Topics/Content outline:
Topics include: researching advanced level techniques, building controls and writing advanced level programming applications.

Expanded Outcomes
Outcome1: Obtain information from the internet, manuals, textbooks and supplied sample code to acquire in depth knowledge of a range of advanced technical features that extend the standard development environment of a given GUI language. The student will demonstrate competence in a selection of at least five of the following topics or additional topics depending on language and operating system features. • Extended knowledge of the features of the chosen language. This is intended to cover gaps between the content of earlier programming courses and the level of language knowledge needed by a working programmer – Registry and INI files, handles, strings and pointers, memory allocation, procedural types, open arrays, dynamic arrays, RTTI, sets, Windows command line, records and typed files, use of objects with string lists, exception handling, MDI, context sensitive help. • Development of language independent resource libraries – use and construction of DLLs • Web programming – construction of server extensions in the given language, CGI and WebBroker • Structure and use of object orientation in the given language • Component structure and development in the given language • Use of operating system messaging and services – e.g. Windows API calls, callback functions, Windows message handling • Inter-process communication - threads and multi-tasking, launching other programs, interfaces, Automation, COM, ActiveX • Advanced language features and programming techniques – streams, graphics, efficiency considerations, standard algorithms • Database techniques - multiple user techniques, use of a database definition language from within the selected language, moving data structures and data to a new database platform • Compiler directives and conditional compilation, advanced debugging, packages and installation procedures
Outcome 2: Demonstrate the ability to successfully apply such features and techniques when writing code to solve selected problems in the given GUI language.
Outcome 3: Be able to communicate their knowledge in a form which other programmers will find usable, relevant and easily intelligible

Assessment:

Weighting	Nature of assessment	Learning outcomes
50%	Design and development of advanced computer programs	1, 2,3
10%	Written report on a current live issue including evaluation of a technique relevant to this issue.	1,2,3
40%	Final Exam	1, 2,3

Learning and teaching approaches:
Lectures, laboratory work, self-directed study.

Learning resources required:
Textbook: Refer to the current programme booklist.