

Course code	Course Title	L	T	P	C
BCSE335L	Healthcare Data Analytics	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			
<b>Course Objectives</b>					
<ol style="list-style-type: none"> <li>1. Describe how data-based healthcare can help in improving outcomes for patient health.</li> <li>2. To design data models that combine patient records from multiple sources to form a patient centric view of data.</li> <li>3. To use data analytics to find health concerns and solutions to the problem faced by a patient.</li> <li>4. To find meaningful patterns and trends in healthcare data to help the overall population.</li> </ol>					
<b>Course Outcomes</b>					
At the end of the course, the student will be able to					
<ol style="list-style-type: none"> <li>1. Explain the concepts of Healthcare Data Analytics and healthcare foundations.</li> <li>2. Apply machine learning techniques on healthcare data analytics.</li> <li>3. Measure and analyse the quality of health-care systems.</li> <li>4. Develop models for effective predictions in healthcare applications.</li> <li>5. Use modern day emerging technologies in healthcare data analytics process.</li> </ol>					
<b>Module:1</b>	<b>Introduction to Healthcare Data Analytics</b>	<b>3 hours</b>			
Introduction – Need for Healthcare Analytics - Foundations of Healthcare Analytics – Examples of Healthcare Analytics.					
<b>Module:2</b>	<b>Healthcare Foundations</b>	<b>5 hours</b>			
Healthcare delivery - Healthcare financing - Healthcare policy – Handling Patient data: the journey from patient to computer - Standardized clinical codesets - Breaking down healthcare analytics: population, medical task, data format, disease.					
<b>Module:3</b>	<b>Machine Learning Foundations for Healthcare</b>	<b>8 hours</b>			
Model frameworks for medical decision making: Tree-like reasoning, Probabilistic reasoning and Bayes theorem, Criterion tables and the weighted sum approach, Pattern association and neural networks - Machine learning pipeline: Loading the data, Cleaning and preprocessing the data, Exploring and visualizing the data, Selecting features, Training the model parameters, Evaluating model performance.					
<b>Module:4</b>	<b>Measuring Healthcare Quality</b>	<b>8 hours</b>			
Introduction to healthcare measures, Medicare value-based programs: The Hospital Value-Based Purchasing (HVBP) program, The Hospital Readmission Reduction (HRR) program, The Hospital-Acquired Conditions (HAC) program, The End-Stage Renal Disease (ESRD) quality incentive program, The Skilled Nursing Facility Value-Based Program (SNFVBP), The Home Health Value-Based Program (HHVBP), The Merit-Based Incentive Payment System (MIPS).					
<b>Module:5</b>	<b>Making Predictive Models in Healthcare</b>	<b>8 hours</b>			
Introduction to Predictive Analytics – Obtaining and Importing the NHAMCS Dataset – Making the Response Variable - Splitting the Data into Train and Test Sets - Preprocessing the Predictor Variables – Building the Models – Using the Models to Make Predictions – Improving our Models.					
<b>Module:6</b>	<b>Healthcare Analytics Applications</b>	<b>6 hours</b>			
Introduction - Descriptive Analytics Applications - Predictive Analytics Applications - Prescriptive Analytics Application.					
<b>Module:7</b>	<b>Healthcare and Emerging Technologies</b>	<b>5 hours</b>			
Healthcare analytics and the internet - Healthcare and the Internet of Things - Healthcare					

analytics and social media - Healthcare and deep learning - Obstacles, ethical issues, and limitations.			
<b>Module:8</b>	<b>Contemporary Issues</b>		<b>2 hours</b>
		<b>Total Lecture hours</b>	<b>45 hours</b>
<b>Text Book(s)</b>			
1.	Kumar, Vikas Vik. Healthcare Analytics Made Simple: Techniques in healthcare computing using machine learning and Python. Packt Publishing Ltd, 2018.		
2.	El Morr, Christo, and Hossam Ali-Hassan. Analytics in healthcare: a practical introduction. Springer, 2019.		
<b>Reference Books</b>			
1.	Dinov, Ivo D. "Data Science and Predictive Analytics." Springer, Ann Arbor, MI, USA <a href="https://doi.org/10.1007/978-1-4939-9783-3">https://doi.org/10.1007 (2018): 978-3.</a>		
2.	Yang, Hui, and Eva K. Lee, eds. Healthcare analytics: from data to knowledge to healthcare improvement. John Wiley & Sons, 2016.		
Mode of Evaluation: CAT / written assignment / Quiz / FAT / Project / Seminar / group discussion			
Recommended by Board of Studies		12-05-2022	
Approved by Academic Council		No. 66	Date 16-06-2022