**BSE 2105 Formal Methods**

(a) Description

The course provides students with skills of solving generic formal prob- lems in science. It covers the intellectual and practical skills necessary for problem formalization.

(b) Aims

The aims of the course are:

*•* To provide students with factual knowledge including the mathe- matical notations and terminologies used in formalizing scientific problems

*•* To provide students with fundamental principles including the laws and theorems arising from the concepts covered in this course;

*•* To be able to apply course material along with techniques and procedures to solve practical problems;

*•* To provide programming skills by writing numerical programs like

Matlab programs, to solve numerical problems.

(c) Teaching and Learning Patterns

Teaching will be by Lectures and practical demonstrations

(d) Indicative Content

*•* Predicate Logic Specification:

Foundations; Basic concepts; Verification; Z; Tools and systems; Z animation Miranda and ZANS; Nitpick and the Z Notation.

*•* Algebraic Specification:

Foundations; Basic concepts; Verification; Tools and systems; Mi- randa; The OBJ family of languages; LARCH.

(e) Assessment Method:

Assessment will be in terms of tests and practical assignments (40%)

and final written examination (60%) (f ) Reading list

(i) Z: An Introduction to Formal Methods, by Antoni Diller, 2nd edition, Wiley, (June 1994), ISBN-10: 0471939730

(ii) Logic in Computer Science: Modeling and Reasoning about Sys- tems, by Michael Huth and Mark Ryan, Cambridge University Press; 2nd Edition (August, 2004), ISBN-10: 052154310X

(iii) Formal Methods and Models for System Design: A System Level Perspective, by Gupta, R., Le Guernic, P. Shukla, S.K. and Talpin, J.P. (Eds.), 2004, ISBN: 978-1-4020-8051-7