

# IS3240: ADVANCED BUSINESS PROGRAMMING IN PYTHON

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## Effective Term

Semester A 2022/23

## 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 SQLite, data extraction with web scraping and API connection, data wrangling, and a glimpse into supervised machine learning (regression and classification). Upon completion, students will be equipped with the programming and analytical skills to engage in data-driven decision-making in modern organizations. This course will also provide the knowledge and training to prepare students for more advanced data analytics and machine learning subjects.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the structure of a Python program and understand applications of computer programming in data handling and analyses.	20	x		
2	Read, analyze, 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.	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.

### Teaching and Learning Activities (TLAs)

TLAs		Brief Description	CILO No.	Hours/week (if applicable)
1	TLA1:Lecture	Concepts and general knowledge of advanced programming techniques in Python related to data handling and analysis are explained.	1, 2, 3, 4	Seminar: 3 Hours/Week

2	TLA2: Laboratory Exercise	Hands-on computer exercises related with business domains are designed 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	TLA3:Tutorial	Concepts, techniques, and good practices of programming are discussed.	1, 2, 3, 4	Seminar: 3 Hours/Week
4	TLA4:Class Discussion and Presentation	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 ExercisesEach laboratory has in-class exercises to assess students' hands-on programming skills of the topics covered.	1, 2, 3, 4	20	
2	AT2: Individual AssignmentThe 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

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**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

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**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

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**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

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**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

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**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

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**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

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**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

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**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

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**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

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**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

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**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, big data, machine learning, business application, data handling, data analysis, NumPy, Pandas, Matplotlib, Scikit-Learn, SQL, web scraping, database connection, data wrangling, regression, and classification.

**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.