Subject Description Form

Subject Code	AMA2222A
Subject Title	Principles of Programming
Credit Value	0
Level	2
Pre-requisite	Nil
Exclusion	Principles of Programming (AMA2222)
Objectives	• To provide students with knowledge on the fundamental elements in computer programming. • To introduce advanced computer programming techniques necessary for developing more sophisticated computer application programs.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: _Professional/academic knowledge and skills_ a) understand the programming elements for solving computing related problems; b) possess the ability to design and develop efficient computer programs for solving problems; c) develop a computer program in a stepwise manner; d) use various software tools for developing computer programs; e) possess the ability to learn advanced programming techniques independently; f) possess the ability to learn other high level programming languages independently; _Attributes for all-roundedness_ g) solve problems using systematic approaches; h) identify and develop problem solutions in a logical manner; i) learn independently any new technology; j) apply information technology with an entrepreneurial perspective.
Subject Synopsis/ Indicative Syllabus	**1. Fundamentals of Computing** Basic concepts of computers and computing, compilation and interpretation, elementary programming constructs. **2. Flow Controls** Flow control, selection, looping, function and recursion. **3. Program Design** Problem solving, problem correctness, testing and debugging. **4. Data Collection and Processing** Data structures, lists, sets, strings and arrays.

	5. Data Analysis and Presentation Correlation and covariance, data visualization, plots and tables. **6. Other applications** Simulation, numerical methods
Teaching/Learning Methodology	This subject emphasizes both the conceptual elements in computer programming and practical experiences. The lectures will be taught in a workshop mode with hands-on exercises reinforcing taught concepts. Students are required to attend the laboratory sessions, which allows them to consolidate their concepts learnt in the lectures. Other practical work helps to reinforce the programming skills learned for applications.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)									
		a	b	c	d	e	f	g	h	i	j
1. Continuous Assessment (Assignments, quizzes, tests and marked laboratory exercises)	60%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2. Examination	40%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total	100 %										

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The continuous assessment and the final examination will be designed to assess the specified learning outcomes. The formats may include written questions, programming exercises and quizzes.

Student Study Effort Required

Class contact:	
▪ Lecture	26 Hrs.
▪ Lab	13 Hrs.
Other student study effort:	
▪ Assignments, quizzes, projects, exams	81 Hrs.
Total student study effort	120 Hrs.

Reading List and References

(1) John Zelle, Python Programming: An introduction to Computer Science, 3rd Edition, Franklin, Beedle & Associates, 2017

(2) Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, Numpy, and Ipython, 2nd Edition, O'Reilly Media, 2018

(3) John Hunt, A Beginners Guide to Python3 Programming, Springer, 2019

	(4) Svein Linge, Hans Petter Langtangen, Programming for Computations - Python, 2nd Edition, Springer, 2020