MULTIDISCIPLINARY COURSES OF ELECTRICAL ENGINEERING OFFERED TO OTHER DEPARTMENTS									
Category	**Course Code**	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				**No. of Credits**
			L	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	
MDM	BTEE25MD304	Instrumentation Engineering	3	0	0	20	20	60	100	3
MDM	BTEE25MD404	Renewable Energy Sources	3	0	0	20	20	60	100	3
MDM	BTEE25MD505	Solar Energy	3	0	0	20	20	60	100	3
MDM	BTEE25MD510L	Solar Energy Lab.	0	0	2	50	0	50	100	1
MDM	BTEE25MD606A	Electric Vehicle	2	0	0	20	20	60	100	2
MDM	BTEE25MD606B	Numerical Methods and Simulation Techniques	2	0	0	20	20	60	100	2
MDM	BTEE25MD705	Battery & Charging Station Management System	2	0	0	20	20	60	100	2

SUBJECT CODE	SUBJECT INSTRUMENTATION ENGINEERING	CREDITS 03

Teaching Scheme	Examination Scheme
Theory: 3 hr./week Tutorial : Practical:	Continuous Assessment: 20 Marks Mid-Semester Exam: 20 Marks End Semester Exam: 60 Marks

Course Objectives:-

1	An introduction to measurement techniques and instrumentation design and operation
2	The basic concept of units, measurement error and accuracy, the construction and design of measuring devices and circuits, measuring instruments and their proper applications.
3	To learn the working of different types of Signal generators.
4	To learn the basics of oscilloscope and it types.
5	To use different measuring techniques and the measurement of different physical parameters using different transducers.

Course Outcomes:-

CO1	Explain the working principles and applications of basic measuring instruments like DC voltmeters, DC ammeters, AC voltmeters, AC ammeters, ohmmeters, and multimeters.
CO2	Understand the basic principles and applications of wave analyzers used for analyzing electrical waveforms.
CO3	Understand the working principle of Cathode Ray Tubes (CRTs) and evaluate high-frequency considerations and the use of delay lines in improving CRO performance.
CO4	Understand and apply fundamental concepts of measurement systems, sensors, and transducers for industrial and scientific applications.
CO5	Understand and apply bridge circuits such as Wheatstone, Kelvin, and Maxwell bridges for accurate measurement of electrical parameters like resistance, inductance, and low resistance.

Mapping of Course Outcome with Program Outcomes

Course Outcome	**Program Outcomes**										
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	2	2	--	--	1	1	--	1	--	1	1
CO2	2	1	--	--	1	--	1	--	--	--	1
CO3	2	2	--	1	1	--	--	--	1	--	1
C04	2	1	1	1	1	--	--	--	--	1	1
C05	2	1	--	1	1	--	--	1	--	--	1

UNIT - I: Block Schematics of Measuring Systems (07Hrs)

Introduction, Advantages of Electronic Measurement, Classification of Measuring Instruments, Functional elements of an instrument, Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters.

UNIT - II: Signal Analysers (07 Hrs)

Introduction, Basic Wave analyzer, AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator.

UNIT - III: Oscilloscopes (07Hrs)

Introduction, CRT, Block Schematic of CRO, Time Base Circuits, CRO Probes, High Frequency CRO Considerations, Delay lines. Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT - IV: Transducers (07Hrs)

Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Piezoelectric Transducers, Magneto Strictive Transducers.

UNIT - V: Bridges (07Hrs)

Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge. Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acquisition Systems.

References/Text Book:-

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.
3. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
4. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.

5. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
6. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
7. Industrial Instrumentation: T. R. PadmanabhamSpiriger 2009.

SUBJECT CODE	SUBJECT **RENEWABLE ENERGY SOURCES**	CREDITS 03

Teaching Scheme	Examination Scheme
Theory: 3 hr./week Tutorial : Practical:	Continuous Assessment: 20 Marks Mid-Semester Exam: 20 Marks End Semester Exam: 60 Marks

Course Objectives:-

1	To Provide knowledge about various renewable energy technologies
2	To outline utilization of renewable energy sources for both domestic and industrial applications
3	To gain knowledge about application of various renewable energy technologies
4	To Study the principles of renewable energy conversion systems.
5	To provide knowledge about wind energy system

Course Outcomes:-

CO1	Explain the difference between renewable and non-renewable energy
CO2	Describe working of solar collectors
CO3	Explain various applications of solar energy
CO4	Describe working of other renewable energies such as wind, biomass , ocean
CO5	

8. Mapping of Course Outcome with Program Outcomes

Course Outcome	**Program Outcomes**											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	1	2	3		2	3	3	3	2	2		2
CO2	1	1	3	1	2	3	3	3	2	2		2
CO3	2	1	1				3	2		1		2
C04	3	3			2	3	3	2				1

UNIT-I **UNIT- I Introduction to Energy Sources** **(07hrs)**

Energy sources and their availability, non-conventional sources, advantages of renewable energy sources, and prospects of renewable energy sources. Solar Energy: Solar energy collectors – flat plate collectors and concentrating collectors, solar energy storage systems – mechanical, electrical, chemical and electro-magnetic, solar pond, applications of solar energy – solar water heating, solar distillation, solar cooking

UNIT- II Wind Energy: **(07hrs)**

Basic principles of wind energy conversion, site selection considerations, basic components of Wind Energy Conversion System (WECS), classification of WEC systems, wind energy collectors – horizontal axis machines and vertical axis machines, generating systems, applications of wind energy. Geothermal Energy: Geothermal sources, hydrothermal resources – vapour-dominated and liquid-dominated systems, hybrid plants – geothermal preheat and fossil superheat; applications of geothermal energy, advantages and disadvantages of geothermal energy

UNIT- III Energy from Biomass: **(07hrs)**

Biomass conversion technologies, photosynthesis, biogas generation, factors affecting biogas generation, classification of biogas plants – floating drum plants and fixed dome plants, selection of site for biogas plant, utilization of biogas; Methods for obtaining energy from biomass, biomass gasification, classification of biomass gasifiers, fixed bed gasifiers and fluidized bed gasifiers, applications of gasifiers, advantages and limitations of gasifiers.

UNIT- IV Geothermal Energy : **(07hrs)**

Geothermal Energy Estimation of Geothermal energy, Nature of Geothermal fields, Geothermal resources, Hydrothermal resources, Vapour-dominated systems, liquid-dominated systems, Prime Movers for Geothermal Energy conversion, Material Selection for Geothermal Power plants, Advantages & Disadvantages of Geothermal Energy, Applications of Geothermal Energy.

UNIT- V Oceans Energy: **(07hrs)**

Energy from the oceans: Ocean thermal energy conversion-open cycle and closed cycle systems, Heat Exchangers, Site Selection.Energy from tides – basic principle of tidal power, components of tidal power plants, single basin and double basin systems, ocean waves – wave energy conversion systems, advantages & limitations of Tidal Power Generation.

Reference/Text Book:

1. G.D. Rai, Non-conventional sources of energy, 6th Edition, Khanna Publishers, 2017.

2. D.P. Kothari, R. Rakesh and K.C. Singal, Renewable Energy Resources and Emerging Technologies, 3rd Edition, Prentice India Pvt. Ltd, 2022.

3. G.S. Sawhney, Non-Conventional Energy Sources, 1st Edition, Prentice India Pvt. Ltd, 2012.

4. G.N. Tiwari and M.K. Ghosal, Renewable Energy Resources: Basic Principles and Applications, 1st Edition, Alpha Science International Ltd, 2005.

5. S P Sukhatme, Solar Energy, Tata McGraw-Hill Publishing Company Limited, Second Edition.

SUBJECT CODE	SUBJECT **SOLAR ENERGY**	CREDITS 03

Teaching Scheme	Examination Scheme
Theory: 3 hr./week Tutorial : Practical:	Continuous Assessment: 20 Marks Mid-Semester Exam: 20 Marks End Semester Exam: 60 Marks

Course Objectives:-

1	To introduce the fundamentals of solar energy and various conventional and non-conventional energy sources.
2	To explain the principles and methods for measuring solar radiation on horizontal and inclined surfaces.
3	To analyze the design, working, and performance of flat plate, air, and concentrating type solar collectors.
4	To understand and apply standard testing procedures for evaluating solar energy systems.
5	To evaluate thermal energy storage methods and conduct economic analysis of solar energy systems in comparison to conventional alternatives.

Course Outcomes:-

CO1	Describe measurement of direct, diffuse and global solar radiations falling on Horizontal and inclined surfaces
CO2	Analyze the performance of flat plate collector, air heater and concentrating type Collector
CO3	Understand test procedures and apply these while testing different types of collectors
CO4	Study and compare various types of thermal energy storage systems
CO5	Analyze payback period and annual solar savings due to replacement of conventional Systems

Mapping of Course Outcome with Program Outcomes

Course Outcome	**Program Outcomes**										
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	2	1	1	2	2	-	-	-	-	1
CO2	3	3	2	2	3	2	-	-	-	-	1
CO3	2	2	1	3	3	1	-	-	-	-	2

C04	2	2	2	1	2	3	-	-	-	1	2
CO5	2	2	2	1	2	3	-	-	-	3	2

UNIT-I Introduction to Energy Sources (07hrs)

Introduction, various energy sources available, Energy Consumption, world energy futures, Energy sources and their availability, conventional energy sources, non-conventional energy sources, advantages and disadvantages of non-conventional energy sources

UNIT- II Solar Radiation & its Measurement (07hrs)

Introduction, Solar Constant, Solar radiation at the Earth's Surface, Solar Radiation Geometry, Solar Radiation Measurement, Solar Radiation on Tilted surfaces

UNIT- III Solar Energy Collectors (07hrs)

Introduction, Principle of conversion of Solar Radiation into Heat, Flat Plate Collectors, Heat Transport System, liquid & air Collectors, Porous & Non-Porous Collectors, Applications of Solar Air Heaters, Advantages of Flat plate Collectors, Concentrating Collectors, Types of Concentrating Collectors, Advantages and Disadvantages of Concentrating Collectors

UNIT- IV Solar Energy Storage (07hrs)

Introduction, Solar Energy Storage. Solar Pond: Solar pond concepts, Solar pond electric power plant, Applications of Solar Ponds

UNIT- V Applications of Solar Energy (07hrs)

Introduction, Solar Water Heating, Space Heating & Cooling, Thermal electric conversion systems, Solar Photo-Voltaics, Solar Distillation, Solar Pumping, Solar Furnace, Solar Cooker, Solar Oven, Solar Green House

Texts:?Reference Books:-

1. J. A. Duffie, W. A. Beckman, "Solar Energy Thermal Processes", John Wiley, 1974.

2. K. Kreith,J. F. Kreider, "Principles of Solar Engineering", Tata McGrawHill Publications, 1978.

References:

1. H. P. Garg, J. Prakash, “Solar Energy: Fundamentals and Applications”, Tata McGraw Hill Publications, 1997.

2. S. P. Sukhatme, “Solar Energy Principles of Thermal Collection and Storage”, Tata McGraw Hill Publications, 1996.

SUBJECT CODE	SUBJECT **SOLAR ENERGY LAB**	CREDITS 02

Teaching Scheme	Examination Scheme
Theory: - Tutorial : Practical: 2 hr./week	Continuous Assessment: 50 Marks Mid-Semester Exam: - End Semester Exam: 50 Marks

Course Objectives:-

1	Understand the principles and working mechanisms of various solar energy devices and systems.
2	Analyze solar radiation data and its impact on system performance.
3	Explore the design, operation, and efficiency of solar thermal and photovoltaic systems.
4	Gain hands-on experience with solar-powered technologies such as cookers, water heaters, and EV charging stations.
5	Evaluate the environmental and economic benefits of solar energy applications

Course Outcomes:-

CO1	Demonstrate understanding of solar radiation measurement using instruments like pyranometers.
CO2	Analyze and compare different solar collectors and their efficiencies
CO3	Design and simulate basic solar PV systems for residential or commercial use.
CO4	Operate and maintain solar thermal systems such as water heaters, cookers, and stills.
CO5	Assess the feasibility and performance of solar-powered systems, including water pumps, refrigeration units, and EV charging stations.

Mapping of Course Outcome with Program Outcomes

Course Outcomes	ProgramOutcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1		2	1		2				
CO2	3	2	2	2	2		3				
CO3	3	3	3	2	3	1	3				
CO4	2	2	2	1	2	2	3				

CO5	2	3	3	2	3	3	3				

List of Practical's to be performed

(Atleast 08 experiments should be performed from the following list)

1) Study of Solar PV Generator.
2) Study of Solar Radiation Using a Pyranometer.
3) Study of Solar Still / Solar Distillation.
4) Study of Solar Water Pumping System.
5) Study of Box-Type Solar Cooker.
6) Study of Solar Water Heater System.
7) Study of Solar Power Plant.
8) Study of Solar Refrigeration System.
10) Study of Solar-Powered EV Charging Station.

SUBJECT CODE	SUBJECT **ELECTRIC VEHICLES**	CREDITS 02

Teaching Scheme	Examination Scheme
Theory: 2 hr./week Tutorial : Practical:	Continuous Assessment: 20 Marks Mid-Semester Exam: 20 Marks End Semester Exam: 60 Marks/ Internal Assessment:

Course objective:

- Introduce the fundamentals of electric vehicles and their role in sustainable transportation.
- Explain the key components of EVs including electric motors, battery systems, power electronics, and control systems.
- Compare electric vehicles with conventional internal combustion engine vehicles in terms of efficiency, performance, and environmental impact.
- Explore the mechanical aspects of EV design including chassis integration, drivetrain configuration, and thermal management.
- Develop interdisciplinary knowledge by linking mechanical systems with electrical and electronic subsystems in EVs.
- Foster practical understanding through case studies, simulations, and real-world applications of electric vehicle technology.
- Encourage innovation and research in electric mobility solutions, battery technology, and sustainable engineering practices.

CourseOutcomes: Attheendofthecourse,thestudentwillbeableto:

CO1	To explain the basic of Electric vehicles and its major parts.
CO2	To define the functionality and working principles of different types of Automotive Powertrains

CO3	To illustrate the working of various automotive transmission systems
CO4	To explain vehicle fundamentals of various subsystem.
CO5	To illustrate the working of motors and conversions and various hybrid electric powertrains and their different modes of operations Electric Vehicles

Mappingof course outcomeswithpogramoutcomes

Course Outcomes	ProgramOutcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1		2		2				1
CO2	3	3	2	1	2		2				1
CO3	3	3	2	1	3						1
CO4	3	2	2		2		1				1
CO5	3	3	2	2	3		2				2

CourseContents:

Unit 1 **(05 Hours)**

Introduction of Electric Vehicles:

History, Basics of Electric Vehicles ,Components of Electric Vehicle, General Layout of EV, EV classification : Battery Electric Vehicles (BEVs), Fuel-Cell Electric Vehicles (FCEVs) Comparison with Internal Combustion Engine: Technology, Advantages & Disadvantages of EV, National Policy for adoption of EVs, Overview of Tesla car.

Unit 2 **(05 Hours)**

Vehicle Mechanics:

History of Vehicle Development, General Configuration of Automobile, Body and Chassis Fundamentals: General Packaging, Types of Structural System, Backbone Construction; Body and Chassis Materials. Automotive Powertrain Mechanical, Suspensions system, Steering System, NVH, Control System Integration and Implementation. Front-Wheel Drive (FWD) Powertrains, Rear-Wheel Drive Powertrains (RWD), Multi-Wheel Drive Powertrains (AWD and 4WD).

Unit 3 **(05 Hours)**

Transmission Systems:

Transmission gears, Manual Transmission (MT), Automatic Transmission (AT), Automated Manual Transmissions (AMT) and Continuously Variable Transmissions (CVT); Manual Transmissions Powertrain Layout and Manual Transmission Structure, Power Flows and Gear Ratios, Manual Transmission Clutch and its structure. Drivetrain and Differential.

Unit 4 **(05 Hours)**

Vehicle fundamentals:

Vehicle resistance, Types: Rolling Resistance, grading resistance, Aerodynamic drag vehicle performance, Calculating The Acceleration Force, maximum speed, Finding The Total Tractive Effort, Torque Required On The Drive Wheel, Transmission: Differential, clutch &gear box, Braking performance.

Unit 5 **(05 Hours)**

Conversions motors & Hybrid Powertrain:

Introduction of DC-DC, AC-AC, AC-DC, DC-AC, four-quadrant operation, Driver circuits. Principle and working of DC motor, Characteristics and Types of DC Motors- Overview (Speed torque characteristics) of Permanent Magnet motor, BLDC Motor, Induction motor. Comparison of all motors. Series HEVs, Parallel HEVs, Series–Parallel HEVs, Complex HEVs, Operating Modes, Degree of Hybridization, Comparison of HEVs, Plug-in Hybrid Electric Vehicles (PHEVs) Real Life examples of HEVs, compare and contrast the performance of ICE vehicles, HEVs and EVs.

Texts/References:

1. Vehicle Powertrain Systems by BehroozMashadi and David Crolla, Wiley, 2012

2. Automotive Aerodynamics by Joseph Katz, Wiley, 2016

3. Automotive Chassis Engineering, by David C. Barton and John D. Fieldhouse, Springer, 2018

4. Automotive Engineering Powertrain, Chassis System and Vehicle Body Edited by David A.

Crolla, Elsevier,2009

5. Automotive Power Transmission Systems by Yi Zhang and Chris Mi, Wiley, 2018

6. Linear Electric Machines, Drives, and MAGLEVs Handbook, by Ion Boldea, CRC Press.

2013

7. Modern Electric, Hybrid Electric, and Fuel Cell Vehicles by MehrdadEhsani, YiminGao,

Sebastien E. Gay, and Ali Emadi, CRC Press 2005

8. Electric Vehicle Technology Explained by James Larminie and John Lowry, John Wiley, 2003

9. Electric and Hybrid Vehicles- Design Fundamentals by Iqbal Husain, CRC Press, 2005

SUBJECT CODE	SUBJECT BATTERY & CHARGING STATION MANAGEMENT SYSTEM	CREDITS 02

Teaching Scheme	Examination Scheme
Theory: 2 hr./week Tutorial : Practical:	Continuous Assessment: 20 Marks Mid-Semester Exam: 20 Marks End Semester Exam: 60 Marks

Course objective:

- Understand the fundamentals of battery technologies used in EVs, including types, Performance Characteristics, and safety considerations.
- Explore fuel cell systems and their integration into electric vehicles, focusing onEfficiency, Sustainability, and hybrid configurations.
- Analyse energy management strategies and the role of grid modernization in supporting EV Deployment and smart charging.
- Gain foundational knowledge of EV charging stations, including types, standards, and Operational principles.
- Design and manage EV charging infrastructure, considering power distribution,Renewable Integration, and system optimization.

CourseOutcomes: Attheendofthecourse,thestudentwillbeableto:

CO1	Compare and evaluate different battery technologies for EV applications based on performance, cost, and lifecycle.
CO2	Demonstrate understanding of fuel cell operation and assess its viability in various EV contexts.

CO3	Apply energy management techniques and propose solutions for integrating EVs into modern smart grids.
CO4	Identify and differentiate EV charging station types, standards, and protocols for various use cases.
CO5	Plan and optimize EV charging infrastructure, including layout, load balancing, and integration with renewable energy sources.

Mappingof course outcomeswithprogramoutcomes

Course	ProgramOutcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	2	1	2				2
CO2	3	2	2	2	2	1	2				2
CO3	2	3	3	2	3	2	3				3
CO4	2	2	2	1	3	1	2				2
CO5	2	3	3	2	3	2	3				3

CourseContents:

Unit 1 Overview of Battery Technologies (05 Hours)

Types of Battery, Introduction to Electrochemical Battery, Electrochemical Reactions, Battery Parameters: Battery Capacity, Discharge Rate, Charging Rate, SOC, SOD, SOH, DOD, Thermodynamic Voltage, Specific Energy, Specific Power, Energy Efficiency, Battery Technologies (used in Tesla Car), Lead-Acid Battery, Nickel Based Battery, Lithium Battery (Li-ion Li-Polymer), Role in Electric Drive Train, Comparisons, Introduction to Graphene Battery, Proposed Batteries.

Unit 2 Fuel Cell (05 Hours)

Overview of Key Fuel Cell Technologies – Various Types of Fuel Cells, Materials for Electrodes, Electrolytes and Other Components, Working Mechanisms, Hydrogen Generation and Storage: Limitations, Recent Progress in Fuel Cells, Safety Issues and Cost Expectation and Life Cycle Analysis of Fuel Cells.

Unit 3 Energy Management&Grid Modernization: (05 Hours)

Introduction to Energy Management Strategies with Optimization Techniques, Classification of Different Energy Management Strategies, Solar Photovoltaic, Solar Cell, Solar Cells to Modules, Wind

Energy, The War of Currents, Solar-DC, Introduction to EV Subsystem, Going Beyond Solar, Wind, Li Ion and Chilled Water Storage, Engineering Considerations and Future Frontiers.

Unit 4 Introduction to EV Charging Station(05 Hours)

Introduction, Energy sources used in EV's, Challenges for charging of EV's, Charging Station infrastructure & EV market in India, Components of EV, Types of EV, Charging Methodology, EV Charger & type of Charging, Various Modes of Charging, Types of Charging Station, Alternate Charging Methods, Charging Time, Charging Infrastructure market in India.

Unit 5 EV Charging Station Infrastructure & management(05 Hours)

Battery Specifications of Various EV Segments, Battery Swapping, Advantages & Challenges of Battery Swapping, Classification of EV Charging Infrastructure, Provision for EV Charging Infrastructure, Assessing EV Charging Demand, Principals of Location Planning for Public EV Charging, Geospatial Analysis, Site Selection & Planning for EV Charging Station.

Texts/References:

1. Energy Resource Management, Krupal Singh Jogi (Sarup& Sons).

2. Non-Conventional Energy resources, Dr. B.H. Khan, Tata McGraw Hill.

3. Electrochemical Energy Storage: Physics and Chemistry of Batteries, De Gryuter, Reinhart Job.

4. Energy Management: W.R. Murphy, G. McKay (Butterworths).

5. Energy Management Principles: C.B. Smith (Pergamon Press).

6. Energy Management and Control System: Vol-I, II – M.C. Macedo (John Willy).

7. Electrochemical Power Sources: Batteries, Fuel Cells, and Supercapacitors, Vladimir S. Bagotsky, Alexander M. Skundin, Yurij M. Volfkovich, 2015.

8. AmlanChakrabarti, Energy Engineering and Management, Prentice Hall India, 2011.

9. World Energy Resources: Charles E. Brown, Springer 2002.

10. Fuel Cells and Hydrogen: From Fundamentals to Applied Research, V. Hacker, S. Mitsushima (Eds.),Elsevier, 2018.

11. Energy for a Sustainable World: Jose Goldenberg, Thomas Johansson, A.K.N. Reddy, Robert

Williams (Wiley Eastern).

12. Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Practice, MehrdadEhsani, YimiGao, Sebastian E. Gay, Ali Emadi.