# Knight Foundation School of Computing and Information Sciences

**Course Title:** Advanced Windows Programming **Date:** 02/05/2009

**Course Number:** COP 4226

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| **Subject Area:** Computer Systems | **Subject Area Coordinator:** Janki Bhimani<br>**email:** jbhimani@fiu.edu |
| **Catalog Description:**<br>Document and Dialog Based Apps, Message Passing, Printing, Drawing, GUI Design, Common Controls, Multithreaded Programming, Serialization, Database Connectivity, Runtime Libraries, Memory Management. | |
| **Textbook:** Windows Forms 2.0 Programming, Sells, Addison-Wesley, 2006<br>ISBN: 0-3212-6796-6 | |
| **References:** None | |
| **Prerequisites by Courses:** COP 3530 | |

Prerequisites Topics:

- Basic techniques of algorithm analysis
- Linked data structures such as linked lists
- Advanced data structures such as hash tables
- Standard data structure library of a major programming language
- Polymorphism and inheritance
- Interfaces and abstract classes

Course Objectives:

1. Master the Application Framework, Message Passing and Event Handling
2. Master the graphics interface using Colors, Pens, Brushes, Fonts for Text and Shapes
3. Master Modal and Modeless Dialog Windows
4. Master Menus, Keyboard Accelerators, Toolbars and Status Bars
5. Master Document and Dialog based applications.
6. Be familiar with the Common Controls and Dialogs
7. Be familiar with Database Connectivity, Serialization, Drag and Drop, and Multithreaded Programming
8. Master programming for a visual environment

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# COP4226
# Advanced Windows Programming

Relationship between Course Outcomes and Program Outcomes

| BS in CS Program Outcome | COP 4226 Course Outcomes |
|---|---|
| a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms | |
| b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems. | 1, 2, 3, 4, 5, 6, 7, 8 |
| c) Demonstrate proficiency in problem solving and application of software engineering techniques | 1, 2, 3, 4, 5, 6, 7 |
| d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other. | 8 |
| e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist. | |
| f) Demonstrate the ability to work cooperatively in teams. | |
| g) Demonstrate effective communication skills. | |

Assessment Plan for the Course
How Data in the Course are used to Assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan:
http://www.cis.fiu.edu/programs/undergrad/cs/assessment/

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## Outline

| Topic | Lecture Hours | Outcomes |
|---|---|---|
| • Introduction to C#<br>o Assembly<br>o Access Modifiers<br>o Virtual Methods<br>o Boxing/Unboxing<br>o Parameter Passing | 5 | 8 |
| • Introduction to Windows Programming<br>o Application Framework<br>o Event Handling<br>o Message Processing<br>o Application Settings | 2.5 | 1 |
| • Device Contexts<br>o Pens, Brushes, Fonts<br>o Drawing Shapes<br>o Drawing Text | 5 | 2 |
| • Dialog Windows<br>o Modal<br>o Modeless<br>o Dialog Controls<br>o Common Dialogs<br>o Dialog based applications | 7.5 | 3, 6 |
| • System Basics<br>o Message Processing<br>o Multithreading<br>o Memory Management | 2.5 | 1, 7 |
| • User Interface<br>o Menus, Keyboard Accelerators<br>o Toolbars<br>o Status Bar | 4 | 4 |
| • Separating the Document from the View<br>o Single Document Applications<br>o Multiple Document Applications<br>o Printing and Print Preview<br>o Splitter Windows and Multiple Views | 7.5 | 5 |
| • Additional Topics<br>o Dynamic Link Libraries<br>o Database Connectivity<br>o Drag and Drop | 4 | 5, 7 |

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**Course Outcomes Emphasized in Assignments**

| Assignment | Outcome | Number of Weeks |
|---|---|---|
| HW 1 | 1, 5, 8 | 2 |
| HW 2 | 1, 3, 4, 5, 6, 7, 8 | 2 |
| HW 3 | 1, 2, 5, 7, 8 | 2 |
| HW 4 | 1 - 8 | 2 |
| Project | 1 - 8 | 4 |

**Oral and Written Communication: None**

**Social and Ethical Implications of Computing Topics: None**

**Approximate number of credit hours devoted to fundamental CS topics**

| Topic | Core Hours | Advanced Hours |
|---|---|---|
| Algorithms | | |
| Software Design | | 2 |
| Computer Organization and Architecture | | |
| Concepts of Programming Languages | | 1 |
| Data Structures | | |

**Theoretical Contents:**

| |
|---|
| Threads |
| Colors and Fonts |
| Graphical Transformations |
| Mapping Coordinate Systems |
| Event Handling and Message Passing |
| Memory Management |
| Model, View, Controller Architecture |
| Serialization |

**Problem Analysis Experiences**

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|---|
| 4 Homework Assignments |
| 1 Project |

**Solution Design Experiences**

| |
|---|
| 4 Homework Assignments |
| 1 Project |

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## The Coverage of Knowledge Units within Computer Science Body of Knowledge[1]

| Knowledge Unit | Topic | Lecture Hours |
|---|---|---|
| PF3 | Objects and References | 1.5 |
| PF5 | Event-handling methods | 2.5 |
| PF5 | Event propagation | 1 |
| OS4 | Processes and Threads | 2.5 |
| OS5 | Object Disposal | 1 |
| PL2 | .NET Environment | 1 |
| PL6 | Single/Multiple Doc Applications | 1 |
| HC2 | Principles of GUI | 2 |
| HC5 | Dialogs and Common Controls | 4 |
| HC6 | Dialogs, Menus, Toolbars | 2 |
| GV1 | Using a graphics API | 1.5 |
| GV1 | Simple color models (RGB) | 1 |
| GV1 | Affine transforms (scaling, translation) | 2 |
| GV1 | Clipping | .5 |
| GV2 | Video display devices | .5 |
| GV2 | Physical and logical input devices | .5 |
| GV2 | Issues facing the developer of graphical systems | 2 |
| GV5 | GDI vs GDI+ | 1 |
| GV5 | Antialiasing, True Type | .5 |
| IM2 | Data Sets and Data Binding | 2 |
| SE1 | Single/Multiple Doc Applications | 3 |
| SE2 | All Topics | 2 |
| SE3 | Windows IDE for .NET | 2 |

[1]See http://www.sigcse.org/cc2001/cs-overview-bok.html for a description of Computer Science Knowledge units