Battlefield High School
Northern Virginia Community College

ITP100 Software Design
6640-80 Senior Capstone Programming course for the IT Program
Professor Drake, Course Syllabus

Battlefield High School: 6640-80 Senior Capstone Programming course for the IT Program
NVCC: ITP100 Software Design

ITP100 Course Description
ITP 100: SOFTWARE DESIGN
6640-80: SENIOR CAPSTONE PROGRAMMING COURSE FOR THE IT PROGRAM

REQUIRED Pre-Requisite: ITE115 – Basic Computer Literacy, Advanced Computer Math or 6670. Senior Year Course. ITP110 introduces principles and practices of software development. Course content includes instruction in critical thinking, problem solving, skills, and essential programming logic in structured and object-oriented design using contemporary tools. Some hands-on assignments will be required.

ITP100 Course Objectives
Upon completion of this course, the student will be able to:
- Understand programming terminology and basic mechanics of programming necessary for success in programming courses.
- Understand the structured design building blocks applied within programming solutions.
- Implement structured design using an appropriation notational language (such as pseudo code)
- Understand the core concepts of object-oriented design
- Implement object-oriented designs (OOD) using the standard Unified Modeling Language (UML) through an appropriate design tool

ITP100 Course Content
Program Design
- Program analysis and design within the system development life cycle
- Evolution and development of both programming languages and program design
- Difference between a design notational language and a design tool
- Development of program algorithms

Structured Design
- Design process for structured program design
- Notational languages (pseudo code and flow charting) and design tools for structured design
- Sequence, selection, and loop structures within a structured design solution for an operation
- Decisions using null ELSE selections, nested selections, and CASE structures within a structured design solution
- Implement WHILE, UNTIL, FOR loops, and nested loops within a structured design
• Implement single dimensional and parallel arrays
• Understand multi-dimensional arrays
• Design modular code using predefined programming functions (such as random() and round())
• Design modular code with user written programming functions
• Structured design solutions that involve one operation calling other operations with received and returned arguments

Object-Oriented Design Introduction

• Design process for object-oriented program design
• Unified Modeling Language within object oriented design
• Tools for standard OOD notational language, the Unified Modeling Language
• Candidate classes given a problem description
• Attributes and methods for candidate classes given a problem description
• Show operations with a full UML signature including received and returned arguments
• Introduce the concepts of object, class, message, data-hiding, information-hiding, encapsulation
• Create a UML class diagram

Cooperative Team Work

• Design team approach to software design
• Work on a single task of a design project while other teams or individuals are working on separate tasks of the same project
• 
  • Advanced Data Modeling Concepts
  • Transform a Data Model into a Functional Database
  • Structured Query Language
  • Database Management Concepts
  • Data Warehousing (Multi-Dimensional Data, OLAP, Data Mining)
  • Object-Oriented Concepts
ITP100 Student Learning Outcomes

Program Design

- Understand the place of program analysis and design within the system development life cycle
- Understand the evolution and development of both programming languages and program design
- Describe the difference between a design notational language and a design tool
- Develop program algorithms

Structured Design

- Describe a reasonable design process for structured program design
- Identify one or more appropriate notational languages (such as pseudo code) and tools for structured design
- Implement sequence, selection, and loop structures within a structured design solution
- Implement decisions using null ELSE selections, nested selections, and CASE structures within a structured design solution for an operation
- Demonstrate a working knowledge of when to apply the appropriate loop structure within a structured design
- Implement WHILE, UNTIL, FOR loops, and nested loops within a structured design solution for an operation
- Implement single dimensional and parallel arrays within a structured design solution
- Understand multidimensional arrays
- Implement modular code using predefined programming functions (such as random() and round())
- Implement modular code with user written programming functions
- Create structured design solutions that involve one operation calling other with received and returned arguments

Object-Oriented Design Introduction

- Describe a reasonable design process for object-oriented program design
- Explain the use and importance of the Unified Modeling Language within object oriented design
- Identify appropriate tools to use with the standard OOD notational language, the Unified Modeling Language
- Identify appropriate candidate classes given a problem description
- Identify appropriate attributes and operations for candidate classes given a problem description
- Show operations with a full UML signature including received and returned arguments
- Define the terms object, class, message, data-hiding, information-hiding, encapsulation
- Create a UML class diagram

Cooperative Team Work

- Work as a member of a design team on a given design task
- Work on a single task of a design project while other teams or individuals are working on separate tasks of the same project
Important Semester Dates

<table>
<thead>
<tr>
<th>Fall 2014 Semester</th>
<th>Spring 2015 Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes begin</td>
<td>Rolling time period</td>
</tr>
<tr>
<td>Last day to drop</td>
<td>27-October-2014</td>
</tr>
<tr>
<td>Last day to withdraw without grade penalty</td>
<td>12-December-2014</td>
</tr>
<tr>
<td>Last day to drop</td>
<td>23-February-2015</td>
</tr>
<tr>
<td>Last day to withdraw without grade penalty</td>
<td>1-May-2015</td>
</tr>
</tbody>
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Drop Date:
If you are not proving successful in this college course due to its rigor or personal issues, the course can be dropped by the above date. With your agreement, your teacher will send an e-mail with this request to the DE Registrar. If a transferrable course, you must be removed from the course. If non-transferable, you can take the high school only credit and remain in the course.

Withdraw Date:
If you missed the drop deadline, you may also be withdrawn from the course. A withdraw places a W on your college transcript but does not impact your college GPA. To be withdrawn, with your permission, your DE Instructor will complete the DE withdraw form and send to the DE Registrar. Please note, too many “W” on a college transcript can impact your ability to secure financial aid in the future!

Grading Criteria and Scale

Each assignment will be based on a grade of 100 points. The total of all assignments will be 60% of the final grade in the course.

Your overall course grade will be determined according to the following percentages.

<table>
<thead>
<tr>
<th>Graded Item</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>20 %</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15 %</td>
</tr>
<tr>
<td>Assignments</td>
<td>30 %</td>
</tr>
<tr>
<td>Projects</td>
<td>25 %</td>
</tr>
<tr>
<td>Notebook</td>
<td>10 %</td>
</tr>
</tbody>
</table>
Your final grade will be based on the following NVCC grade scale. Please note that you must also pass the Final Exam in order to pass the course, regardless of your scores on the other assignments.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
</tr>
<tr>
<td>B</td>
<td>80-89</td>
</tr>
<tr>
<td>C</td>
<td>70-79</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>0-59</td>
</tr>
</tbody>
</table>

**Academic Dishonesty**

When College officials award credit, degrees, and certificates, they must assume the absolute integrity of the work you have done; therefore, it is important that you maintain the highest standard of honor in your scholastic work.

The College does not tolerate academic dishonesty. Students who are not honest in their academic work will face disciplinary action along with any grade penalty the instructor imposes. [Drake imposes: You will receive a zero grade on a first offense, your second offense will result in a zero for the final class grade.] Procedures for disciplinary measures and appeals are outlined in the Student Handbook. In extreme cases, academic dishonesty may result in dismissal from the College. Academic dishonesty, as a general rule, involves one of the following acts:

1. Cheating on an examination or quiz, including giving, receiving, or soliciting information and the unauthorized use of notes or other materials during the examination or quiz.
2. Buying, selling, stealing, or soliciting any material purported to be the unreleased contents of a forthcoming examination, or the use of such material.
3. Substituting for another person during an examination or allowing another person to take your place.
4. Plagiarizing means taking credit for another person’s work or ideas. This includes copying another person’s work either word for word or in substance without acknowledging the source.
5. Accepting help from or giving help to another person to complete an assignment, unless the instructor has approved such collaboration in advance.
6. Knowingly furnishing false information to the College; forgery and alteration or use of College documents or instruments of identification with the intent to defraud.

**Special Services:**

Students with disabilities should contact a Counselor for Disability Services. “Northern Virginia Community College is committed to complying with Section 504 of The Rehabilitation Act of 1973, as amended, and Americans with Disabilities Act (ADA) by providing reasonable accommodations for students. No qualified student with a documented disability shall be denied access to, or participation in, services, programs, and activities of the College.” [www.nvcc.edu]
**Attendance/Student Participation**

Education is a cooperative endeavor between the student and the instructor. Instructors plan a variety of learning activities to help their students master the course content. Your contribution is to participate in these activities within the framework established in the class syllabus. Faculty will identify specific class attendance policies and other requirements of the class in the class syllabus that is distributed at the beginning of each term. Successful learning requires good communication between students and instructors; therefore, in regular classroom attendance, regular participation in all activities, and respectful attitudes are required and essential at all times.

It is your responsibility to inform your instructor prior to an absence from class that is not a sickness. You are responsible for making up all course work missed during an absence. In the event of unexplained absences, your instructor may withdraw you administratively from the course.

**Electronic Device Policy**

The NVCC Student Handbook recognizes the College's responsibility "to provide a ... learning environment that facilitates the mission of the College." Inconsistent with that environment is any disruption or obstruction of teaching, research, administration, disciplinary proceedings or other College activities," Therefore, students must silent cell phones and other electronic devices during regular class time, and turn OFF cell phones and other communication devices during any/every exam. Students whose cell phones interrupt instruction will receive no credit for work performed during that class session.

**Additional Course Information:**

1. It is your responsibility to understand the syllabus.
2. In order to be successful in IT Programming you will need constant access to the internet, and several software development tools. Most of the tools will be available via the IT software program managed by Professor Drake. If you do not have access to the Internet at home, please see me the first week of class.
3. Try to avoid causing distractions in class. This means do not engage in private conversations during the lecture and tests. Do not read or do other schoolwork after class begins.
4. I do not accept assignments via email.
5. You may use a laptop in class, but I will occasionally check during class to see if you are using it to only take notes. If I find you online or playing games, you will lose the right to use a laptop in class for the entire school year. Since we are an IT Class, this will impact your success in the course. If you see another student using their laptop inappropriately please inform me (either in person or via email).
Required Supplies:

- **CONSTANT ACCESS TO THE INTERNET.**
- Source to store class work (for example: external hard drive, flash drive, dropbox account, google drive, Office 365), minimum size 8G. **This is to be with you or accessible at all times!**
  - This same storage location MAY NOT contain games!
- Method for you to take and store both notes and sheets of paper. You MUST have the entire year of notes in one location and they must be with you for EVERY class. Your choices include:
  - 3-ring binder
  - Notebook with location to stores papers
  - Computer for notes
    - Scan all documents at home to be online
    - Or combine computer with a paper storage method
  - A method to place ‘TABS’ on your notebook to keep it organized and for fast access to a section
- Paper (there will be times that you will need paper even if you elect to take notes on a computer)
- Pencil, pen, eraser, colored pencils/pens or highlighters for note taking
- Online Storage for all class assignments
- Ream of paper, for class. Put your name on the Ream of paper
- EXPO Markers