SHRI VENKATESHWARA UNIVERSITY

Syllabus

B.Tech

Electronic & Communication Engineering

VIII SEMESTER

(Three Years Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Electronic & Communication Engineering

SEMESTER- VIII

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	SEC - 801	Wireless Sensor Networks	3	0	0	20	10	30		70		100	3
2	SEC-802	Satellite Communication	3	0	0	20	10	30		70		100	3
3	SOE- 081	Renewable Energy	3	0	0	20	10	30		70		100	3
4	SOE- 082	Operation Research	3	0	0	20	10	30		70		100	3
5	SEC - 811	Project Stage-II	0	0	12				100		100	200	6
6	SEC- 888	Seminar							100			100	3
												700	21

SEC-801	Wireless Sensor Networks	3L:0T:0P	3 credits

Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks, Applications of Sensor Networks, Types of wireless sensor networks

Mobile Ad-hocNetworks (MANETs) and Wireless Sensor Networks, Enabling technologies forWireless Sensor Networks. Issues and challenges in wireless sensor networks

Routing protocols, MAC protocols: Classification of MAC Protocols, S-MAC Protocol, B-MACprotocol, IEEE 802.15.4 standard and ZigBee,

Dissemination protocol for large sensor network. Data dissemination, data gathering, and datafusion; Quality of a sensor network; Real-time traffic support and security protocols.

Design Principles for WSNs, Gateway Concepts Need for gateway, WSN to InternetCommunication, and Internet to WSN Communication.

Single-node architecture, Hardware components & design constraints,

Operating systems and execution environments, introduction to TinyOS and nesC.

Text/Reference Books:

1. Waltenegus Dargie , Christian Poellabauer, "Fundamentals Of Wireless Sensor NetworksTheory And Practice", By John Wiley & Sons Publications ,2011
2. Sabrie Soloman, "Sensors Handbook" by McGraw Hill publication. 2009
3. Feng Zhao, Leonidas Guibas, "Wireless Sensor Networks", Elsevier Publications,2004
4. Kazem Sohrby, Daniel Minoli, "Wireless Sensor Networks": Technology, Protocols andApplications, Wiley-Inter science
5. Philip Levis, And David Gay "TinyOS Programming" by Cambridge University Press 2009

Course Outcomes:

At the end of the course the students will be able to

1. Design wireless sensor networks for a given application
2. Understand emerging research areas in the field of sensor networks
3. Understand MAC protocols used for different communication standards used in WSN
4. Explore new protocols for WSN

SEC-802	**Satellite Communication**	**3L:0T:0P**	**3 credits**

Introduction to Satellite Communication: Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication.

Orbital Mechanics: Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit, evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day.

Satellite sub-systems: Study of Architecture and Roles of various sub-systems of a satellite system such as Telemetry, tracking, command and monitoring (TTC & M), Attitude and orbit control system(AOCS), Communication sub-system, power sub-systems etc.

Typical Phenomena in Satellite Communication:Solar Eclipse on satellite, its effects, remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.
Satellite link budget

Flux density and received signal power equations, Calculation of System noise temperature for satellite receiver, noise power calculation, Drafting of satellite link budget and C/N ratio calculationsin clear air and rainy conditions.

Modulation and Multiple Access Schemes:Various modulation schemes used in satellite

communication, Meaning of Multiple Access, Multiple access schemes based on time, frequency, and code sharing namely TDMA, FDMA and CDMA.

Text /Reference Books:

1. Timothy Pratt Charles W. Bostian, Jeremy E. Allnutt: Satellite Communications: WileyIndia. 2nd edition 2002
2. Tri T. Ha: Digital Satellite Communications: Tata McGraw Hill, 2009
3. Dennis Roddy: Satellite Communication: 4th Edition, McGraw Hill,2009

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Visualize the architecture of satellite systems as a means of high speed, high rangecommunication system.
2. State various aspects related to satellite systems such as orbital equations, sub-systems in asatellite, link budget, modulation and multiple access schemes.
3. Solve numerical problems related to orbital motion and design of link budget for the givenparameters and conditions.

SOE-081 Renewable Energy

Objectives: To impart the knowledge of basics of different non conventional types of power generation & power plants in detail so that it helps them in understanding the need and role of Non-Conventional Energy sources particularly when the conventional sources are scarce in nature.

Outcomes:

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

1. Study various non-conventional sources of energy like wind, biomass etc and its applications in remote areas of the country.
2. Understand the working criteria of various direct energy conversion systems and study its applications.
3. Understand the importance of non energy scenario.
4. Understand and pursue further research work behind the development of non conventional energy sources as a part of their research work.
5. Understand other direct energy conversion systems like m thermoelectric and fuel cells.
6. Evaluate methods for generation of hydrogen power and production of hydrogen.

S.N.	Unit number	Topics	Sub Topics
1	**1**	**Introduction**	Introduction Various non -conventional energy resources - Introduction, availability, classification, relative merits and demerits. 3 Solar Cells: Theory of solar cells. solar cell materials, solar cell array, solar cell power plant, limitations. 4
2	**2**	**Solar Thermal Energy**	Solar radiation, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power
3	**3**	**Geothermal Energy**	plants, thermal energy storage for solar heating and cooling, limitations. 9 Resources of geothermal energy, thermodynamics of geo -thermal energy conversion -electrical conversion, non -electrical conversion, environmental considerations. 4 Magneto -hydrodynamics (MHD): Principle of working of MHD Power
4	**4**	**Thermo -electrical**	plant, performance and limitations. 2 Fuel Cells: Principle of

		and thermionic Conversions:	working of various types of fuel cells and their working, performance and limitations. 3
5	**5**	**Bio -mass**	Principle of working, performance and limitations. Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems. 6 Availability of bio -mass and its conversion theory. Ocean Thermal Energy Conversion (OTEC): Availability, theory and working principle, performance and limitations. Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants. 3

Text/References Books:

1. Raja etal, "Introduction to Non -Conventional Energy Resources" Scitech Publications.
2. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006.
3. M.V.R. Koteswara Rao, " Energy Resources: Conventional & Non -Conventional " BSP Publications,2006.
4. D.S. Chauhan,"Non -conventional Energy Resources" New Age International.

SOE-082 OPERATION RESEARCH

Objectives:

S.N.	Unit number	Topics	Sub Topics
1	**1**	**Introduction:**	Definition and scope of operations research (OR), OR model, solving the OR model, art of modeling, phases of OR study. Linear Programming: Two variable Linear Programming model and Graphical method of solution, Simplex method, Dual Simplex method, special cases of Linear Programming, duality, sensitivity analysis.
2	**2**	**Transportation Problems:**	Types of transportation problems, mathematical models , transportation algorithms, Assignment: Allocation and assignment problems and models, processing of job through machines.
3	**3**	**Network Techniques:**	Shortest path model, minimum spanning Tree Problem, Max -Flow problem and Min -cost problem. Project Management: Phases of project management, guidelines for network construction, CPM and PERT.
4	**4**	**Theory of Games :**	Rectangular games, Minimax theorem, graphical solution of 2 x n or m x 2 games, game with mixed strategies, reduction to linear programming model. Quality Systems: Elements of Queuing model, generalized poisson queuing model, single server models.
5	**5**	**Inventory Control:**	Models of inventory, operation of inventory system, quantity discount. Replacement: Replacement models: Equipment's that deteriorate with time, equipment's that fail with time.

Reference Books:

1. Wayne L. Winston, "Operations Research" Thomson Learning,2003.
2. Hamdy H. Taha, "Operations Research-An Introduction" Pearson Education,2003.
3. R. Panneer Seevam, "Operations Research" PHI Learning, 2008.
4. V.K.Khanna, "Total Quality Management" New Age International, 2008.