SHRI VENKATESHWARA UNIVERSITY

Syllabus

B.Tech
Computer Science and Engineering

VIII Semester

(Four Years Programme)
(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Computer Science and Engineering
VIII - SEMESTER

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	SCS- 801	Data Analytics	3	0	0	20	10	30		70		100	3
2	SOE- 081	Renewable Energy	3	0	0	20	10	30		70		100	3
3	SOE- 082	Operation Research	3	0	0	20	10	30		70		100	3
4	SCS-811	Project Stage -III	0	0	12				100		100	200	6
5	SCS-888	Seminar							100			100	3
												600	18

Data Analytics S CS-801)		
Course Outcome (CO)		**Bloom's Knowledge Level (KL)**
At the end of course , the student will be able to understand		
CO 1	Describe the life cycle phases of Data Analytics through discovery, planning and building.	
CO 2	Learn various Data Analysis Techniques.	
CO 3	Implement various Data streams.	
CO 4	Understand item sets, Clustering, frame works & Visualizations.	
CO 5	Apply R tool for developing real time applications.	
DETAILED SYLLABUS		**3-0-0**
Unit	**Topic**	**Proposed Lecture**
I	**Introduction to Data Analytics:** Sources and nature of data, classification of data (structured, semi-structured, unstructured), characteristics of data, introduction to Big Data platform, need of data analytics, evolution of analytic scalability, analytic process and tools, analysis vs reporting, modern data analytic tools, applications of data analytics. **Data Analytics Lifecycle:** Need, key roles for successful analytic projects, various phases of data analytics lifecycle – discovery, data preparation, model planning, model building, communicating results, operationalization.	**08**
II	**Data Analysis:** Regression modeling, multivariate analysis, Bayesian modeling, inference and Bayesian networks, support vector and kernel methods, analysis of time series: linear systems analysis & nonlinear dynamics, rule induction, neural networks: learning and generalisation, competitive learning, principal component analysis and neural networks, fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, stochastic search methods.	**08**
III	**Mining Data Streams:** Introduction to streams concepts, stream data model and architecture, stream computing, sampling data in a stream, filtering streams, counting distinct elements in a stream, estimating moments, counting oneness in a window, decaying window, Real-time Analytics Platform (RTAP) applications, Case studies – real time sentiment analysis, stock market predictions.	**08**
IV	**Frequent Itemsets and Clustering:** Mining frequent itemsets, market based modelling, Apriori algorithm, handling large data sets in main memory, limited pass algorithm, counting frequent itemsets in a stream, clustering techniques: hierarchical, K-means, clustering high dimensional data, CLIQUE and ProCLUS, frequent pattern based clustering methods, clustering in non-euclidean space, clustering for streams and parallelism.	**08**
V	**Frame Works and Visualization:** MapReduce, Hadoop, Pig, Hive, HBase, MapR, Sharding, NoSQL Databases, S3, Hadoop Distributed File Systems, Visualization: visual data analysis techniques, interaction techniques, systems and applications. **Introduction to R** - R graphical user interfaces, data import and export, attribute and data types, descriptive statistics, exploratory data analysis, visualization before analysis,	**08**

	analytics for unstructured data.	

Text books and References:

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press.
3. Bill Franks, Taming the Big Data Tidal wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, John Wiley & Sons.
4. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley
5. David Dietrich, Barry Heller, Beibei Yang, “Data Science and Big Data Analytics”, EMC Education Series, John Wiley
6. Frank J Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley and SAS Business Series
7. Colleen Mccue, “Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis”, Elsevier
8. Michael Berthold, David J. Hand,” Intelligent Data Analysis”, Springer
9. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGraw Hill
10. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", Springer
11. Mark Gardner, “Beginning R: The Statistical Programming Language”, Wrox Publication
12. Pete Warden, Big Data Glossary, O’Reilly
13. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons
14. Pete Warden, Big Data Glossary, O’Reilly.
15. Peter Bühlmann, Petros Drineas, Michael Kane, Mark van der Laan, "Handbook of Big Data", CRC Press
16. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier

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**	Solar radiation, flat plate collectors and their materials, applications

		Energy	and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal
3	**3**	**Geothermal Energy**	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 plant, performance and limitations. 2 Fuel Cells: Principle of working of various types of
4	**4**	**Thermo -electrical and thermionic Conversions:**	fuel cells and their working, performance and limitations. 3 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
5	**5**	**Bio -mass**	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
2	**2**	**Transportation Problems:**	Linear Programming, duality, sensitivity analysis. Types of transportation problems, mathematical models ,
3	**3**	**Network Techniques:**	transportation algorithms, Assignment: Allocation and assignment problems and models, processing of job through machines.
4	**4**	**Theory of Games :**	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.
5	**5**	**Inventory Control:**	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. 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.