Contribution to Class ….. 10%
Homework ................. 10%
Midterm .................. 30%
Term Paper ............... 20%
Final ....................... 30%

No makeup exams!!!

The course grades are assigned as:

- 90 – 100% = A-
- 80 – 89% = B
- 70 – 79% = C
- 60 – 69% = D
- Below 60% = F

Note: Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of “A” (or “F”). By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

---

Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, images, rasterization, and math preliminaries</td>
</tr>
<tr>
<td>2</td>
<td>Ray tracing preliminaries; Geometric objects</td>
</tr>
<tr>
<td>3</td>
<td>2D/3D transform; OpenGL programming</td>
</tr>
<tr>
<td>4</td>
<td>Lighting, shading, and viewing</td>
</tr>
<tr>
<td>5</td>
<td>Vertex processing</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
</tr>
<tr>
<td>7</td>
<td>Review and midterm exam</td>
</tr>
<tr>
<td>8</td>
<td>Visualization</td>
</tr>
</tbody>
</table>

Revised 2019.10
Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

A course grade of “incomplete” will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Term paper requires students to write a report for “Motion Graphics And Non Moving Graphics”. Motion graphics offers new narrative possibilities compared to traditional print graphics - but motion graphics may also introduce limitations easily overcome by non-moving graphics. Take at least two examples of each kind of graphic form and compare the communicative strengths and weaknesses of each. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

By the end of this course, students will be able to:

1. understanding of fundamental algorithms and techniques in computer graphics;
2. understand 2D and 3D viewings and transformations;
3. describe how graphics display devices work and what graphics;
4. explain the graphics modeling process and create polygonal meshes models;
5. create virtual scenes, transform objects, and work with a camera.
We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

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Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quarter with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

The Learning Environment:

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- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

Revised 2019.10
Reagan National University Library Services:

RNU’s online collection contains over 60,000 volumes comprised of books, journals, videos, and faculty created resources. The Library Research Portal (library@rnu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts, visual media, and teaching resources. Appropriate sources include scholarly and peer-reviewed journal articles, scholarly books, and well-respected news magazines and newspapers. The Library offers a large number of appropriate sources and each student is required to attend an online Library orientation. Assistance is available to help students select and locate appropriate sources when RNU is open. The online library is available to students 24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

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Syllabus

1. Administrative Information:
   Course Number: CSC 365
   Course Title: Programming Hand Held Devices
   Credit Hours: 3
   Prerequisite: CSC 122
   Term: WI 2019
   Class Time: W 9:00 – 12:45
   Class Room: 1
   Instructor: [redacted]
   Office Hours: M TU 11:00 AM – 1:00 P. M.
   Telephone:
   E-Mail: [redacted]

Revised 2019.10
**Course Description**

This course covers Android/IOS programming. The major topics include: GUIs, layouts, menus, resource files, events, touch/gesture processing, accelerometer and motion event handling, images, video, audio, graphics, animation, maps, geo-location, threading, web services, timers, supporting various screen sizes/resolutions, and more. We will write Apps for Android phones/watches, iPhone, and Apple Watch.

**Teaching Procedures**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

**Text:**

There is no textbook for this course, but I strongly encourage students to explore the wide range of freely-available Android-related and ISO-related resources.

- Keep up with changes and improvements in the Android ecosystem by reading the Android Developer's Blog.
- Watch tutorials and other presentations from the Google I/O conference.

**Course Requirements:**

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Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

- Contribution to Class ...... 10%
- Homework ..................... 10%
- Midterm .................. 30%
- Final ......................... 50%

No makeup exams!!!

The course grades are assigned as:

- 90 – 100% = A-
- 80 – 89% = B
- 70 – 79% = C
- 60 – 69% = D
- Below 60% = F

Note: Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of “A” (or “F”). By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intro to Interface Builder (IB) Objective C Data types, Intro to Objective C Classes IBOutlets</td>
</tr>
<tr>
<td>2</td>
<td>Setters/Getters Arrays and Collections</td>
</tr>
<tr>
<td>3</td>
<td>UIControlEvents/UIEvents and Event Handlers Application Lifecycle/UILabel</td>
</tr>
<tr>
<td>4</td>
<td>UITextView/UITextField</td>
</tr>
</tbody>
</table>

Revised 2019.10
Term Paper:

Term paper requires students to write a report for “Handheld devices for applications using dynamic multimedia data”. Growing demand for ubiquitous and pervasive computing has triggered a sharp rise in handheld device usage. At the same time, dynamic multimedia data has become accepted as core material which many important applications depend on, despite intensive costs in computation and resources. This paper investigates the suitability and constraints of using handheld devices for such applications. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Revised 2019.10
Attendance, Absence, Lateness, Incomplete:

A course grade of “incomplete” will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

Students should be able to perform the following upon completion of this course:

- Develop a wide range of completely functional mobile applications (8 - 10 apps).
- Test the mobile application using the vendor supplied simulator.
- Test the mobile application on the actual device (ipod, iphone, ipad)
- Develop splitview applications
- Develop touch-based applications
- Develop a game application with Quartz library
- Develop a web application camera.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

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Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a

Revised 2019.10
disability data sheet, which can be obtained from the student services office.

**The Learning Environment:**

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Revised 2019.10
1. **Administrative Information:**

   - Course Number: CSC 368
   - Course Title: Web Programming
   - Credit Hours: 3
   - Prerequisite: CSC 122
   - Term: SP 2019
   - Class Time: W 9:00 – 12:45
   - Class Room: 1
   - Instructor: [Redacted]
   - Office Hours: M Tu 11:00 AM – 1:00 P. M.
   - Telephone: [Redacted]
   - E-Mail: [Redacted]
Course Description

This course presents and applies the web programming languages (HTML, DHTML, Javascript, Coldfusion), tools, and techniques used to develop professional web sites. The course moves step-by-step through the processes involved in planning, designing, launching, and maintaining successful web sites, with an emphasis on teamwork.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:


Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Homework ............... 20%
Final Project ............... 15%

Revised 2019.10
Midterm ………………… 30%
Final ……………………. 35%

No makeup exams!!!

The course grades are assigned as:

- 90 – 100% = A-
- 80 – 89% = B
- 70 – 79% = C
- 60 – 69% = D
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regarding to his/her progress or any aspects of the course.

Computer laboratory

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lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab.
Faculty will be around when the students are doing their lab assignments.

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<th>Reading</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Web Fundamentals, Programming Languages for the Web</td>
<td>Chapters 1 and 2</td>
<td>File browser v1.0, indexer v1.0</td>
</tr>
<tr>
<td>2</td>
<td>HTML Basics, the working environment The PHP language</td>
<td>Chapters 3 and 4</td>
<td>Chapter 5 and 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>File Browser v2.0, indexer v2.0</td>
</tr>
<tr>
<td>3</td>
<td>More on the PHP language</td>
<td>Chapter 7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Using HTML with PHP, forms, sessions, cookies, etc. Using CSS and templates. Intro to databases</td>
<td>Chapter 9</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Database manipulation in PHP</td>
<td>Chapter 12 and 13</td>
<td>Indexer v3.0</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Basics of JavaScript</td>
<td>Chapter 14</td>
<td>Indexer 4.0+Searcher; final project proposal due</td>
</tr>
</tbody>
</table>

Revised 2019.10
Term Paper:

Term paper requires students to write a report for “Web Site Development Checkpoints: Website”. Websites provide organizations with a valuable tool for the presenting a face to the entire world few successful businesses can survive today with having a professional-looking and functional website (Lucas). This paper is to analyze the resolve of a company’s web site whether or not it achieve the purpose it intend. Web-Site development checkpoints is the process of collecting and linking information about a specific web page. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

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Course Outcome:

At the end of this course the successful student will be able to:

- apply a structured approach to identifying needs, interests, and functionality of a website.
- design dynamic websites that meet specified needs and interests.
- write well-structured, easily maintained, standards-compliant, accessible HTML code.
- write well-structured, easily maintained, standards-compliant CSS code to present HTML pages in different ways.
- use JavaScript to add dynamic content to pages.
- critique JavaScript code written by others, identifying examples of both good and bad practice.

Moodle Forum:

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Reagan National University

Syllabus

1. Administrative Information:

   Course Number: CSC 417
   Course Title: Object-Oriented Programming
   Credit Hours: 3
   Prerequisite: CSC 122
   Term: SP 2019
   Class Time: W 9:00 – 12:45
   Class Room: 1
   Instructor: [blank]
   Office Hours: M TU 11:00 AM – 1:00 P. M.
   Telephone: [blank]
   E-Mail: [blank]
Course Description

Advanced use of an object-oriented programming language in the implementation of object-oriented systems. The language is studied in depth to see how advanced concepts are realized in the language, and is used to produce example systems. Emphasis is placed on the most recent advanced features.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

• Offers a different and unique, but relevant, perspective;
• Contributes to moving the discussion and analysis forward;
• Builds on other comments;
• Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:


Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Homework Assignments .................... 20%
Term Paper .................................. 20%

Revised 2019.10
Midterm .................................. 30%
Final ..................................... 30%

No makeup exams!!!

The course grades are assigned as:

90 – 100% = A-
80 – 89% = B
70 – 79% = C
60 – 69% = D
Below 60% = F

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Computer laboratory

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<tbody>
<tr>
<td>1</td>
<td>Introduction to Object Oriented Programming, Basic elements</td>
<td>Chapters 1 and 2</td>
<td>Assignment 1</td>
</tr>
<tr>
<td>2</td>
<td>Program control, Operators, Basic UML</td>
<td>Chapters 3, 4, 5, 9</td>
<td>Assignment 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(assignment 1 due)</td>
</tr>
<tr>
<td>3</td>
<td>Initialization and clean-up, I/O, Arrays, ArrayList, Composition, Implementation hiding</td>
<td>Chapter 7, 8, 9, 10</td>
<td>Assignment 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(assignment 2 due)</td>
</tr>
<tr>
<td>4</td>
<td>Inheritance &amp; Polymorphism Upcasting &amp; Downcasting Interfaces, Abstract Classes &amp; Polymorphism</td>
<td>Chapter 11, 13</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Database manipulation in PHP</td>
<td>Chapter 12 and 13</td>
<td>Assignment 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(assignment 3 due)</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Review, GITHUB workshop</td>
<td>Chapter 12, 17</td>
<td>(Assignment 4 due)</td>
</tr>
</tbody>
</table>

Revised 2019.10
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topic</th>
<th>Chapter(s)</th>
<th>Assignment(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Some Java I/O</td>
<td>Chapter 32</td>
<td>Assignment 5</td>
</tr>
<tr>
<td>9</td>
<td>JAVA I/O and Exceptions, JDBC</td>
<td>Chapter 14, 15, 16</td>
<td>(Assignment 5 due)</td>
</tr>
<tr>
<td>10</td>
<td>GUI development, JavaFX, Inner Classes and Lambda Expressions</td>
<td>Chapter 20, 21</td>
<td>Assignment 6</td>
</tr>
<tr>
<td></td>
<td>The Collections Framework, Data Structures &amp; Algorithms</td>
<td>Chapter 22, 24</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>ConcURRENCY &amp; Multithreading Design Patterns, Localization</td>
<td>Chapters 30, 36</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Final Exam</td>
<td></td>
<td>Assignment 7</td>
</tr>
</tbody>
</table>

Term Paper:

Term paper requires students to write a report for “THE ADVANTAGES OF OBJECT-ORIENTED PROGRAMMING USING C++”. Object-oriented programming is a new way of approaching the job of programming. Programming over the years has evolved to accommodate the increased complexity of programs. (1) Structured, easy to understand programming has been around since the late 60's. These advances allowed programmers to write fairly complex programs relatively easy using such languages as C and Pascal. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

A course grade of “incomplete” will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

At the end of this course the successful student will be able to:

Revised 2019.10
• To understand Object Oriented Programming concepts
• To understand the role that methods play in an object-oriented program
• To understand the concept of a class hierarchy.
• To know the basic characteristics of Java
• To become familiar with the relationship between classes and objects in a Java program
• To comprehend Java Data and Control Structures
• To understand the difference between a Java application and a Java applet.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a “0” on their work if they either submit work that isn’t their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

The Learning Environment:

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• All backgrounds and cultures are respected.

• During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.

Revised 2019.10
• All members of the class arrive on time and leave the class only on breaks or in case of emergency.

• Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.

• Each student turns in work that is his or her own.

• Consideration is always given to other classes that are taking place in adjoining classrooms.

• At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

**Reagan National University Library Services:**

RNU’s online collection contains over 60,000 volumes comprised of books, journals, videos, and faculty created resources. The Library Research Portal (library@rnu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts, visual media, and teaching resources. Appropriate sources include scholarly and peer-reviewed journal articles, scholarly books, and well-respected news magazines and newspapers. The Library offers a large number of appropriate sources and each student is required to attend an online Library orientation. Assistance is available to help students select and locate appropriate sources when RNU is open. The online library is available to students 24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

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Reagan National University

Syllabus

1. Administrative Information:

   Course Number:  CSC 420
   Course Title:    Image Processing
   Credit Hours:   3
   Prerequisite:   CSC 122
   Term:           SU 2018
   Class Time:     W 9:00 – 12:45
   Class Room:     1
   Instructor:     [Redacted]
   Office Hours:   M TU 11:00 AM – 1:00 P. M.
   Telephone:      [Redacted]
   E-Mail:         [Redacted]
Course Description

This course introduces principles techniques and fundamental algorithms used to manipulate digital image imagery in the spatial and frequency domains. Topics covered in this course include: image sampling, quantization and representation, image enhancement (histogram equalization), filtering (sharping, blurring and noise), image transformation, segmentation and color. Several assignments will be given requiring students to process digital images using techniques discussed in class. Software used in this course includes the use of Python and MATLAB.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:


Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Revised 2019.10
Homework Assignments .................. 20%
Midterm .................................... 40%
Final ........................................ 40%

No makeup exams!!!

The course grades are assigned as:

\[
\begin{align*}
90 - 100\% &= A - \\
80 - 89\% &= B \\
70 - 79\% &= C \\
60 - 69\% &= D \\
\text{Below 60}\% &= F
\end{align*}
\]

Note: Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of “A” (or “F”). By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
</tr>
</thead>
</table>
| 1    | **Introduction to the digital image**  
Why digital images?  
The (film and) digital camera.  
Data types and 2d representation of digital images. |
| 2    | **Characteristics of grey-level digital images**  
Discrete sampling model.  
Quantization.  
Noise processes.  
Image attributes |
| 3    | **Segmentation**  
Thresholding and thresholding algorithms.  
Performance evaluation and ROC analysis.  
Connected components labelling. |

Revised 2019.10
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 4       | **Image transformations**  
Grey level transformations.  
Histogram equalization.  
Geometric transformations.  
Affine transformations.  
Polynomial warps |
| 5       | **Morphological operation**  
Erode and dilate as max and min operators on binary images.  
Open, close, thinning and other transforms.  
Medial axis transform.  
Introduction to grey-level morphology. |
| 6       | Midterm Exam |
| 7       | **Image filtering**  
Fourier descriptors.  
Linear and non-linear filtering operations.  
Image convolutions.  
Separable convolutions.  
Sub-sampling and interpolation as convolution operations. |
| 8       | **Feature characterization**  
Calculation of region properties.  
Moment features.  
Boundary coding line descriptors from boundary coding and from moments.  
Image search and multi-resolution algorithms. |
| 9       | **Edge and corner detection**  
Edge enhancement by differentiation.  
Effect of noise, edge detection and Canny implementation.  
Edge detector performance evaluation.  
Image structure tensor.  
Relationship to image auto-correlation.  
Characterization and Harris corner detector. |
| 10      | **Color images**  
Representations of color in digital images.  
Color metrics.  
Pixel-wise (point) operations.  
Color invariants and Finlayson color constancy algorithm. |
| 11      | **Template matching and advanced topics**  
Similarity and dissimilarity matching metrics.  
L2 metric and relationship to cross-correlation2D object detection, recognition, location.  
Sub-pixel accuracy and performance evaluation. |
| 12      | Final Exam |
Term Paper:

Term paper requires students to write a report for “DIGITAL IMAGE PROCESSING TECHNIQUES”. Digital Image Processing (DIP) is the process of digital images using various computer algorithms. This digital image processing has been employed in number of areas such as pattern recognition, remote sensing, image-sharpening, color and video processing and medical. This paper should present a brief overview and literature review of digital image processing techniques such as image pre-processing, image compression, edge detection and segmentation. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

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Course Outcome:

At the end of this course the successful student will be able to:

- Explain how digital images are represented and manipulated in a computer, including reading and writing from storage, and displaying.
- Write a program which implements fundamental image processing algorithms.
- Be conversant with the mathematical description of image processing techniques and know how to go from the equations to code.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Revised 2019.10
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**Special Needs and Accommodations:**

Please address any special problems or needs at the beginning of the quarter with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

**The Learning Environment:**

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Revised 2019.10
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Reagan National University

Syllabus

1. Administrative Information:
   - Course Number: CSC 433
   - Course Title: Information Retrieval
   - Credit Hours: 3
   - Prerequisite: CSC 122
   - Term: SP 2019
   - Class Time: W 9:00 – 12:45
   - Class Room: 1
   - Instructor: [Redacted]
   - Office Hours: M TU 11:00 AM – 1:00 P.M.
   - Telephone:
   - E-Mail: [Redacted]

Revised 2019.10
Course Description

Information retrieval is the identification of textual components, be them web pages, blogs, microblogs, documents, medical transcriptions, mobile data, or other big data elements, relevant to the needs of the user. Relevancy is determined either as a global absolute or within a given context or viewpoint. Practical, but yet theoretically grounded, foundational and advanced algorithms needed to identify such relevant components are taught.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:


Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Revised 2019.10
Homework Assignments .................. 20%
Midterm ........................................ 40%
Final ............................................... 40%

No makeup exams!!!

The course grades are assigned as:

90 - 100% = A-
80 - 89% = B
70 - 79% = C
60 - 69% = D
Below 60% = F

Note: Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of “A” (or “F”). By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to information retrieval, How much information - Consumers 2009, Amount of information</td>
<td>Chapters 3, 4, 5, 9</td>
<td>Assignment 2 (assignment 1 due)</td>
</tr>
<tr>
<td>2</td>
<td>Concept of a Document (all), Greengrass: 2.1.1-2.14, 2.1.6, Specialty search engines (all), van Rijsbergen: Ch 7, (up to Swets model), Retrieval evaluation (graduate students required), Manning, Raghavan, Schutze: Ch 8</td>
<td>Chapter 7, 8, 9, 10</td>
<td>Assignment 3 (assignment 2 due)</td>
</tr>
</tbody>
</table>

Revised 2019.10
<table>
<thead>
<tr>
<th>Implementation hiding</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4</strong></td>
<td>Inheritance &amp; Polymorphism Upcasting &amp; Downcasting Interfaces, Abstract Classes &amp; Polymorphism</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Database manipulation in PHP</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Midterm Exam</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Review, GITHUB workshop Some Java I/O</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>JAVA I/O and Exceptions, JDBC</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>GUI development, JavaFX, Inner Classes and Lambda Expressions</td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>The Collections Framework, Data Structures &amp; Algorithms The Collections Framework, Data structures &amp; Algorithms</td>
</tr>
<tr>
<td><strong>11</strong></td>
<td>Concurrency &amp; Multithreading Design Patterns, Localization</td>
</tr>
<tr>
<td><strong>12</strong></td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

**Term Paper:**

Term paper requires students to write a report “ON INFORMATION RETRIEVAL SYSTEM”. Information retrieval is the process of obtaining and presenting more related information from the largest collection of information resources according to the user’s need. The tremendous growth in information resources on the Internet makes the information retrieval process a tedious and difficult task for users. Due to information overloading, there is a need for better techniques to retrieve most relevant information from web. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

**Classroom Policies:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

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Revised 2019.10
Course Outcome:

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

- Understand the principles of information storage and retrieval systems and database
- Understand how effective information search and retrieval is interrelated with the organization and description information to be retrieved
- Use a set of tools and procedures for organizing information
- Become familiar with the techniques involved in conducting effective searches of print and online information resources
- Use different theoretical foundations, methods and measurements to underly and evaluate major types of information retrieval systems and search engine.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

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Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadrimester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

The Learning Environment:

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Revised 2019.10
• During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.

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Revised 2019.10
Reagan National University

Syllabus

1. Administrative Information:

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>CSC 499</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Title:</td>
<td>Computer Science Project</td>
</tr>
<tr>
<td>Credit Hours:</td>
<td>3</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>At least 8 CSC courses completed.</td>
</tr>
<tr>
<td>Term:</td>
<td>SP 2019</td>
</tr>
<tr>
<td>Class Time:</td>
<td>Monday 14:00 – 17:45</td>
</tr>
<tr>
<td>Class Room:</td>
<td>2</td>
</tr>
<tr>
<td>Instructor:</td>
<td></td>
</tr>
<tr>
<td>Office Hours:</td>
<td>F 9:00 – 12:00</td>
</tr>
<tr>
<td>Telephone:</td>
<td></td>
</tr>
<tr>
<td>E-Mail:</td>
<td></td>
</tr>
</tbody>
</table>
**Course Description:** This is a special course for selected students to carry out research under the guidance of a faculty member. This course requires the student to prepare a proposal, which must be approved by the Department Chair.

**Course Information:**
The senior capstone course in which student individually design a software system, document and present their conclusions. Students also develop a detailed undergraduate portfolio for a comprehensive review of their undergraduate work. Project work involves the development of design alternatives, development of an appropriate software architecture, and design and test the implemented system. The software design focuses on addressing overall design goals while understanding constraints of cost, etc. Deliverables and schedule are determined by the instructor.

**Teaching Procedures:**
Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**
Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:
- Offers a different and unique, but relevant, perspective;
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- Builds on other comments;
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We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

**Text:**
Reading materials provided by the instructor.

**Course Requirements:**
Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

- Contribution to Class ...... 20%
- Final Presentation ...... 30%
- Final Project............. 50%

2019.10
No makeup exams!!!

The course grades are assigned as:

- 91 – 100% — A
- 81 – 90% — B
- 71 – 80% — C
- 61 – 70% — D
- Below 61% — F

Note: Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of “A” (or “F”). By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Final Project:

The first document you shall hand in in the course is a project description. It shall contain:

- Background. A brief description of the subject area of your degree project. If you, for example, do a project about software architectures, you describe what a software architecture is and why it is important to select the right architecture for the job.
- Problem formulation. Describe the actual problem you plan to investigate. You can read about how to find a suitable problem here.
- Expected result. Describe what results you expect from your project.

The purpose of the project description is for the examiner to determine if your project idea is reasonable within the limited time frame of a thesis project.

All projects must be supervised by an authorized Computer Science faculty member. Although students may work with advisors outside of the field of Computer Science, they must have a Computer Science advisor. Project proposals must be approved by the Computer Science advisor in advance to ensure their suitability.

All projects must include a final written report.

All grades associated with the Project must be B or higher.

What are the different categories of projects?

- joining a faculty member's research group
- further developing a project started within an advanced course, perhaps in collaboration with other students from that course
• working more one-on-one with a faculty member - this might either be a smaller project
  or a test-run for a larger initiative
• working as a member of one of the University's large team efforts - there are an
  increasing number of these relatively high-profile projects
• providing critical computer science skills to disparate projects across the University
• working on commercial, industrial or government projects - with appropriate
  coordination of NDAs
• working with other CS students on exercises which may develop into 'start-ups'
Students who pass this class have the working knowledge for software development and hands-on experience in working on real life projects. At the end of the course student will possess the skills necessary to:

1. Work on either an ill defined or well defined problem
2. Enforce the necessary steps towards the completion of the project
3. Use the knowledge available and search when necessary and apply it effectively
4. Disseminate the technical information in a professional manner when necessary

**Moodle Forum:**

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- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
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Reagan National University

Syllabus

1. Administrative Information:

   Course Number: CSC 511
   Course Title: Computer Architecture
   Credit Hours: 3
   Prerequisite: Permission from Instructor
   Term: WI 2019
   Class Time: Monday 9:00 – 12:45
   Class Room: 2
   Instructor: [Blank]
   Office Hours: SA, SU 1:00 – 2:30 P. M.
   Telephone: [Blank]
   E-mail: [Blank]

Revised 2019.10
2. Catalog Description:

This course provides an understanding of modern computing technology through an in-depth study of the interface between hardware and software. It demonstrates the computer architecture from the application programs down to the hardware levels. Topics covered are applications of digital logic circuits, register transfer logic and assembly language to the design and operation reviewed.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:


5. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:
6. **Course Requirements:**

There will be a in-class quiz in each class and the quiz material will be announced at the end of each class. Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

- Quiz ....................... 10%
- Midterm .................... 35%
- Final ....................... 35%
- Term Project .............. 20%

**No makeup exams!!!**

The course grades are assigned as:

- 90 – 100% = A
- 80 – 89% = B
- 70 – 79% = C
- Below 70% = F

**Note:** Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

**Computer laboratory**

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. **Term Project:**

This course is a hands-on research oriented course. You (in groups of two or three) are expected to propose, conduct, and experimentally evaluate a 2-3-month long research project whose goal is to advance the state-of-the-art and/or current understanding in computer architecture or a related subject. The topic of the project is flexible, but it must be approved by me. This is your
chance to explore in depth a computer architecture topic that interests you and perhaps even publish your innovation in a top computer architecture conference. I strongly encourage you to start thinking about your project topic as early as possible and interacting with me to crystallize it over time.

8. **Classroom Policies:**

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

9. **Attendance, Absence, Lateness, Incomplete:**

In accordance with the policies of the Reagan National University, class attendance is required, and classes will start promptly at the schedule time. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of “incomplete” will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

**Warning:** Any cheating and plagiarism will result in a failing grade in the course.

10. **Course Outline:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MIPS Assembly language.</td>
<td>Ch. 1</td>
</tr>
<tr>
<td></td>
<td>• The Von Neumann machine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Instructions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• registers</td>
<td></td>
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<tr>
<td></td>
<td>• arithmetic, add, addi translating high level arithmetic into assembly.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>More on Mips Assembly</td>
<td>Ch. 2, 3</td>
</tr>
<tr>
<td></td>
<td>• Memory and Registers, lw and sw. Addressing modes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Arrays. Some example programs with arrays. Subroutines</td>
<td></td>
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<tr>
<td></td>
<td>• Stacks and the answer to recursive subroutines</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Revision of Digital logic.</td>
<td>Ch. 4</td>
</tr>
<tr>
<td></td>
<td>(a) logic gates, truth tables, implementing truth tables.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) Longest path</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Arithmetic</td>
<td>Ch. 5</td>
</tr>
<tr>
<td></td>
<td>(a) Binary numbers, hex-numbers.</td>
<td></td>
</tr>
</tbody>
</table>

Revised 2019.10
<table>
<thead>
<tr>
<th>5</th>
<th>Implementing Addition, Ripple adder, Faster Adder. Reading Tanenbaum 3.2.3. Handout on the ripple carry adder.</th>
<th>Ch. 6, 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Midterm Exam</td>
<td></td>
</tr>
</tbody>
</table>
| 7  | Implementing the MIPS processor  
• Latches and memory Reading Tanenbaum 3.3.  
• The single cycle approach. Nothing much in Tanenbaum. Look at the slides. The basic idea, use the opcode of the instruction to specify what functional units have to be switched on. Do everything in a single cycle.  
• Problems with the single cycle approach. Slowest instruction gives the cycle time, a functional unit can only be used for one thing at a time so have to repeat functional units, separate adders. | Ch. 8   |
| 8  | Multicycle implementations  
• The concept of a cycle.  
• Finite state machines.  
• Balancing the work into single cycles.  
• Controlling the work done with a finite state machine.  
• The five cycles of the MIPS. | Ch. 9, 10|
| 9  | Implementing Finite State machines  
• Roms, PLAs  
• Microcode  
• RISC/CISC  
• Microcode and some modern processors. | Ch. 11  |
| 10 | Pipelines  
• Doing more than one thing at once.  
• Problems with pipelines, stalls, branch delay slots.  
• Making programs faster by avoiding stalls. | Ch. 12  |
| 11 | Caches.  
• Principle of locality  
• Direct Mapped Caches  
• Set Associative Caches  
• LRU  
• write through, write back  
• Cache line, length | Ch. 13  |
| 12 | Final Exam                                                                                                   |         |

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11. Course Outcome:

By the end of the course, the student should understand the major architectural styles and appreciate the compromises that they encapsulate. They should be able to read outline descriptions of real processors and understand in which way their designs fit into the frameworks described in the course. They should also be able to understand the impact of design choices in programming in the context of a specific architecture.

12. Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with university policy. In general – students will receive a 0 on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

13. Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quarter with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

14. The Learning Environment:

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Revised 2019.10
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Reagan National University

Syllabus

1. Administrative Information:

Course Number: CSC 512
Course Title: Operating Systems
Credit Hours: 3
Prerequisite: CSC 511
Term: WI 2019
Class Time: TU 9:00 – 12:45
Class Room: 1
Instructor: [Redacted]
Telephone: [Redacted]
E-Mail: [Redacted]
2. **Catalog Description:**

This course introduces the facilities provided in modern operating systems. It examines the issues in operating system design and implementation such as inter-process communication, process scheduling, deadlock, memory management, virtual memory, file systems and distributed systems. Particular emphasis will be given to the major OS subsystems.

3. **Teaching Procedures:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**


5. **Course Requirements:**

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

- Two Midterm .................. 25% each
- Final ............................ 30%
- Term project.................... 20%

No makeup exams!!!

Revised 2019.10
The course grades are assigned as:

- 90 – 100% = A
- 80 – 89% = B
- 70 – 79% = C
- Below 70% = F

**Note:** Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

**Computer laboratory**

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co-requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

6. **Term Project:**

Term paper requires students to write a report “Functions of the Operating System”. **Some of the functions are given below:**

**i. I/O Management:**
Selecting the appropriate channel of data transfer as required, activating and handing over control, giving them autonomy for overlapped operation. The transfer of the data between primary and secondary storage is left to the control of the DMA Controller.

**ii. Memory Management:**
Allocating/deallocating memory to programs, creating virtual memory in disk drives, swapping programs and data from one place to another in the memory. Preventing one program to interfere with another program.

**iii. File Management:**
Anything and everything that is kept in permanent storage is done by means of a file which can be of any length, as far as the user is concerned. But, as far as the disk drives are concerned, the spaces are allocated to a file in clusters, as and when additional space is required, and the clusters are not necessarily in sequence one after another.

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The Operating System, not only creates and allocates spaces for files, but it keeps quick accessible records of the file structure details in the directory area and in the File Allocation Table [FAT].

iv. Job Control:
In case of batch-processing jobs, the Operating System controls the loading, execution and unloading of the jobs, along with initiating activities of input/output operation.

v. Buffering:
A buffer is a specific storage area, created in primary storage or in the data-channel or both, where the data is stored in transit between input/output devices and main memory.

The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

7. Classroom Policies:

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8. Attendance, Absence, Lateness, Incomplete:

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Warning: Any cheating and plagiarism will result in a failing grade in the course.

9. Course Outline:

In this course we will cover operating system concepts and design principles with the following schedule (subject to minor changes in content and schedule):

Week 1
• • Introduction to operating systems

Week 2
• • Computer hardware review

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Review of basic operating system concepts

Week 3:
• Processes and threads: process and thread models, management, and implementation
• Interprocess Communication: race conditions, critical regions, mutual exclusion

Week 4:
• First Midterm
• Interprocess communication: sleep and wakeup, semaphores, mutexes, monitors, message passing, and barriers.

Week 5:
• Classical interprocess communication problems: The dining philosophers problem, readers and writers problem, the sleeping barber problem.

Week 6:
• Scheduling: batch, interactive, and real-time.

Week 7:
• Deadlock detection, recovery, and avoidance

Week 8:
• Second Midterm
• Memory management: basics, swapping, virtual memory

Week 9:
• Page replacement algorithms Design and implementation issues of paging systems, segmentation

Week 10:
• Files directories and file system implementation.

Week 11:
• Security issues: cryptography, authentication, attacks, and protection mechanisms, trusted systems

Week 12:
Final Exam

10. Course Outcome:

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At the end of this course, you will be able to:

- Explain the objectives and functions of modern operating systems, and how they have evolved from primitive batch systems to sophisticated multi-user systems.
- Describe how computing resources are used by application software, and managed by system software. Contrast between kernel mode and user mode in an operating system.
- Compare and contrast the common algorithms used for both preemptive and non-preemptive scheduling of tasks in operating systems, such as priority, performance comparison, and fair-share schemes.
- Explain memory hierarchy and cost-performance tradeoffs. Compare and contrast paging techniques.
- Compare and contrast different approaches to file organization, recognizing the strengths and weaknesses of each.
- Identify potential threats to operating systems and the security features designed to guard against them.

11. **Academic Honesty:**

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12. **Special Needs and Accommodations:**

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

13. **The Learning Environment:**

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Revised 2019.10
• All members of the class arrive on time and leave the class only on breaks or in case of emergency.
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Reagan National University

Syllabus

1. **Administrative Information:**

   Course Number: CSC 513
   
   Course Title: Data Structures
   
   Credit Hours: 3
   
   Prerequisite: CSC 511
   
   Term: WI 2019
   
   Class Time: Wednesday 2:00 – 5:45
   
   Class Room: 3
   
   Instructor:
   
   Office Hours: SA – 1:00 – 2:30 P. M.
   
   Telephone:
   
   E-Mail:

Revised 2019.10
2. **Catalog Description:**

This course covers data structures and associated algorithms that allow complex tasks to be solved in simple and elegant ways. It focuses on program design and organization ideas such as abstract data types, data structures and object-oriented programming. Topics include are: lists, stacks, queues, heaps, dictionaries, maps, hashing, trees and balanced trees, sets, and graphs.

3. **Teaching Procedures:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
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- Builds on other comments;
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We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**


Revised 2019.10
5. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

- Midterm: 6th class
- Final: last class

6. Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

- Midterm .................. 30%
- Term Project ............... 40%
- Final ....................... 30%

No makeup exams!!!

The course grades are assigned as:

- 90 – 100% = A
- 80 – 89% = B
- 70 – 79% = C
- Below 70% = F

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Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills

Revised 2019.10
acquired in the particular course which lists this course as a co-requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. **Term Project:**

Term project requires students to write a report “A STUDY ON THE USAGE OF DATA STRUCTURES IN INFORMATION RETRIEVAL”. This paper throws light in the usage of data structures in the field of information retrieval. Information retrieval is an area of study which is gaining momentum as the need and urge for sharing and exploring information is growing day by day. Data structures have been the area of research for a long period in the arena of computer science. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

8. **Classroom Policies:**

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

9. **Attendance, Absence, Lateness, Incomplete:**

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<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction. Course overview. Introduction to algorithms</td>
<td>Ch. 1</td>
</tr>
<tr>
<td>2</td>
<td>Analyzing and Designing algorithms, Recursion</td>
<td>Ch. 2, 3</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Complexity analysis</th>
<th></th>
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<tbody>
<tr>
<td>3</td>
<td>Recurrence equations, Data Structure</td>
</tr>
<tr>
<td>4</td>
<td>Stacks and queues</td>
</tr>
<tr>
<td>5</td>
<td>Heapsort, Hashing</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
</tr>
<tr>
<td>7</td>
<td>Trees and Priority Queues</td>
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<td></td>
<td>Binary Search Trees</td>
</tr>
<tr>
<td>8</td>
<td>Balanced BSTs (including Red-Black Trees)</td>
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<tr>
<td>9</td>
<td>Graphs</td>
</tr>
<tr>
<td>10</td>
<td>Elementary Graph Algorithm</td>
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<tr>
<td>11</td>
<td>Elementary Graph Algorithm</td>
</tr>
<tr>
<td>12</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

11. **Course Outcome:**

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.
- Demonstrate different methods for traversing trees.
- Compare alternative implementations of data structures with respect to performance.

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- Each student turns in work that is his or her own.
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Reagan National University Library Services:

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24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

As an RNU student, you are required to use the RNU online library, as one source, to assist you in completing a required research paper or project.
1. **Administrative Information:**

   Course Number: CSC 514  
   Course Title: Database Theory  
   Credit Hours: 3  
   Prerequisite: Permission from Instructor  
   Term: WI 2019  
   Class Time: Thursday 2:00 – 5:45  
   Class Room: 1  
   Instructor:  
   Office Hours: SA 11:00 – 1:00  
   Telephone:  
   E-Mail:  

Revised 2019.10
2. **Catalog Description:**

This course provides the understanding of the fundamentals of relational systems including data models, database architectures, and database manipulations. The main subjects of the course include the understanding of relational database theories, industry standard SQL, and database design. A conceptual/semantic data modeling with the entity-relationship diagramming technique is also covered.

3. **Teaching Procedures:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**


5. **Course Requirements:**

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

**Examinations**

There are two in-class exams and they are scheduled as:

- Midterm: 6th week
- Final: last class

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6. **Course Requirements:**

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

- Midterm ................. 40%
- Final ....................... 40%
- Term Project ............. 20%

**No makeup exams!!!**

The course grades are assigned as:

- 90 – 100% = A
- 80 – 89% = B
- 70 – 79% = C
- Below 70% = F

**Note:** Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams, and any number of students can earn a grade of A (or F). By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

**Computer laboratory**

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. **Term Project:**

Term paper requires students to write a report on “Primary Key in Relational Database”. This paper shall discuss the main feature of a relation database would be the primary key. It is a unique identifier set to each and every record that travels across different tables in relationships. The primary keys job is to make each record unique and it lets data to be kept in more than one table. Each table within a relational database will have a field for the primary key. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

8. **Classroom Policies:**

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

9. **Attendance, Absence, Lateness, Incomplete:**

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In accordance with the policies of Reagan National University, class attendance is required, and classes will start promptly at the schedule time. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of “incomplete” will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

**Warning:** Any cheating and plagiarism will result in a failing grade in the course.

**10. Course Outline:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INTRODUCTION -- Basic database concepts, terminology, and architecture; Types of database management systems. Differences between relational, key-value, document, and graph models.</td>
<td>Ch. 1, 2</td>
</tr>
<tr>
<td>2</td>
<td>DATA MODELING -- Relations, schemas, constraints, queries, and updates; Conceptual vs. physical modeling; Entity types, attributes, keys, roles; Weak types, ER diagrams; ER vs. UML; EER techniques: subclasses and inheritance, union types; Document and Key-Value stores; Graph stores; Knowledge representation and ontologies.</td>
<td>Ch. 3, 4</td>
</tr>
<tr>
<td>3</td>
<td>SQL -- Data definition: specifying tables, data types, constraints; Simple SELECT, INSERT, UPDATE, DELETE statements; Complex SELECT queries, including joins and nested queries; Actions and triggers; Views; Altering schemas.</td>
<td>Ch. 5, 6, 7</td>
</tr>
<tr>
<td>4</td>
<td>NON-RELATIONAL QUERY LANGUAGES -- Advanced queries for Redis, Mongo, and Neo. RELATIONAL ALGEBRA -- Definition of algebra; Relations as sets; Operations: select, project, join, etc.</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>5</td>
<td>DATABASE PROGRAMMING -- Embedded SQL; dynamic SQL, JDBC; Avoiding injection attacks; Stored procedures; Lightweight data access layers for Python and JavaScript applications; PHP and MySQL (well, maybe we’ll get to this...); Object Relational Modeling: Hibernate for Java, ActiveRecord for Rails.</td>
<td>Ch. 10, 11</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>NORMALIZATION THEORY -- Functional dependencies, 2NF, 3NF, BCNF, 4NF, 5NF; Minimal covers; Relational decompositions.</td>
<td>Ch. 14, 15</td>
</tr>
<tr>
<td>8</td>
<td>INDEXING -- Files, blocks, and records; Heap files vs. sorted files; Hashing; RAID; Replication; Single-level and multi-level indexes; B-Trees and B+-trees; Multiple key indexes; Hash, bitmap, and functional indexes.</td>
<td>Ch. 16, 17</td>
</tr>
<tr>
<td>9</td>
<td>QUERY PROCESSING AND OPTIMIZATION --</td>
<td>Ch. 18, 19</td>
</tr>
</tbody>
</table>

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|   | Translation of SQL into query plans; fundamental algorithms for external sorting, projection, selection, and joins; Pipelining; Heuristics for optimization. |   |
|---|---|
| 10 | TRANSACTIONS, CONCURRENCY, AND RECOVERY — Transaction basics; Concurrency basics; Recovery basics; Sharding in Mongo. | Ch. 20, 21, 22 |
| 11 | SECURITY — Overview of security issues; GRANT and REVOKE; Roles; Public-key cryptography; Statistical security; Flow control. | Ch. 30 |
| 12 | Final Exam |   |

11. **Course Outcome:**

After successful completion of the course, students are expected to be able to do the following.

- Model databases proficiently at conceptual and logical levels of design. Use the entity-relationship model (E-R) and E-R diagrams with extensions.
- Develop relational database schemas which respect and enforce data integrity represented in E-R diagrams.
- Implement a relational database schema using Structured Query Language (SQL), to create and manipulate tables, indexes, and views.
- Create and use complex queries in SQL.
- Write database application programs with an understanding of transaction management, concurrency control, and crash recovery.

12. **Academic Honesty:**

It is assumed that all students have familiarized themselves with the university’s policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn’t their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

13. **Special Needs and Accommodations:**

Please address any special problems or needs at the beginning of the quarter with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

14. **The Learning Environment:**

Reagan National University is committed to providing a positive learning environment in which students of all ages and backgrounds can learn together in a setting that encourages the free exchange of ideas and information. To accomplish this goal, the members of the RNU

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Board have established the following expectations for learning.

- All backgrounds and cultures are respected.
- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
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Revised 2019.10
1. Administrative Information:

Course Number: CSC 521
Course Title: Artificial Intelligence
Credit Hours: 3
Prerequisite: CSC 511
Term: W1 2019
Class Time: SA 9:00 –12:45
Class Room: 1
Instructor: [Name]
Office Hours: Wed 1:00 –3:00
Telephone:
E-Mail: [Email]
2. **Course Description:**

This course is an introduction to the basic principles, techniques, and applications of Artificial Intelligence. It focuses on the materials on AI programming, logic, search, game playing, machine learning, natural language understanding, and robotics introduce the student to AI methods, tools, and techniques, their application to computational problems.

3. **Teaching Procedures:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text Book:**


5. **Grading Policy:**

Revised 2019.10
4-homeworks @ 20%
Term paper @ 20%
Midterm @ 30%
Final @ 30%

90 – 100% = A
80 – 89% = B
70 – 79% = C
Below 70% = F

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

6. Term paper:

Term paper requires students to write a report on “Artificial Intelligence and the future”. This paper shall discuss the following questions: What is AI? Why is Machine learning a hot topic these days in the tech world? How does it affect us and to what extent we have used it till today? Do you know that many of the websites like Facebook, Instagram, and YouTube are somehow powered by AI? The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

7. Academic Integrity:

Reagan National University is committed to the principles of honesty and academic integrity in every facet of our operation. This requirement includes every person in the RNU community. Students are expected to uphold these principles in the strictest ways possible. Scholarship is fundamental to the very existence of the University and without integrity and honesty we cannot endure.

The University has established extensive processes to promote these virtues and to provide penalties for those who transgress. Students are referred to the STUDENT HANDBOOK and the UNIVERSITY CATALOG for further information and penalties.

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8. Schedule and Contents:

Week 1 What Artificial Intelligence Is:

Introduction
Domains of Artificial Intelligence
Characteristic features of AI systems
Illustrative example: A planning system
  Description of the world model of the system
  The state-space search paradigm
  A general problem solving method: Means-Ends Analysis
  Illustration of the MEA method
  The goal tree
  Explanations provided by the system
Another example: proving theorems in prepositional calculus with MEA
  Conclusion
  Exercises

Week 2 & 3 Programming in COMMON LISP

Primary data structures
  Atoms
  Lists
Program structure and evaluation
  Program structure
  The LISP interpreter
  Examples of evaluations
Special functions
  Setq
  Quote
Some primitive functions
  Car and cdr
  Cons
  List and append
LISP predicates
  Atom
  Listp

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Endp
Null
Eq, eql, equal
Number
Member
Logical operators
Not, and, or
Conditionals
Cond
Printing and reading
Print
Read
User-defined functions
Defun
Optional arguments
Exercises
Iteration
Let and let*
Do list
Mapping functions
Mapcar
Recursion
Recursive functions
A recursive trace
Property lists
Get
Setf
Symbol-plist
Other functions
Function
Remove, remove-if, remove-if-not
Gensym
Lambda expressions
Scope of variables
Application: Pattern matching
Exercises

Week 3 & 4 Search Techniques

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Searching the state-space of a problem
Another search problem
Blind search
   Bread-first search
   Depth-first search
   Uniform-cost search
Heuristic search
   Hill climbing
   Best-first search
   The search algorithm A*
Implementation of the search methods
Game tree search
   An exemplary game: Tic-tac-toe
   The minimax procedure
   Searching a partial game tree
   Alpha-beta pruning
      An alpha cutoff
      A beta cutoff
Exercises

Week 5 & 6 Knowledge Representation and Problem Solving

Introductions
   What is a representation?
   General features of a representation
Logic
   The standard form of logic
      Representing knowledge in first-order logic
      An axiomatic system
      Natural deduction
   The clausal form of logic
      Definition
      Conversation to clausal form
Resolution
   The resolution rule of inference
   The resolution method
   Resolution in prepositional logic

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Resolution in predicate calculus
  Substitution and unification
  A unification algorithm
  Resolution of predicate calculus expressions
  Strategies for improving the efficiency of resolution

General features of the logic representation

Exercise

Logic programming and Prolog
  A Prolog program
  How Prolog answers questions
  The relation between Prolog and logic
  Declarative and procedural meaning of Prolog programs

Data objects
  Variables
  Structures
  Lists

Some operation on lists
  Membership
  Concatenation
  Add
  Delete
  Sub list

Arithmetic
Input and Output

Controlling backtracking
  Negations
  Fail and true
  Order of clauses and goals
  Depth-first search in Prolog

Exercises

Production systems
  The architecture of a production system
  An abstract example of a production system
  Playing tic-tac-toe with productions
  A production system for the water jug problem
  An example of production system with inference rules
  General features of the production systems

Exercises

Revised 2019.10
Exam 1

Week 7 & 8 Machine Learning

Introduction
What is learning?
Concepts
Intuitive definition of generalization
Intuitive presentation of some basic learning strategies
Rote learning
Explanation-based learning
Empirical inductive learning from examples
Conceptual clustering
Quantitative discovery
Learning by abduction
Learning by analogy
Case-based reasoning
Artificial neural networks
Genetic algorithms
Multi-strategy learning

Explanation-based learning
The explanation-based learning problem
The explanation-based learning method
Learning an operational definition of a concept
The learning problem
The learning method
Features of the explanation-based learning method

Empirical inductive learning
Generalization rules
Generalization of a set of descriptions
Empirical inductive learning from examples
The version space method
General presentation of the method
The learning algorithm
A complex example: learning the concept of an ill cell
Features of the version space method

Learning by analogy
General presentation
A simple form of analogy: determinations
Definition of determinations
Use of the determinations
Problem solving by analogy
Exercises

Week 9 & 10 Natural Language Processing

Introduction
Goals of natural language processing
Types of applications
What is natural language understanding?
Why is natural language processing difficult?

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Ambiguity
Paraphrase
Ellipsis
Reference
Awareness

Components of natural language processing

Morphological analysis
Syntactic analysis
Grammars
Context-free grammars
Parsing
Transition networks as language recognizers
Augmented transition networks

Compositional semantics
Semantic grammars

Exercises

Week 11 & 12 Expert and Knowledge Acquisition

General presentation
   What are the expert systems?
   Expertise domains
   Expert system shells
   Knowledge acquisition

Modes of knowledge acquisition
   Expert to knowledge base via a knowledge engineer
   Expert to knowledge base via an intelligent editor
   Expert to knowledge base via a learning system
   Book knowledge-to-knowledge base via a text understanding system and learning system

Case Study: Disciple, an expert, and knowledge acquisition system
   An intuitive view of Disciple
   Knowledge Base
   Disciple as an Expert System
      The problem solving method
      General presentation
      Problem reduction
      Problem solving through decomposition

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Problem solving through by constraints
Problem solving through by analogy
Control mechanisms
Definition of the search space
Global control of the search
Meta-rules
Knowledge acquisition in Disciple
The knowledge acquisition problem
General presentation of the knowledge acquisition method
Illustration of the knowledge acquisition method
Explanation-based mode
Analogy-based mode
Developing the knowledge base
Features of the knowledge acquisition method
Exercises

9. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

10. Attendance, Absence, Lateness, Incomplete:

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A course grade of “incomplete” will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Warning: Any cheating and plagiarism will result in a failing grade in the course.

11. Course Learning Outcome:

On successful completion of the course the student will be able to:
Knowledge and understanding:

○ Explain basic concepts of machine learning and classical AI

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o Compare advantages and disadvantages of some basic AI algorithms
o Account for the historical development, current situation and future prospects for some sub-area of AI.

Skills and abilities:
- Choose appropriate algorithms for solving given AI problems in a memory- and time-efficient manner.
- Implement efficient AI algorithms in a suitable programming language.
- Summarize scientific progress and ethical issues.

Judgment and approach:
- Analyze and critically discuss soft aspects of AI.
- Summarize and constructively criticize scientific texts.

12. Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn’t their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

13. Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the counselor for special needs.

14. The Learning Environment:

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During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.

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Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.

Each student turns in work that is his or her own.

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Reagan National University

Syllabus

1. Administrative Information:
   
   Course Number: CSC 537
   Course Title: Data Communications
   Credit Hours: 3
   Prerequisite: CSC 511
   Term: WI 2019
   Class Time: Friday 2:00 – 5:45
   Class Room: 1
   Instructor: [redacted]
   Office Hours: Wed 3:00 – 5:00
   Telephone: [redacted]
   E-Mail: [redacted]

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2. **Catalog Description:**

This course provides the foundation for work in data communications and local area network management. It focuses on the primary aspects of data communications networking, including a study of the Open Systems Interconnection (OSI) and Internet models. Topics include in this course are: data transmission principles, media, major protocols, topologies, routing methods, introduction to networking principles, and Network operating system management fundamentals.

3. **Teaching Procedures:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**


5. **Course Requirements:**

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

**Examinations**

There are two in-class exams and they are scheduled as:

- **Midterm:** 6th class

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6. **Grading:**

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

35% Midterm Examination  
35% Final Examination  
20% Term Paper  
10% Quizzes. Quizzes (which need not be announced before hand) based on the material discussed so far in the course.

**No makeup exams!!!**

The course grades are assigned as:

- 90 – 100% = A  
- 80 – 89% = B  
- 70 – 79% = C  
- Below 70% = F

**Note:** Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

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Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. **Term Paper:**

Term paper requires students to write a report on “Measurement-based simulation of WiFi interference”. This paper shall cover a typical wireless network exhibits time-varying channel conditions and complex interference relationships, which are also influenced by different vendor implementations. Therefore, to improve the mapping between wireless simulation and real life, site and device specific models are needed. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.
8. **Classroom Policies:**

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<th>Topics</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview of computer networks, the Internet, the OSI model and TCP/IP stack.</td>
<td>Ch. 1, 2</td>
</tr>
<tr>
<td>2</td>
<td>Ethernet, Token Ring, and Wireless and the methods they use of connecting to the physical layer. Data Link Layer responsibilities.</td>
<td>Ch. 3, 4, 5</td>
</tr>
<tr>
<td>3</td>
<td>Internet protocols on the Network layer and subnetting LANS.</td>
<td>Ch. 6</td>
</tr>
<tr>
<td>4</td>
<td>Router hardware and configuration. Routers, routed and routing protocols.</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>5</td>
<td>TCP/IP segment, IP packet and Data Link frame formats.</td>
<td>Ch. 8, 9</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
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<td>7</td>
<td>Network timing and Congestion Control.</td>
<td>Ch. 10, 13</td>
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<tr>
<td>8</td>
<td>Peer-to-peer and client-server programming using sockets in TCP or UDP.</td>
<td>Ch. 11, 12</td>
</tr>
<tr>
<td>9</td>
<td>Reliability, Connection-Oriented and Connectionless protocols on the Transport Layer, namely TCP and UDP.</td>
<td>Ch. 14</td>
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<tr>
<td>10</td>
<td>Applications used in every-day network-related tasks.</td>
<td>Ch. 15, 16</td>
</tr>
<tr>
<td>11</td>
<td>Wireless and Mobile networks.</td>
<td>Ch. 17</td>
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<tr>
<td>12</td>
<td>Final Exam</td>
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</tbody>
</table>

11. **Course Learning Outcome:**

Revised 2019.10
On successful completion of this course, the student should be able to

1. Describe the fundamental principles in data communications and computer networks including
   • Delay and loss in Packet-Switched Networks
   • Protocol layers and their service models
   • Popular network applications like HTTP, FTP, SMTP, DNS, P2P, etc.
   • Reliable data transfer and sliding window protocols
   • Congestion control and flow control
   • Routing algorithms like LS and DV
   • LAN and Ethernet with emphasis on error detection and multiple access protocols

2. Mathematically and logically analyze how computer protocols work in the abstract

3. Solve real-world problems in the context of today’s Internet (TCP/IP and UDP/IP)

12. **Academic Honesty:**

   It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn’t their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

13. **Special Needs and Accommodations:**

   Please address any special problems or needs at the beginning of the quarter with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

14. **The Learning Environment:**

   Reagan National University is committed to providing a positive learning environment in which students of all ages and backgrounds can learn together in a setting that encourages the free exchange of ideas and information. To accomplish this goal, the members of the RNU Board have established the following expectations for learning.
   • All backgrounds and cultures are respected.
   • During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
   • All members of the class arrive on time and leave the class only on breaks or in case of emergency.

Revised 2019.10
• Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.

• Each student turns in work that is his or her own.

• Consideration is always given to other classes that are taking place in adjoining classrooms.

• At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

Reagan National University Library Services:

RNU’s online collection contains over 60,000 volumes comprised of books, journals, videos, and faculty created resources. The Library Research Portal (library@rnu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts, visual media, and teaching resources. Appropriate sources include scholarly and peer-reviewed journal articles, scholarly books, and well-respected news magazines and newspapers. The Library offers a large number of appropriate sources and each student is required to attend an online Library orientation. Assistance is available to help students select and locate appropriate sources when RNU is open. The online library is available to students 24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

As an RNU student, you are required to use the RNU online library, as one source, to assist you in completing a required research paper or project.
1. **Administrative Information:**

   - **Course Number:** CSC 540
   - **Course Title:** Programming Languages Principles
   - **Credit Hours:** 3
   - **Prerequisite:** Permission from Instructor
   - **Term:** SP 2019
   - **Class Time:** TU 14:00-17:45
   - **Room:** 3
   - **Instructor:** [Redacted]
   - **Office hour:** F 9:00 – 12:00
   - **Telephone:** [Redacted]
   - **E-Mail:** [Redacted]
2. **Course Description:**

This course presents the principles of programming language design, and programming in multiple paradigms, including functional programming, logic programming and object-oriented programming. It focuses on programming language specification and semantics such as language models, functional, object-oriented, logic, string, and concurrent programming.

3. **Teaching Procedures:**

Teaching procedures for this course will include, professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**


**Course Requirements:**

Students will be expected to complete independent projects during the semester. Because this is programming languages course, students must know how to write professional programs in at least two different languages.

5. **Research Requirement**

As a graduate student at Reagan National University, each student in this class must do some sort of research regarding the programming language principles from computer science aspect. You could use the online library that is available from RNU web site. Of course, you may also go to any public libraries to do your research. Your research must be a topic related to this course.
6. **Grading Policy:**

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the homework and final project as well as one middle examination. The weights of the exams are:

- Midterm ........................................ 30%
- Final Exam ..................................... 40%
- Term Paper and Homework ............ 30%

The course grades are assigned as:

- 90 – 100% = A
- 80 – 89% = B
- 70 – 79% = C
- Below 70% = F

Note: Any cheating on the test or project will result in a grade of "F". Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams. By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor his/her progress or any aspects of the course.

**Computer laboratory**

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co-requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

**Term paper proposal format:**

You are required to submit a typed proposal, consisting of (1) the title of the topic, (2) your names and email addresses, (3) a brief description (one or two paragraphs) of the topic, and (4) five main references to recent books or articles you plan to use. Web links can be used as references, however at least three references should be a book or a technical article. The proposal can be in bullet or paragraph format. The length of the proposal should be one page, double spaced.

**Term paper format:**

Length: Among 15 to 20 pages. Your report should be typed on 8.5 x 11 inches white paper, double-spaced.

Contents: At least (not limited) to the following: (You may select your own style of writing as long as it composes a complete technical paper.)

1. An excellent title

2. Abstract

3. Introduction and/or Motivation: In learning the algorithm, you are really learning two
things: the problem that the algorithm is designed to solve; and the particular solution provided by the algorithm. Your paper should discuss both of these things.

4. Algorithm Description: You should present the studied algorithm(s) for the problem or discuss some algorithm design technique not covered in class, giving examples of algorithms employing this technique.
5. Algorithm Analysis: You should discuss the complexity of the algorithm to the extent that you are able, and also explain the running time function if you can.

6. Discussions: Improvement, comments, or suggestions to the algorithm(s) you have described.

7. Conclusion

8. References: List all the related references using the department’s standard bibliographic and reference style. Also attach a copy of your main reference(s) that is/are the source of your algorithm and/or algorithm analysis.

Term paper evaluation criteria:

1. (10%) Title and Abstract: Was the title appropriate? Was the abstract a good summary of the paper?

2. (30%) Readability and Organization: Were there any grammar and/or spelling errors? Were complete sentences used? Were the sentences concise and clear? Were the paragraphs, sections, and the whole paper well organized? Did you present the information so that your reader could understand without going to the original source?

3. (35%) Technical quality: Was it clear to me that you understood the paper you were summarizing? Was your coverage of the paper reasonably complete? Were the techniques you used to design and analyze the algorithm appropriate, efficient?

4. (15%) Adequate references: Was the specified form followed? Did you refer to the bibliography as appropriate throughout your text?

5. (10%) Adequate length: Was there any sections that could be shortened or extended?

Extra credit (up to 5%) will be given to the originality and significance.

Term paper presentation:

Length of the presentation is 42 minutes (for each student: 14 minutes), followed by 3 minutes discussion session where the participants will ask questions and discuss the topic. Presentations use MS-PowerPoint.

Each presentation will be evaluated by all participants and evaluations forms will be provided.

Course Schedule
Week Lecture Topics
1 Introduction to Programming Languages
2 Python, SML, Prolog
3 Programming language syntax
4 Names, Scopes, and Bindings
5 Semantic Analysis
6 Midterm Exam
7 Control Flow
8 Data Types, Subroutines and Control Abstraction
9 Data Abstraction and Object Orientation
10 Functional Languages, Logic Languages
11 Concurrency; Review Session
12 Final Exam

7. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

In accordance with the policies of Reagan National University, class attendance is required, and classes will start promptly as scheduled. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has completed at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

8. Course learning Outcomes:

At the end of this course, students should be able to:

1. Understand the central issues and principles governing the design of modern programming languages.
2. Understand the fundamental differences between the four major programming language paradigms.
3. Understand the value of operational and denotational semantic specifications of programming languages.
4. Implement a syntax analyzer for any programming language.
5. Understand the process of translation of a program in a high-level language to a low-level language.

9. Academic Honesty:
It is assumed that all students have familiarized themselves with the university’s policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn’t their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

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As an RNU student, you are required to use the RNU online library, as one source, to assist you in
completing a required research paper or project.
Reagan National University

Syllabus

1. Administrative Information:
   
   Course Number:    CSC 543
   Course Title:     Software Engineering
   Credit Hours:     3
   Prerequisite:     CSC 540
   Term:             WI 2019
   Class Time:       TH 14:00 -- 17:45
   Class Room:       1
   Instructor:       
   Office Hours:     M 9:00 – 12:00
   Telephone:        
   E-Mail:           

Revised 2019.10
2. **Catalog Description:**

This course covers the software engineering methods and tools used for systematic development of software products. It focuses on the software development process, from requirements initiation and analysis, through specification and design, to implementation, integration, testing, and maintenance. It also provides a solid introduction to design patterns: their usage, benefits and implementations.

3. **Teaching Procedures:**

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

**Participation in Class Discussion**

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**


5. **Assignments:**

There will be three project assignments. The projects will involve analyzing real world problems, design software with CASE tools (Excelerator), and implement the software with GUI and DATABASE tools. All assignments are group projects.

All assignments are due at the class on the due day. Later homework will have 20% subtracted from the score for every late day.

6. **Course Requirements:**

Due to the abundant amount of material that has to be covered in this class, in addition to the

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regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

   Midterm: 6th class
   Final: last class

7. Grading:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

   Final Project .......... 25%
   Midterm ............... 30%
   Final .................... 45%

The course grades are assigned as:
   90 - 100% = A
   80 - 89%  = B
   70 - 79%  = C
   Below 70%  = F

Note: Scores and grades will not be “curved.” Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

8. Final Project:

A. Organization of the project teams

   All students must participate in one project team (a list of suggested term projects are listed below). Each team (2 to 4 students) should supply me with a

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contract signed by all team members. The contract must be spooled or typed and should minimally cover the following:

- Organizational structure of team (democratic/chief programmer/hierarchical.)
- Time and place for meetings.
- An agreement to share files, documents, and protocols which are related to the project.
- Specification of grading method, either individual grades or one grade for all team members.
- A contingency plan for loss of members.
- A rough term project schedule

Each team should maintain a log of time spent on term project activities with each entry records the time, place and the nature of the team activities plus the names of the participated members. This team log is expected to hand in with the rest of the documents at the end of the semester.

B. Term project selection

a. A real world Registrations System
b. Any real software project upon agreement between the instructor and the term members.

C. Term project documents

The following documents are required to hand in during the project:

a. Project Plan.

9. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

10. Attendance, Absence, Lateness, Incomplete:

In accordance with the policies of Reagan National University, class attendance is required, and classes will start promptly at the schedule time. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Revised 2019.10
Warning: Any cheating and plagiarism will result in a failing grade in the course.

11. **Course Outline:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapter(s)</th>
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<tbody>
<tr>
<td>1</td>
<td>An overview of software engineering</td>
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<td></td>
<td>The impact of software</td>
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<td>2</td>
<td>The software crisis</td>
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<td>Object-oriented design</td>
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<td>CASE tools</td>
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<td>12</td>
<td>Final Exam</td>
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</table>

12. **Course Outcome:**

This course will serve to broaden the student's understanding of the issues and latest developments in the area of software development and maintenance. To reach this goal, the following objectives need to be met:

1. Define the current state of software development and maintenance characterized as "the software crisis".
2. Understand the multidimensional aspect of software engineering which is the current best attempt at solving the software crisis.

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