

IS3240: ADVANCED BUSINESS PROGRAMMING IN PYTHON

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Advanced Business Programming in Python

Subject Code

IS - Information Systems

Course Number

3240

Academic Unit

Information Systems (IS)

College/School

College of Business (CB)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

CB2240 Introduction to Business Programming in Python or IS2240 Python Programming for Business

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The Advanced Business Programming in Python provides an introduction to big data handling and analysis and supervised machine learning through Python programming with applications in business settings. Key topics include data analysis and visualization using Python libraries (NumPy, Pandas, Matplotlib), database handling with MySQL, data extraction with web scraping and API connection, data wrangling, and a glimpse into the use of Flask for web application development. Upon completion, students will be equipped with the programming and analytical skills to engage in design and implementation of modern information systems and digital platforms for organizations.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Analyze the structure of a Python program and understand applications of computer programming in data handling and analyses.	20	x		
2	Analyze, discuss, test and debug Python programs.	20	x	x	
3	Identify, characterize, and analyze a problem, and write Python programs to solve the business problem.	30		x	x
4	Apply Python programming knowledge and techniques to address data-driven business problems, which involve advanced skills such as data analysis and visualization, database connection, web scraping, and web application development.	30		x	x

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	LTA1: Lecture Students will learn the concepts and general knowledge of advanced programming techniques in Python related to data handling and analysis.	1, 2, 3, 4	Seminar: 3 Hours/Week

2	LTA2: Laboratory Exercise	Students will complete hands-on computer exercises related with business domains in order to help students apply what they have learned in lecture. Major assignment involves individual work or teamwork by a group of students in the same laboratory group to solve a specific business problem.	2, 3, 4	Seminar: 3 Hours/Week
3	LTA3: Tutorial	Students will learn the concepts, techniques, and good practices of programming.	1, 2, 3, 4	Seminar: 3 Hours/Week
4	LTA4: Class Discussion and Presentation	Students will perform in class programming exercises in tutorial and laboratory to get immediate feedback from students. This is followed by discussion of the exercises afterwards to reinforce the learning of the materials tested. Presentation of laboratory results and assignments may be required.	1, 2, 3, 4	Seminar: 3 Hours/Week

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	AT1: Participation and Laboratory Exercises Each laboratory has in-class exercises to assess students' hands-on programming skills of the topics covered.	1, 2, 3, 4	20	
2	AT2: Individual Assignment The individual assignment, including programme codes, results, written report and presentation, is required to assess the technical analysis and implementation skill sets of the students.	2, 3, 4	20	

3	AT3: Group ProjectThe group project serves the purpose of continuous assessment of students' understanding of the key domain areas and as an indicator of how well the students have performed.	1, 2, 3, 4	20	
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Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Assessment Rubrics (AR)**Assessment Task**

AT1: Participation and Laboratory Exercises

Criterion

Ability to accurately describe and understand the concepts in Python programming related to big data handling and analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT1: Participation and Laboratory Exercises

Criterion

Ability to quickly understand and analyze a Python program

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT1: Participation and Laboratory Exercises

Criterion

Ability to creatively, effectively and efficiently write Python programs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT1: Participation and Laboratory Exercises

Criterion

Capability to creatively and effectively develop applications that involve advanced techniques to solve business problems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT2:Individual Assignment

Criterion

Ability to effectively test and debug Python programs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT2:Individual Assignment

Criterion

Ability to creatively, effectively and efficiently write Python programs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT2:Individual Assignment

Criterion

Capability to creatively and effectively develop applications that involve advanced techniques to solve business problems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT3:Group Project

Criterion

Ability to accurately describe and understand the concepts in Python programming related to big data handling and analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT3:Group Project

Criterion

Ability to accurately understand and analyze a Python program

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT3:Group Project

Criterion

Ability to creatively, effectively and efficiently write Python programs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT3:Group Project

Criterion

Capability to creatively and effectively develop applications that involve advanced techniques to solve business problems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT4:Final Examination

Criterion

Ability to accurately describe and understand the concepts in Python programming related to big data handling and analysis

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT4:Final Examination

Criterion

Ability to accurately understand and analyze a Python program

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT4:Final Examination

Criterion

Ability to creatively, effectively and efficiently write Python programs

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

AT4:Final Examination

Criterion

Capability to creatively and effectively develop applications that involve advanced techniques to solve business problems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Python, business application, data handling, data analysis, NumPy, Pandas, Matplotlib, Scikit-Learn, SQL, web scraping, database connection, data wrangling, Flask, web applications.

Reading List

Compulsory Readings

Title	
1	Nil. All materials will be distributed through lecture slides and supplementary materials on Canvas.

Additional Readings

Title	
1	Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, 2nd Edition, O'Reilly Media, 2017.
2	David I. Schneider, An Introduction to Programming Using Python, 1st Edition, Pearson, 2016.
3	Jake VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, 1st Edition, O'Reilly Media, 2016.
4	Fabio Nelli, Python Data Analytics: With Pandas, NumPy, and Matplotlib, 2nd Edition, Apress, 2018.
5	Jason Myers, Rick Copeland, Essential SQLAlchemy: Mapping Python to Databases, 2nd Edition, O'Reilly Media, 2015.

6	Ryan Mitchell, Web Scraping with Python: Collecting More Data from the Modern Web, 2nd Edition, O'Reilly Media, 2018.
7	Andreas Müller, Sarah Guido, Introduction to Machine Learning with Python: A Guide for Data Scientists, 1st Edition, O'Reilly Media, 2016.