I. Title: Programming Laboratory I

2. Credit Structure (L-T-P-Cr): 3 0 4 5

3. Course Code: IT625

4. Semester: SEM 2, MSc(IT)

5. Category: Foundation

6. Prerequisites: Knowledge of programming in structured paradigm and object-oriented paradigm (which are fulfilled if the student has taken “programming paradigms” course in semester-1 of the program)

7. Foundation for: Software design and construction with a focus on Web-based design. The course will serve as foundation for two courses in the next semester: Distributed Systems and, Software Engineering.

8. Abstract Content:
Primary: The course aims to equip students with fundamental principles of designing web-based software systems. Another aim of the course is to teach and realize standard programming practices and patterns for both structured paradigm as well as for object-oriented paradigm. Towards the former aim, students will learn the general architecture of www, rudimentary concepts of networking and network-based computing, HTML – the lingua-fraca of the web, client-side programming (JavaScript, Ajax, Applets, and other active objects), server-side programming (PHP, JSP, Servlets), website system administration and web-server maintenance (Apache httpd, Python, Perl), sysad tools (shell-scripts, makefiles, autoconf), modern network-based computation (XML, Jini, J2ME). Learning of the above is not in a standard textbook fashion but “getting-the-essential-to-solve-the-problem-at-hand” approach. The idea here is: learning a software tool/technology by solving the most representative problem that the tool is designed for, will endow major part of the essential knowledge of that software tool/technology. Towards the second goal of the course, students will learn common patterns of errors in programming, essential software engineering tools (version-control, cvs, Junit, Ant), and essential object-oriented design patterns. Examples will be discussed in the class using “C” as a representative of structured paradigm and “Java” as a representative of the object-oriented paradigm. Basic knowledge of both will be assumed.

An important part of the course is a 7-week course-project during which the students will have an opportunity to continually apply principles learned during the classes.

Optional:

9. Suggested Text/s: Internet as a resource to learn software construction for web-based systems. For learning programming principles and practices, the following books are recommended:
Object-oriented software construction By Bertrand Meyer
Design Patterns By Gang-of-four
Effective C++ By Scott Meyers
Thinking in Java By Bruce Eckel
Thinking in C++ By Bruce Eckel
11. Outcomes and Objectives: After successful completion of the course, the student will have learned to design and develop solutions for web-based systems. The student will also be aware of major programming error patterns and some design patterns for OO design. Most importantly, the student will master the skill of “grabbing the most essential” of any technology within a very short amount of time to solve the problem at hand. This is in contrast to the student's earlier exposure (undergraduate) to the standard mode of learning from textbooks in a sequential manner. This is a present-day requirement for ICT industry where new tools, techniques, and technologies are introduced almost every month, if not every week.