.tutorialspoint.com/statistics/probability_density_function.htm

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ELECTRIC AND HYBRID VEHICLE

Credits 4

Course Objectives

- To familiarize with the fundamental concept of electric vehicle
- To overview the energy storage technologies used for electric and hybrid vehicle.
- To determine various electric drives suitable for electric vehicles.
- To understand about the different power converter topologies used in electric vehicle
- To understand the concept of hybrid and electric vehicle architecture, component sizing and electric motor drive.

Course Outcomes

After completion of the course, the students will be able to

CO1 - Summarize the basics of electric vehicle and its working principle.
CO2 - Combine the different energy storage technologies and its implementation in hybrid vehicle.
CO3 - Develop the hybrid electric vehicle with different power converter topology.
CO4 - Review the working of different configurations of electric vehicle and its concepts
CO5 - Describe the working of different configurations of hybrid vehicles.

UNIT I INTRODUCTION TO EV

History of hybrid and electric vehicles - social and environmental importance - impact of modern drive - trains on energy supplies - Fundamentals of vehicle propulsion and Braking: Dynamic Equation - Power train tractive effort - Vehicle Power Plant and Transmission Characteristics - Vehicle Performance.

UNIT II HYBRID VEHICLE

Classification - Series and Parallel HEVs - Series-Parallel Combination - Advantages and disadvantages Internal Combustion Engines: Reciprocating Engines - Gas Turbine Engine- Design of an HEV: Hybrid Drive train - Sizing of Components.

UNIT III ELECTRIC PROPULSION DRIVE SYSTEMS

Electric drives used in EV/HEV: Induction motor drives - DC motor drives - Permanent magnet motor drives - their Configuration - SRM Drives.

UNIT IV ELECTRIC VEHICLE

Configurations of EV - advantages - EV transmission configuration: Transmission components - gear ratio - EV motor sizing - EV market.

UNIT V ELECTRIC VEHICLE STORAGE TECHNOLOGY

Battery Types - Parameters - Technical characteristics – modelling and equivalent circuit - Methods of battery charging - Fuel cells: Types - Fuel cell electric vehicle – Ultra capacitors - Hydrogen storage systems – Flywheel technology.

Text Books

1. Mehrdad Ehsani, Yimin Gao, Sebastien E.Gay, Ali Emadi, “Modern Electric, Hybrid Electric and Fuel Cell Vehicles”, CRC Press, 3rd Edition, 2019.
2. Iqbal Hussain, “Electric and Hybrid Vehicles – Design Fundamentals”, CRC Press, 2nd Edition, 2011.

Reference Books

1. K. T. Chau, “Electric vehicle machines and drives: Design, analysis and application”, John Willey and Sons Singapore pte. ltd., 1st Edition, 2015.
2. J. Larminie and J. Lowry, “Electric vehicle technology explained”, John Willey & Son ltd., 2nd Edition, 2012.

Web References

1. https://nptel.ac.in/courses/108103009/
2. https://www.evgo.com/why-evs/types-of-electric-vehicles/
3. https://www.electrichybridvehicletechnology.com/
4. http://www.ieahev.org/
5. https://www.sae.org/learn/content/acad06/
6. https://www.intechopen.com/books/electric-vehicles-modelling-and-simulations

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SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE
(An Autonomous Institution)
(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107

Ph. D Course Work Evaluation Pattern

The Ph.D. candidate shall take the course work examination consisting of written Papers of 3 hours duration each and a maximum mark of 100 for each Paper.

Sl. No	Course	Title of the Course	Credits	Max.Marks		
				CAM	ESM	Total
1	I	Research Methodology	4	-	100	100
2	II	Research and Publication Ethics	4	-	100	100
3	III	Advanced Course	4	40	60	100
4	IV	Advanced Course	4	40	60	100

Table 1 Weightage of Assessment for Mandatory Courses

Title of the Course	Part-A 10X2=20 Marks)	Part-B (5X16=80 Marks)	Total (100 Marks)	Minimum Pass Mark
Research Methodology	10 Questions – Equally Distributed– Each carries TWO Marks.	5 Questions – 2 Questions from each Unit – Internal Choice – All Questions carries 16 Marks each	Part A – 20 Marks and Part B – 80 Marks Total Marks – 100 Marks	60
Research and Publication Ethics	10 Questions – Equally Distributed– Each carries TWO Marks.	5 Questions – 2 Questions from each Unit – Internal Choice – All Questions carries 16 Marks each	Part A – 20 Marks and Part B – 80 Marks Total Marks – 100 Marks	60

For each of the Mandatory courses, the candidates have to appear for an End Semester Examination in each subject conducted by the Controller of examinations for **100 marks**. The passing minimum is **60 marks in the end semester examination**.

Scheme of Evaluation for Advanced Course:

The advanced course is done under the guidance of the Supervisor. For the Continuous assessment marks (**CAM**) the following two components are used for evaluation.

Sl. No	Components	Marks
1	5 Seminars	20
2	3 Test	20
Total CAM		**40**

Pattern for Seminar Evaluation:

Sl. No	Component	Syllabus	Maxi Marks
1	Seminar - 1	From unit 1	4
2	Seminar - 2	From unit 2	4
3	Seminar - 3	From unit 3	4
4	Seminar - 4	From unit 4	4
5	Seminar - 5	From unit 5	4

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Total Marks	20

Table 2 Weightage of Assessment for Advanced Courses

Sl. No	Test	Portion for Test	Test Marks	Duration of Test	Weightage for Internal Marks
1	CAT – 1	2 Units (Unit 1 and 2)	30	1 ½ hours	10***
2	CAT – 2	2 Units (Unit 3 and 4)	30	1 ½ hours	
3	CAT – 3	5 Units (Unit 1 to 5)	60	3 hours	10
Continuous Assessment for advanced courses					**20**

***A minimum of two tests (CAT 1 and 2) to be conducted for advanced course and, out of them, the best one is to be considered for computation of internal assessment marks.

Question Paper Pattern– Advanced Course Theory

Question paper pattern for CAT and ESE is shown in Table 3 (a) and (b) respectively.

Table 3 (a) Question Paper pattern for CAT 1 and 2

Part-A (5X2=10) 2 Mark Questions	Part-B (2X10=20) 10 Mark Questions	Total Marks (30)
5 (At least two questionsfrom each unit)	**2** (out of 4 Questions and at least two questions from each unit)	30

Table 3 (b) Question Paper pattern for CAT 3 and End Semester Examination

Part-A (5X2=10) 2 Mark Questions	Part-B (5X10=50) 10 Mark Questions	Total Marks (60)	Minimum Pass Mark
5 (At least one question from each unit)	**5** (at least one question from each unit)	60	30

For each of the courses, the maximum internal mark awarded is **40 marks**. All the candidates have to appear for an **external (Semester) examination** in each subject conducted by the Controller of examinations for **60 marks**. The passing minimum is **30 marks** in the semester examination. The overall passing minimum is **60 marks**.

Research Work Proposal

- All the above course works of the scholar are to be undertaken as per the academic norms and shall be evaluated by the norms of the Institution.
- No change in the prescribed course works shall be made without the approval of the DC. The changes in course content/syllabus and grades shall be approved by the Academic Council.
- Only courses taken after the date of provisional registration shall count towards this requirement. Any courses already passed by the candidate prior to the registration shall not be counted for this purpose.
- The Ph.D. scholar has to obtain a minimum of 60%, of marks or it's equivalent grade or 6.0 CGPA on 10-point scale in the course work in order to be eligible to continue in the program and to submit the dissertation / thesis.

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- The supervisors are requested to submit the CAT examinations papers [viz. CAT1, CAT2, CAT3] and PPT of all 5 seminars to the Dean Research through the concerned head of the department.

- The attendance sheet of all the CAT and seminar should be submitted with the signature of the scholar to the Dean Research with the endorsement of the supervisor and concerned head of the department.

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