Nepal Open University
Manbhawan, Lalitpur, Nepal
Faculty of Science, Health and Technology

Master of Philosophy in Information and Communication Technology (MPhil in ICT)

Course Title: Advanced Programming Technique **Credit Hours**: 3 (45Hrs)

Course Code: ICT 704 **Semester**: First **Year**: I

Full Marks: 100 **Pass Marks: 50**

Introduction:

The subject Advanced Programming Techniques covers advanced topics in the field of programming. The programming techniques included in this course ranges from common techniques that can be implemented in general purpose programming languages to specialized techniques used in network/Internet programming, which can be applied in cross-platform and cross-device platforms. Programming language used for this purpose is JavaScript and any other programming languages approriate to the techniques.

Course Objectives:

The objectives of the course are:

1. To teach programming techniques applicable to any programming language.
2. To impart concepts and practices about writing clean codes and their maintenance.
3. To introduce techniques to develop cross-platform / cross-device applications for tablets, PCs and Macs by using a 4GL scripting programming language like JavaScript.

Course Contents:

Contents	Hours
Unit 1: General Programming Techniques • Software Development Life Cycle • Programming and events • Formatting and commenting • Error handling • Version control • Naming • Functions • Writing secure codes • User Authentication • Unit Testing	10
Unit 2: Object Oriented Programming Techniques • Classes and abstraction • OO process model • Extreme programming • Scrum • Other Agile methods • Emergence	5

Unit 3: File Handling and Database Connectivity • I/O streams • Java/Net Beans • JDBC / ODBC connection	4
Unit 4: GUI Programming • Dynamic graphics • Game-loops • Animation • Mouse and Multi-touch input • Hit-testing	6
Unit 5: Scripting Programming • OO programming in JavaScript • Developing and debugging JavaScript • User interfaces in JavaScript • Object exchange via JSON • JavaScript events and listeners • Local storage in JavaScript • Dynamic graphics using HTML5 Canvas and CSS animations • Dynamic web applications	15
Unit 6: Distributed and Web Programming • Client-Server communication • Remote Method Invocation • Sound and Web audio • Cross-platform / cross-device development • Using Geo-location on mobile devices	5

Learning Outcomes:

Unit 1: General Programming Techniques:

Students will be able to write correct, clean and modular codes with proper naming conventions and formats having good readability. They will also learn to use security features in their programs.

Unit 2: Object Oriented Programming Techniques:

Students will be able to write programs on OO paradigm by learning Agile development as well as Extreme programming techniques, Scrum and other Agile methods.

Unit 3: File Handling and Database Connectivity:

Students will learn to handle files and folders within their programs. They will also be able to connect program codes to databases.

Unit 4: GUI Programming:

Students will be able to develop Games and other GUI intensive applications.

Unit 5: Scripting Programming:

Students will learn features of a 4GL Scripting programming language (i.e. JavaScript) on top of OO programming in order to develop dynamic graphical and dynamic web applications.

Unit 6: Distributed and Web Programming:

Students will learn to write programs in distributed environment e.g. Client-Server communication, RMI etc. They will also learn techniques to program on cross-platforms / cross-devices.

Mode of Delivery:

The mode of course delivery consists of open and distance (online/offline) and face-to-face or both. 25% of the course is designed to be delivered on online mode, 60% on offline, and remaining 15% on face-to-face mode.

Evaluation Scheme:

- In-semester: 40%
- End-semester: 60%

In Semester Evaluation (40%)	End Semester Evaluation (60%)
a) Unit Assignment/Project/Task (20%) b) Critical Comment/Review (15%) c) Interaction with the Tutor (5%)	a) Short answer questions b) Long answer questions or research paper writing (With a focus on higher order thinking skills such as analysis, synthesis, evaluation, etc.)

Semester Guidelines:

(i) The semester system is not only an examination system. The main objective of this system is to enhance student's knowledge, skill and capacity continuously, extensively and in depth.

(ii) The normal and maximum duration for obtaining the master's degree is 24 months and 72 months respectively. Students failing to complete the requirements in 72 months have to re-enroll.

(iii) Students need to maintain 80% online presence (attendance) for both theory and laboratory classes. They should be regular or part time as per the course registration in online classes. They should enter before starting the classes.

References Books:

1. Clean Code – A Handbook of Agile Software Craftsmanship by Robert C. Martin, Prentice Hall, 1st edition (August 11, 2008), ISBN-13: 978-0132350884.

2. Eloquent JavaScript: A Modern Introduction to Programming by Marijn Haverbeke, 2nd Edition, ISBN-13: 978-1593275846

3. Advanced Java 2 How to program by H. M. Deitel, P. J. Deitel, and S. E. Santry, (2001),

4. Prentice-Hall, Inc. Upper Saddle River, New Jersey 07458.

5. Core Java 2: Volume I – Fundamentals(7th Edition) by Cay S. Horsemann, and Gary Cornell

6. Core Java Volume I-Fundamentals ,11th Edition by Cay S. Horstmann

Journals and Links:

1. *The Computer Journal* , OXFORD Academic, ISSN 0010-4620
2. https://academic.oup.com/comjnl
3. www.osjournal.org
4. https://www.journals.elsevier.com/journal-of-computer-and-system-sciences
5. https://www.springer.com/gp/computer-science/all-journals-in-computer-science
6. https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=12