Subject Description Form

Subject Code	AP20005
Subject Title	Programming in Physics
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	To introduce basic computer programming techniques for the computational solution of problems in physics.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) possess basic knowledge in information technology; (b) understand the fundamentals of computer architecture and operations; (c) write computer programs in a general-purpose programming language; and (d) develop and operate computer programs to solve simple problems in physics.
Subject Synopsis/ Indicative Syllabus	**Basic information technology**: general organization of computer systems; representation of data; programming languages; software development environment. **Programming techniques**: fundamental data types; variables; operators; conditional statements; loops; functions; arrays; strings; input/output. **Applications in physics**: the motion of a falling object; density and mass; electrical circuits; solution of algebraic equations; graphical data representation.
Teaching/Learning Methodology	**Lecture**: The fundamentals in programming and the applications in physics will be explained. Demonstrations on problem solving including programming will be conducted. Students are encouraged to raise questions when meeting difficulties. **Computer laboratory**: Students work on given problem sets either individually or through interaction among each other. They are encouraged to raise questions and discuss any issues with the instructor. These problem sets provide the opportunities to apply the knowledge gained from the lectures and to consolidate what have been learned.

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
(1) Continuous assessment	40	✓	✓	✓	✓
(2) Examination	60	✓	✓	✓	✓
Total	100				

The continuous assessment is based on computer laboratories, assignments and a mid-term test. The examination is a three-hour written final examination. Various kinds of questions will be set in both components to assess the intended learning outcomes.

Student Study Effort Expected

Class contact:	
• Lecture	22 h
• Laboratory	24 h
Other student study effort:	
• Self-study	74 h
Total student study effort	120 h

Reading List and References

Textbook:

P. Deitel and H.M. Deitel, "C++ How to Program", 7th Edition, Prentice Hall (2009).

References:

S. Prata, "C++ Primer Plus", 5th Edition, Sams (2004).

P.L. DeVries and J.E. Hasbun, "A First Course in Computational Physics, 2nd Edition, Jones & Bartlett Publishers (2010).