



# UGANDA CHRISTIAN UNIVERSITY

A Center of Excellence in the Heart of Africa

BSCS_2:1 (BSc. Computer Science)	(2 <sup>nd</sup> Year Undergraduate, 1 <sup>st</sup> Semester)
University	Uganda Christian University (UCU), Main Campus
School /Faculty	ENGINEERING, DESIGN AND TECHNOLOGY
Department	Computing and Technology
Programme	Bachelor of Science in Computer Science
Course Code	DSC2103
Course Title	Data Science
Lecture Hours	15
Practical Hours	30
Study Hours	45
Contact Hours	45
Credit Units	4
Course Designer (s)	Miss. Immaculate Kamusiime

Course Lecturer(s)	Miss. Immaculate Kamusiime Miss. Desire Namanya
Welcome message	Welcome to the <b>Data Science</b> course! In this course, you will be exposed to a multidisciplinary domain that uses scientific methods, processes, statistics, and computational languages to draw knowledge and insights from unstructured data.

Description	Students will explore the theoretical issues, methods, tools, and problems that relate to data-rich issues in the humanities, social sciences, and sciences. Students will learn the core concepts of statistics and computing while working hands-on with real data. We will examine real-world examples and cases to place data science techniques in the Ugandan context, develop data-analytic thinking, and illustrate that proper application is as much an art as it is a science. In addition, we will work hands-on with the R programming language and its associated data analysis libraries/packages.
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Audience Description	This is a course intended Year 2, Semester 1, Computer Science
Delivery Mode	<ol style="list-style-type: none"> <li>1. Group and Individual Projects</li> <li>2. Traditional Classroom-Based Teaching (online and in-person)</li> <li>3. Practical Lab Sessions</li> </ol>
Course Objectives	<ul style="list-style-type: none"> <li>• To develop practical data analysis skills, which can be applied to practical problems.</li> <li>• To develop fundamental knowledge of concepts underlying data science projects from multiple disciplines.</li> <li>• To develop practical skills needed in modern analytics.</li> <li>• To give a hands-on experience with real-world data analysis.</li> <li>• To develop applied experience with data science languages</li> </ul>
Expected Learning Outcomes	<p>The students should be able to;</p> <ul style="list-style-type: none"> <li>• Incorporate data science principles to address data-dependent questions in the humanities, social sciences, and sciences.</li> <li>• Apply basic exploratory analysis to identify abnormalities in data (i.e., missing values, outliers, redundant features, etc.)</li> <li>• Anticipate and identify ways in which sampled data may be biased</li> <li>• Perform the appropriate feature transformations for processing quantitative and qualitative</li> </ul>

	<p>data</p> <ul style="list-style-type: none"> <li>• Develop and deploy a Machine Learning model</li> </ul>
Brief Content Description	<ul style="list-style-type: none"> <li>• Week 1 – Week 4: Foundation of Data Science (Experimental designs/business intelligence, data classification, data descriptive statistics, data exploration using Python, data visualization using Microsoft Office Excel/Tableau).</li> <li>• Week 5: Assessment 1</li> <li>• Week 5: Exploratory data analysis of quantitative &amp; qualitative data types</li> <li>• Week 6-Week 9: Introduction to Machine Learning, Supervised Learning &amp; Unsupervised Learning</li> <li>• Week 10: Assessment 2</li> <li>• Week 10: Time Series Forecasting</li> <li>• Week 11: Assessment 3 (Course Project)</li> <li>• Week 11: ML model deployment</li> <li>• Week 12: End of Semester Exam</li> </ul>
Teaching and Learning Methods	<ul style="list-style-type: none"> <li>• Discussions,</li> <li>• Case studies</li> </ul>
Learner Support Plan	<ul style="list-style-type: none"> <li>• Face-to-face meetings</li> <li>• Zoom meetings</li> <li>• Pre-recorded lectures</li> <li>• Group discussions</li> </ul>

Resources/Teaching and Learning Materials	<p>These will mainly be disseminated through the UCU eLearning system and the university library system KOHA. They will include;</p> <ul style="list-style-type: none"> <li>• Pre-recorded lectures</li> <li>• Presentation Slides</li> <li>• Textbooks and eBooks</li> <li>• MOOCs and YouTube videos</li> <li>• interactive quizzes, demonstrations, charts and diagrams</li> <li>• Open Educational Resources (OER) like; Academic papers and articles</li> <li>• <a href="https://library.ucu.ac.ug/index.php/eresources/ejournals">https://library.ucu.ac.ug/index.php/eresources/ejournals</a></li> <li>• <a href="https://catalogue.library.ucu.ac.ug">https://catalogue.library.ucu.ac.ug</a></li> </ul>
Course Plan Assessment	<p><b>Coursework</b> (Quizzes and tests, Lab activities, Take-home assignments, Group tasks): 40</p> <p><b>EXAM:</b> (Written, Practical): 60</p>
Supporting Technologies	<ul style="list-style-type: none"> <li>• Discussion forums (Kaggle, R Community (Posit)</li> <li>• wikis,</li> <li>• journals</li> <li>• PowerPoint</li> <li>• Moodle</li> <li>• Software installation for R and RStudio (<a href="https://posit.co/products/open-source/">https://posit.co/products/open-source/</a>)</li> <li>• Excel, Tableau (for analysis and visualization)</li> </ul>
Additional Reading	<ul style="list-style-type: none"> <li>• Learn R for Applied Statistics with Data Visualizations, Regressions, and Statistics by Eric GohMing Hui (<a href="https://doi.org/10.1007/978-1-4842-4200-1">https://doi.org/10.1007/978-1-4842-4200-1</a>)</li> </ul>