**INTERMEDIATE PROGRAMMING**

# PRG 210 - Section: [001]

**Credit Hours:** 3.00 **Lab Hours:** 0.00 **Lecture Hours:** 3.00

# IAI Core: IAI Majors:

|  |  |  |
| --- | --- | --- |
| **Semester: [Spring 2015]** | **Course Begins: [01/22]** | **Course Ends: [5/14]** |
| **Days: [Thursday]** | **Times: [6pm]** | **Room: [8.50pm]** |

**Instructor:** [Jack Brzezinski PhD] **E-mail:** [[jbrzezinski@mchenry.edu](mailto:jbrzezinski@mchenry.edu)] **Phone:** [8578]

**Office Hours:** [Tuesdays 4 - 6 or by appointment]

**Office Location:** [D161 or D154]

# Required Course:

**Textbook(s): Gaddis, Intro to C++ (continued from PRG 110) Course Description:**

Intermediate Programming builds on the C++ language concepts learned in Introduction to Programming. More

detail is provided on functions, arrays, pointers and user-defined functions. In addition, students will learn the principles of object oriented programming including: classes, abstract data types, data structures, algorithms, and the design and implementation of multi-file projects. Course may be repeated once for a maximum of 6 credit hours.

# Course Prerequisite: PRG 110.

**Course Objectives:**

Upon completion of this course, the student will be able to:

1. Demonstrate an understanding of the problem-solving capabilities of a high-level language.
2. Write well-designed, sophisticated programs.
3. Demonstrate an understanding of structured programming techniques.
4. Describe and define recursion, dynamic memory allocation, function overloading, binary files, and the Standard Template Library.
5. Demonstrate an understanding of pointers, strings, and multi-dimensional arrays.
6. Demonstrate an understanding user-defined data types including structures, lists, stacks, queues, deques, and binary trees.
7. Demonstrate an understanding of the advantages of a high-level language.
8. Demonstrate an understanding of and appreciation for structured programming techniques.
9. Explain the concept of object oriented programming.
10. Explain the need for good planning prior to coding a program.
11. Demonstrate an understanding and appreciation for the construction problems involved in large application programs.
12. Demonstrate an understanding and appreciation for proper program documentation.
13. Demonstrate an understanding of user-defined data structures.
14. Design, code, compile, and execute complete high-level programs on the computer.
15. Debug programs until successful execution to ensure complete and accurate output.
16. Design modular programs that demonstrate correct usage of function design including use of local variables, reference variables, function overloading, default parameters, tight cohesion, and loose coupling.
17. Create structured programs that make correct use of arrays, pointers, strings, structures, dynamic memory, binary files, and various user-defined data structures.
18. Write a simple objected oriented program that defines a class and objects, and uses one or more constructors.

**Course Outline:**

1. Review of programming fundamentals
   1. Inputs and outputs
   2. Ifs and loops
   3. Functions
   4. Arrays
   5. Text Files
2. Advanced array operations
   1. Sorting arrays
   2. Searching arrays
   3. Multi-dimensional arrays
3. Pointer operations
   1. Pointer variables
   2. Pointer arithmetic
   3. The relationship between arrays and pointers
   4. Initializing pointers
   5. Dynamic memory
4. Characters and strings
   1. Character testing and character functions
   2. String manipulation
   3. The relationship between strings, arrays, and pointers
   4. String functions
   5. The STL string class
5. Structures
   1. Creating abstract data types
   2. Accessing structure members
   3. Initializing a structure
   4. Arrays of structures
   5. Passing structures to functions
   6. Pointers to structures
   7. Unions
6. Advanced file operations
   1. Member functions for reading and writing files
   2. Creating binary files
   3. Creating random access files
7. Introduction to objected oriented programming
   1. Creating a class
   2. Creating objects
   3. Private and public members
   4. Constructors and destructors
8. Linked lists
   1. Creating a linked list
   2. List operations
   3. The STL list container
9. Stacks and queues
   1. The stack ADT
   2. The STL stack container
   3. The queue ADT
   4. The STL queue and deque containers
10. Recursion and binary trees
    1. Using recursion in a program
    2. Using recursion to search a binary tree

# Assignments and Grading Criteria

[Insert. Must include the value of each project, skill, exam, etc. as it relates to the final grade.]

# Policies

**Attendance policy:** [Attendance is required]

**Late work/make-up policy:** [Arrangements can be made with the instructor]

# Weekly Course Schedule

[Insert date of each class meeting, topics to be covered, assignment due dates, testing dates, final exam date, etc. Table format below is optional.]

|  |  |
| --- | --- |
| Week #1 | Arrays  Home Assignment 1 |
| Week #2 | Arrays and algorithms Home Assignment 2 |
| Week #3 | Pointers  Home Assignment 3 |
| Week #4 | Pointers  Home Assignment 4 |
| Week #5 | Pointers  Home Assignment 5 |
| Week #6 | Structures  Home Assignment 6 |
| Week #7 | Structures  Home Assignment 7 |

|  |  |
| --- | --- |
| Week #8 | Classes/Objects Home Assignment 8 |
| Week #9 | Classes/Objects Home Assignment 9 |
| Week #10 | Classes/Objects Home Assignment 10 |
| Week #11 | Inheritance, polymorphism, virtual functions Home Assignment 11 |
| Week #12 | Inheritance, polymorphism, virtual functions Home Assignment 12 |
| Week #13 | Inheritance, polymorphism, virtual functions Home Assignment 13 |
| Week #14 | Data structures  Home Assignment 14 |
| Week #15 | Review |
| Week #16 | Review |

**Withdrawals:** The last day to drop this course is **[Insert date according to** [www.mchenry.edu/academiccalendar.asp](http://www.mchenry.edu/academiccalendar.asp) **].** Failure to attend class does not constitute official withdrawal. If students are considering a withdrawal, they should consult directly with the instructor and an academic advisor. Students may withdraw from a class through the Registration Office, either in person or by fax: (815) 455-3766. In their request, students should include their name, student ID number, course prefix, number and section, course title, instructor, reason for withdrawing, and their signature. Withdrawal from a course will not be accepted over the telephone.

Please refer to the following link for other important college dates: [www.mchenry.edu/academiccalendar.asp](http://www.mchenry.edu/academiccalendar.asp)

# Special Needs Statement

McHenry County College offers support services for students with special needs. It is your responsibility to meet with the Special Needs Coordinator and provide current documentation regarding a disability. Please call or stop by the Special Needs Department, (815) 455-8676, Room A260, as soon as possible if you would like more information about the accommodations that are available. In addition, it is important for you to discuss those accommodations with your instructor so you are fully able to participate in this course.

# Academic Integrity

As an educational community, McHenry County College values the pursuit of academic excellence and integrity. In accordance with this philosophy and Chapter 10, Act 5 of the 1994 Illinois Community College Act, academic dishonesty in any form, including cheating, plagiarism, and all other acts of academic theft, is considered intolerable. Appropriate sanctions, up to and including suspension from the College will be imposed by authorized College personnel.

# Copyright Policy

MCC will maintain current procedures and guidelines to ensure that all staff and students comply with applicable copyright laws and other intellectual property protection laws. The College will encourage staff and students to engage in the development of intellectual property and facilitate ownership protections with respect to such development of intellectual property.

The College expects that staff and students will act responsibly and ethically in a manner consistent with all copyright laws and College copyright procedures and guidelines. This policy authorizes the College to adopt and maintain such procedures and guidelines necessary to ensure compliance with copyright laws and to facilitate ownership protection with respect to the development of intellectual property.

# Student Code of Conduct and the Judicial Process

Consistent with the MCC mission is an expectation that students will govern themselves in terms of appropriate behavior with emphasis on self-respect and respect for others. It is the practice of the College to respect the properly exercised rights of its students. The College recognizes a student’s rights within the institution to freedom of speech, inquiry and assembly; to the peaceful pursuit of education; and to the reasonable use of services and facilities at MCC.

MCC has adopted a Student Code of Conduct and judicial process to maintain a learning environment of respect, civility, safety, and integrity for all members of the MCC community.

Whenever possible, sanctions for violations of the Student Code of Conduct may be educational in nature. However, violations affecting the health and safety of members of the MCC community are deemed to be the most serious. Therefore, acts of violence, threats or dangerous behavior are most likely to result in a suspension from the College. Violations of the academic dishonesty policy may also result in suspension or expulsion from the institution and/or reduced or failing grade.

# Children on Campus

For the safety of children on campus, children (i.e., less than 16 years of age) are not permitted on campus unattended by a parent/guardian, except when they are attending classes offered by MCC for children. The College requires that no children be allowed into a classroom/laboratory environment, including the Testing Center, Learning Center and computer labs, solely for the purpose of a parent/guardian to provide direct supervision of his/her child.

# Teaching Schedule

The scheduling of the activities and teaching strategies on this syllabus, but not the objectives or content, may be altered at any time at the discretion of the instructor.

# Resources

The following are useful resources available to you as a student at McHenry County College:

**Advising and Transfer Center: Phone (815) 479-7565; Office A257** [www.mchenry.edu/ATC/Index.asp](http://www.mchenry.edu/ATC/Index.asp)

# Counseling:

**Phone (815) 455-8765; Office A257**

[www.mchenry.edu/counseling](http://www.mchenry.edu/counseling)

# Financial Aid:

**Phone (815) 455-8761; Office A262**

[www.mchenry.edu/financialaid](http://www.mchenry.edu/financialaid)

# Library:

**Phone (815) 455-8533; Office A212**

[www.mchenry.edu/library](http://www.mchenry.edu/library)

# Special Needs:

**Phone (815) 455-8676; Office A260**



[www.mchenry.edu/specialneeds](http://www.mchenry.edu/specialneeds)

# Tutoring and Study Skills (Sage Learning Center):

This workforce solution was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timelines, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use, by an organization and/or personal use by an individual for non-commercial purposes, is permissible. All other uses require the prior authorization of the copyright holder.

**Phone (815) 455-8579; Office A247**

[www.mchenry.edu/sage](http://www.mchenry.edu/sage)