SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with 'A' grade by NAAC
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.

School of Electrical and Electronics

Minutes of Board of Studies Meeting held on 1st June, 2020

(Virtual Meeting conducted on Zoom Platform (Time: 10.30 a.m. to 12 noon)

- Dr.N.M.Nandhitha, Prof. & Dean School of Electrical and Electronics started the meeting by welcoming both the external and the internal numbers to the Board of Studies meeting (30.6.2020, 10.30 a.m. to 12.00 noon)

- Dr M D Selvaraj. Professor, IIITDM accepted the changes suggested by Dr S Lakshmi. However he added that "Specialized services – E-mail, Video conferencing and internet connectivity" from Unit-5 can be replaced with 'Case studies on Weather Forecasting Satellites ' .

- Dr.Sivakumaran, Prof., NIT, Trichy accepted the changes proposed in 'MEMS and its Applications' and 'Automatic Speech Recognition'.

- Mr M Sugadev, presented the changes made in 'Advanced Electronic Test Engineering'. He also added that this course is conducted with the infrastructure sponsored by QMAX Technologies, Chennai. Mr J Visweeswaran, NI Electronics, appreciated the effort taken by the Department and the syllabus revision was accepted.

- Dr P Chitra, putforth the revisions for 'Pattern Recognition and Image Vision'. Dr M D Selvaraj accepted the revision and added that "Classification performance measures - Risk and error probabilities" can be replaced with "Non-metric methods for pattern classification on numeric data, Decision tress, Classification and Regression Trees (CART)".

- Dr S Lakshmi, proposed syllabus revision in 'Mobile Adhoc Networks and Spread Spectrum Communication'. Dr M D Selvaraj, accepted the syllabus revision.

- Dr T Ravi presented the syllabus revision on Nanoelectronics to the board. MrJVisweeswaran accepted the changes and added that 'Nanoelectronics in Random Access Memory, Mass Storage devices and related topics' can be included.

- Dr M Sumathi presented syllabus revision in 'Integrated Services Digital Network' and "Radar and Navigational Aids". Dr M D Selvaraj accepted the changes.

- Dr P Chitra proposed the revisions in 'Signals and Systems' to the board. Dr Sivakumaran accepted the changes and he suggested that "Speech Signal Processing" can also be included.

- Dr S Barani presented the syllabus revision in 'Digital Signal Processing' to the board. Dr N Sivakumaran suggested that "Audio Coding Techniques and Comparison Analysis and Related Topic" can be included.

- Dr T Ravi presented the syllabus revision in "Programming in HDL". Dr M D Selvaraj suggested that "Case Study on related topics" can be included.

- Mr M Sugadev presented syllabus revision in 'AI and Soft Computing' and 'SCADA Systems Applications' to the board. Dr M D Selvaraj readily accepted the revisions.

SL NO	COURSE CODE	COURSE NAME	DELETED TOPICS	ADDED TOPICS
	SEC1631	SATELLITE COMMUNICATIONS	**UNIT 1** satellite access, single access, pre-assigned FDMA, SCPC (spade system), TDMA, pre-assigned TDMA, demand assigned TDMA **UNIT 2** Effects of rain – Uplink rain– Fade margin – Downlink rain **UNIT 3** ascent guidance, satellite rendezvous. **UNIT 4** Advanced very high resolution radiometer	**UNIT 1** Multiple Access Techniques: Introduction, FDMA , SCPC Systems, MCPC Systems, TDMA, CDMA, SDMA **UNIT 2** Satellite Link Design Fundamentals: Transmission Equation, Satellite Link Parameters, Propagation considerations. **UNIT 3** Satellite subsystem: Power supply subsystem, Attitude and Orbit control, Tracking, Telemetry and command subsystem, Payload **UNIT 4** Satellite Instruments: Microwave Radiometer (MWR), Infra-red Camera (NIRST), High Sensitivity Camera (HSC),Data Collection System (DCS),Technological Demonstration Package (TDP).
	SEC1632	MEMS AND ITS APPLICATIONS	**UNIT 1** Working principle of micro system - Micro sensors, Micro actuators, Micro accelerometers and Micro fluidics **UNIT 4** case study - Capacitive RF MEMS switch	**UNIT 1** Overview of microelectronics manufacture and Microsystems technology. Laws of scaling. The multidisciplinary nature of MEMS. Survey of materials central to micro engineering. Applications of MEMS in variousindustries. **UNIT 2**

				Packaging: Microsystemspackaging,Essentialpackagingtechnologies,Selectionofpackagingmaterials. **UNIT 3** engineering mechanics behind these Microsensors, Actuation usingElectrostatic forces (Parallel plate, Torsion bar, Comb drive actuators),Casestudy:Combdriveactuators. **UNIT 4** RF MEMS relays andswitches-Micromachined RF filters-Micromachined antennas-Switched delay lines. Micromachined transmissionlines-RFMEMSbasedcircuitdesignandcasestudies **UNIT 5** Designconsiderations, Mechanical Design, Process design, Realization of MEMS components using intellisuite. Micro systempackaging,PackingTechnologies,AssemblyofMicrosystems,ReliabilityinMEMS.
	SEC1633	AUTOMATIC SPEECH RECOGNITION	**UNIT 4** Vector quantization,speechcoding **UNIT 5** Adapting to variability in speech (DTW).	**UNIT 2** Adaptation (Noise adaptation, Speaker adaptation/normalization, Language model adaptation), Qualityanalysisofspeechprocessingsystem **UNIT 3** Speech Signal Representation-Short-time FourierAnalysis,ParametricRepresentationoftheSpectralAnalysis **UNIT 5** Case study: Neural network-based acoustic modeling (Hybrid/Tandem/TDNN models), Convolutional Neural Networks in Speech, Speaker Adaptation.
	SEC1634	ADVANCED ELECTRONIC TEST ENGINEERING	**UNIT 1** Electrical tests -Text fixtures - Bed of nails fixtures - Cross talk test - Mock up test - In circuit test – Burn-in-test - Fault diagnostic methods. **UNIT 4** Digital Pin Electronics - Drive	**UNIT 1** Digital and Analog VLSI Testing-VLSI Technology Trends Affecting Testing . Fault Modeling **UNIT 2** FunctionalDSP-BasedTesting **UNIT 3** AnalogandMixed-SignalCircuitTest

			data formats - Digital High way - Analog Highway	**UNIT 4** Advantest Model T6682 ATE Generic Test Automation Architecture - Overview of the Gtaa, Test Generation Layer-Test Definition Layer- Test Generation Layer-Test Definition Layer- Test Generation Layer-Test Definition Layer-Troubleshooting Biomedical Equipment- Defibrillators- ECG Systems- ECG Machine Maintenance- EEG, Machines, Troubleshooting and Preventive Maintenance, Hemodialysis Machines and Troubleshooting.
	SEC1635	PATTERN RECOGNITION AND IMAGE VISION	**UNIT 1** studyofshapebyregion analysis **UNIT 4** FUZZY CLASSIFIERS- Fuzzy and crisp classification - Fuzzy clustering - Fuzzy pattern recognition -	**UNIT 1** feature detection, Applicationsofpatternrecognition **UNIT 2** Parzen-windowmethod. K-Nearest Neighbourmethod **UNIT 4** Sequential pattern recognition-Hidden Markov models (HMMs)-Discrete HMMs, Continuous HMMs **UNIT 5** AI in imaging system.
	SEC1636	MOBILE ADHOC NETWORKS	**UNIT 3** Introduction-IssuesinDesigningaRoutingProtocolforAdHocWirelessNetworks **UNIT 4** Battery Management Schemes - Transmission Power Management Schemes - System Power Management Schemes	**UNIT 2** Cross layer Design: need for cross layer design, cross layer optimization, parameter optimization techniques, cross layer cautionary perspective. Integration of adhoc with Mobile IP networks **UNIT 4** Security in Ad-hoc Wireless Networks, Issues and Challenges inSecurityProvisioning,NetworkSecurityAttacks,KeyManagementandSecureToutingAd-hocWirelessNetworks
	SEC1637	NANO ELECTRONICS	**UNIT 1** Quantumdot,currentflowintwoterminalQuantumdots,ballistictransport,SingleElectronTransistor	**UNIT 1** Introduction to nanotechnology,Impacts, Limitationsofconventionalmicroelectronics,Trendsinmicroelectronicsand optoelectronics Mesoscopic physics, trends in microelectronics and optoelectronics, characteristic lengths inmesoscopicsystems,Quantummechanicalcoherence Nanomaterials: Preparation – Plasma Arcing – Chemical Vapor Deposition – Sol-Gels – Electrode Position – Ball Milling –Applications Of Nanomaterials

				UNIT 4 Carbon Nanotube: Fullerenes - types of nanotubes – formation of nanotubes – assemblies – purification of carbon nanotubes – electronic properties – synthesis of carbon nanotubes **UNIT 5** Introductiontocharacterizationofnanostructures,toolsusedforofnanomaterials characterization,microscope-optical,electron,andelectronmicroscope, Micro Electronics.
	SEC1638	SPREAD SPECTRUM COMMUNICATION	**UNIT 1** Basic digital communication concepts, Impact of wide band, Detection of binary signals in additive white GaussianNoise, Differences between standard narrow-band communication systems and spread spectrum systems **UNIT 4** Problem definition and the optimum synchronizer, serial search synchronization techniques, general analysis ofaverage synchronization time, synchronization using a matched filter, synchronization by estimating the receivedspreading code, tracking loop pull-in, performance of spread spectrum system without coding, performance ofspreadspectrumsystemwithforwarderrorcorrection **UNIT 5** Calculation of theoretical capacity of a CDMA system, coding and decoding processes in CDMA,effects of interference in CDMA, and synchronization in CDMA wireless communication systems. 3G wirelesssystems using CDMA technologies, Major factors influencing the capacity of CDMA wireless networks, MulticarrierCDMA,Rakereceivers wirelessLANapplications, commercialandmilitaryapplications	**UNIT 1** Slow and fast frequencyhopping. General mechanism of ML sequence. Power spectral densit of ML sequence. General mechanism andpropertiesofWalshHadamardCode, OVSF,Barkercodes,GoldandKasamicodes **UNIT 2** Systems communications models – Performance without coding under AWGN and different jamming environments – spread spectrum systems performances with forward error correction -Block coding – Convolutional coding and specific error correcting codes – Inter leaving – Random coding bounds **UNIT 5** CDMA RF Propagation Principles, Antennas for Wireless Systems ,CDMA Traffic Engineering,CDMA Air Interface Overview, Key CDMA Performance Parameters and their Significance, Call Processing fromPerspectiveoftheSubscriberHandset,CDMAHandoffs
	SEC1639	RADAR AND NAVIGATIONALAIDS	**UNIT 5** DME and TACAN-Distance Measuring Equipment-	**UNIT 1** Maximum UnambiguousRange,RadarWaveforms,

			Operation of DME-TACAN-TACAN Equipment Aids toApproach and Landing-Instrument Landing System-Ground Controlled Approach System-Microwave LandingSystem(MLS) Doppler Navigation-The Doppler Effect-Beam Configuration-Doppler frequency Equation-Track Stabilization-Doppler Spectrum-Components of The Doppler Navigation System-Doppler Range Equation-Accuracy of Doppler Navigation System. Inertial Navigation-Principles of Operation-Navigation Over The Earth-ComponentsofaninertialNavigationSystem-EarthCoordinateMechanization-Strapped-DownSystems-Accuracyof Inertial Navigation Systems. Satellite Navigation System-The Transit System-Navstar Global Positioning System(GPS)-Nightvisionsystems	ModifiedRadarRange Equation **UNIT 2** Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two-coordinates), Phase Comparison Monopulse. Target Reflection Characteristics and Angular Accuracy. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers., MTI Improvement Factor, N-Pulse Delay-LineCanceler **UNIT 4** Instrument Landing System, Ground controlled Approach System **UNIT 5** GPS principle of operation, Position location determination, principle of GPS receiver and applications, Brief note on :Global Satellite Navigation system, Martitime Satellite ,Satellite Constellations ,Navigation Satellites of different countries such as Glonas and Compass, GAGAN,IRNSS, NAVIC Receiver and applications
	SEC1640	INTEGRATED SERVICES DIGITAL NETWORKS		**UNIT 1** reviewofswitchingtechnologies **UNIT 3** Delay Analysis and Simulation, ISDN products, Switches,Multiplexers,Terminaladapters,ISDNchipsets. **UNIT 4** ATM-Broadband Network Protocol, ATM Network Components, ATM SwitchesTerminalEquipment,UniqueBenefits. **UNIT 5** PotentialB-ISDNSatelliteApplications,GeneralB-ISDNServiceRequirements,Architecture,TerrestrialB-ISDNSupport,SystemConceptTypesofServicesSupported,PrivateBasedB-ISDN,SystemConcept,TypesofServices Supported
	SECA1301	SIGNALS AND SYSTEMS		**UNIT 4** Spectrum of DT signals, Discrete Time Fourier Transform (DTFT)- Properties of DTFT - z-transform -Basic properties of Z transform Properties of ROC - Inverse z-transform, Convolution method and Partial fraction expansion- Discrete time Systems- Classification of systems,Linear time Invariant System -

				Difference equation - Computation of Impulse response, Frequency response, step response, natural response, forced response and Transfer function using Z Transform, Convolution Sum using matrix, graphical and tabulation method-Properties of convolution sum. **UNIT 5** Mathematical tools for the analysis of deterministic and random signals – Sampling theorem-Analysis and modeling of Signals -Speech, music, medical signals- Applications of Fourier Transform- Analysis and modeling of Systems- Systems that manipulate signals-analysis and synthesis of signals and their interaction with systems
	SEC1319	DIGITALSIGNALPROCESSING	**UNIT 1** Representation, Characterization and Classifications of Continuous Time (CT) & Discrete Time (DT) signals, Sampling, theorem - Aliasing effect, Operations on DT signals , Convolution, Advantages of DSP over ASP , Classification of CT &DTsystems , properties of Discrete time systems-Linearity-Time invariance-causality –stability-Linear time Invariant systems,Difference equation representation of LTI systems-The Z transform-properties of Z transform-Inverse Z transform-SystemtransferFunction	**UNIT 5** RealTimeDSPSystemArchitectureand FunctionalBlocks,AnalogInterface,SignalConditioning,generationanddetectionforrealtimeapplications,-DSPHardwares(DigitalSignalProcessor,FPGA,ARMProcessorwithDSP Extension)&itsapplications - Speech Signal Processing, Enhancements, Coding & Transcoding Techniques (A-Law, U-Law, G.711, G.723,G.729, GSM) for IP and Mobile Telephone applications - High Definition Audio Signal Processing,
	SEC1402	PROGRAMMINGINHDL	**UNIT 1** Digital system design process - Hardware simulation - Introduction to VHDL - Language elements of VHDL -Dataobjects-Datatypes-Operators-Signalassignments-Inertialdelaymechanism-Transportdelaymechanism - Variableassignments-ConcurrentandSequentialassignments-Deltadelay	**UNIT 1** Introduction to VHDL - Language elements of VHDL -Concurrent and Sequential assignments Data flow modeling - Concurrent Signal Assignment statements- Structural modeling- Component declaration-Component Instantiation-Behavioralmodeling-Processstatement-ExamplesforVHDLmodeling **UNIT 5** FPGA Design Flow - Architecture ofXilinx Artix7 FPGA - Input/Output Blocks (IOB) - Configurable Logic Blocks (CLB)-ProgrammableInterconnect - Internal Hard macros - Realizing applications in FPGA - combinational functions - N-bit functions, Encoder, Decoders - Sequential functions - N-bit

				register,shift registers, up/down counters- N-bit processor.
	SECA7017	AI AND SOFT COMPUTING	UNIT 5 Communication - Communication as action, A formal grammar for a fragment of English, Syntactic analysis Augmented grammars, Semantic interpretation, Semantic interpretation, Ambiguity and disambiguation, Discourse understanding-Grammar induction, Probabilistic language processing - Probabilistic language models, Information Retrieval and implementation, Information Extraction, Machine translation systems	**UNIT 5** Natural language processing – Text classsification - Information Retrieval and Exatraction-AugmentatedGrammers and Semantic Interpretation - Speech Recognition-Image formation-Object Recognition from structural information – Robotics – Machine learning in Robotic Perception –Path planning.
	SECA7024	SCADA SYSTEMS APPLICATIONS	**UNIT 2** SCADA Architectures - First generation - Monolithic, Second generation - Distributed, Third generation - Networked Architecture	**UNIT 2** Remote Terminal Unit (RTU), Interface units, Human- Machine Interface Units (HMI), Display Monitors/Data Logger Systems, Intelligent Electronic Devices (IED), Communication Network, SCADA Server, SCADA Control systems and Control panels

- Dr.N.M.Nandhitha informed the board that Dr.Krishnamoorthi of School of EE has developed software for Digital Logic Circuits Laboratory (virtual laboratory).
- Dr.R.Pandian proposed few additions in the course “Electrical and Electronic Measurements and Instrumentation”. He pointed out the topics which include Display devices, waveform generators and analyzers. Dr. Sivakumaran agreed and he suggested that it can be added in the syllabus. He also suggested to add polyphase metering.
- Dr.Lalithakumari presented the syllabus for an elective course ‘Automotive Instrumentation’. Dr.Sivakumaran suggested to include networks, Graphical User Interface in Automotive Instrumentation

COURSE CODE	COURSE NAME	DELETED TOPICS	INCLUDED TOPICS
SEIA1401	Electrical and Electronic Measurements and Instrumentation	--	Unit-5 DSO, DPO, MSO, Analog Recorders – Strip Chart and X-Y recorders, Digital Recorders Function generators, Signal generators, Waveform analyzers, Spectrum analyzers, Distortion analyzers

- Dr.V.Sivachidambaranathan,Prof.&Head, Dept. of Electrical and Electronics Engineering requested Dr.Vanitha, Faculty/EEE to present he curriculum revisions before the board.

- She has presented the old and new syllabus for Electrical Technology (theory and practical)before the board and discussed the valid additions made in the syllabus. Dr.Sivakumaran, Prof.,NIT, Trichy gave suggestions to include the standards, tools and grounding procedures and casestudiesinthe syllabus.

- Dr.M D Selvaraj insisted on the feasibility of conducting laboratory through Virtual Labs.Mr.J.Visweeswaran, National Instruments also welcomed the idea of virtual laboratory.

- Dr.V.Sivachidambaranathanputforth the syllabus of the new courses, 'Industrial Drives and automation' , 'Computer Control of Electric Drives'for the approval of the board. Dr N Sivakumaran approved the Syllabus for these new courses.

Name of the Course : **Electrical Technology**
Course Code :**SEEA1102**

UNIT	Content	Remarks
1	**MAGNETICCIRCUITS** Definition of MMF, Flux and Reluctance - Leakage Factor - Reluctances in Series and Parallel (Series and Parallel Magnetic Circuits) – Electromagnetic Induction - Fleming's Rule - Lenz's Law - Faraday's laws - statically and dynamically induced EMF- Self and mutual inductance – Analogy of Electric and Magnetic circuit. **INTRODUCTIONT OF ELECTRICAL STANDARDS** Indian Standard Electricity Rules - Domestic Wiring - Wiring Materials and Accessories - Staircase Wiring – Fluorescent Tubes– Earthing –Types of Earthing – Benefits of Earthing.	Shifted Magnetic circuit to Unit 2 Inclusion

2	**DCMACHINES** Construction, Principles of operation of DC Machines - Types - EMF Equation - Performance Characteristics, of Series andShuntGenerators-DCMotor-Torque-Speed-TorqueCharacteristicsofSeriesandShuntMotors - SpeedControlandApplications **DC GENERATORS** Construction, Principles and Working operation of DC Generators - EMF Equation – Types of Generators - Performance Characteristics of Series and Shunt Generators – Applications. **DC MOTORS** Construction, Principles and Working of operation of DC Motors – Torque Equation – Back EMF - Types of DC Motors - Torque - Speed Characteristics of Series and Shunt Motors - Speed Control of DC Motors - Applications.	To give more exposure on DC Machines, this can be split in to DC Generators in Unit 3 and DC Motors in Unit 4.
3	**TRANSFORMERS** Constructional Details and Principle of operation of Single -Phase Transformer - EMF Equation - Phasor Diagram on No Load and Loaded Transformer - Equivalent Circuit - Open Circuit and Short Circuit Test on Transformer - Regulation and Efficiency- Auto Transformer	Content included in Unit 5
4	INDUCTIONMOTORS(QUALITATIVETREATMENTONLY) Constructional Details of Three Phase Induction Motor - Slip Ring and Squirrel Cage Rotor- Principle of operation- Torque Equation - Torque / Slip Characteristics - Starters - Applications Introduction to Single Phase Induction Motors - Capacitor Start Capacitor Run Motor -Shaded Pole Motor.	Deletion DC Motor fromUnit 2 has shifted to Unit 4 instead of Induction motors.
5	**SYNCHRONOUSMACHINESANDSPECIALMACHINES(QUALITATIVETREATMENT ONLY)** Principles of Alternator - Construction Details - Types Special Machines: Stepper motor- Permanent magnet Stepper motor-Variable reluctance stepper motor- AC and DC Servomotor -Stepper Motor Selection and Control : An Industrial Case Study. UniversalMotor - Hysteresis Motor -Permanent Magnet Synchronous Motor - Switched Reluctance Motor - Brushless D.C Motor - Construction,WorkingandApplications.	Deletion Inclusion Transformers form Unit 3 has shifted in addition to special electrical machines

Name of the Course : **ELECTRICAL ENGINEERINGLAB** Course Code :**SEEA2102**		
	List of Experiments	**Remarks**
	1. Wiringcircuits for a. Calling bell. b. Staircase. c. Fluorescent lamp d. Basic house hold wiring using switches, fuses, Indicator–lamps etc. 2. Open circuit characteristics of separately excited dc	Theory related Experiments are executed

	shunt generator. 3. Load characteristics of self-excited dc shunt generator. 4. Load characteristics of dc Compound generator. 5. Load characteristics of dc shunt motor. 6. Speed control of dc shunt motor. 7. Load characteristics of dc series motor 8. Load test on single phase transformer 9. Open circuit and short circuit test on single phase transformer 10. Brake load test on three phase squirrel cage induction motor. 11. Load test on single phase Induction motor.	

- BoS members are happy that the revised courses enhance employability/ Entrepreneurship/Skills of the students. The meeting ended with a vote of thanks by Dr.N.M.Nandhitha who expressed her sincere gratitude to both the external and internal members for joining the meeting.

EXTERNAL MEMBERS:

1. Dr.N.Sivakumaran
2. Dr.M.D.Selvaraj
3. Mr.J.Visweswaran

INTERNAL MEMBERS:

1. Dr.N.M.Nandhitha
2. Dr.T.Ravi
3. Dr.P.Chitra
4. Dr.S.Barani
5. Dr.S.Poornapushpakala.
6. Dr.M.Sumathi
7. Dr.S.Lakshmi
8. Dr.P.Kavipriya
9. Mr M Sugadev
10. Ms.E.Anna Devi
11. Ms.S.Yogalakshmi
12. Dr.LalithaKumari.S

13. Dr.Pandian.R

14. Dr.Marshiana.D

15. Dr.V.Sivachidambaranathan

16. Dr.D.Susitra

17. Dr.R.Vanitha

18. Mrs.D.Ramya

19. Mrs.P.Sivagami