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

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 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 (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 (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 (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
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:

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.

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.

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.
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: [Name Redacted]

Office Hours: M TU 11:00 AM – 1:00 P. M.

Telephone: [Number Redacted]

E-Mail: [Address Redacted]

Revised 2019.10
Course Description

This course introduces principal 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 (sharpening, 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:

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>
</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. |
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topics</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-correlation.  
2D 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:

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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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:

- 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
**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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- Each student turns in work that is his or her own.
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Revised 2019.10
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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.
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:           [Redacted]
   E-Mail:              [Redacted]
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.

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

Revised 2019.10
Implementation hiding

4  Inheritance & Polymorphism
   Upcasting & Downcasting
   Interfaces, Abstract Classes & Polymorphism
   Chapter 11, 13

5  Database manipulation in PHP
   Chapter 12 and 13
   Assignment 4
   (assignment 3 due)

6  Midterm Exam

7  Review, GITHUB workshop
   Some Java I/O
   Chapter 12, 17
   (Assignment 4 due)

8  JAVA I/O and Exceptions, JDBC
   Chapter 32
   Assignment 5

9  GUI development, JavaFX, Inner Classes and Lambda Expressions
   Chapter 14, 15, 16
   (Assignment 5 due)

10 The Collections Framework, Data Structures & Algorithms
    Chapter 20, 21
    Chapter 22, 24
    Assignment 6

11 Concurrency & Multithreading Design Patterns, Localization
    Chapters 30, 36

12 Final Exam
   Assignment 7
   (Assignment 6 due)

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**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.

**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.

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

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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.
1. **Administrative Information:**

   Course Number: CSC 499  
   Course Title: Computer Science Project  
   Credit Hours: 3  
   Prerequisite: At least 8 CSC courses completed.  
   Term: SP 2019  
   Class Time: Monday 14:00 – 17:45  
   Class Room: 2  
   Instructor: [Redacted]  
   Office Hours: F 9:00 – 12:00  
   Telephone: [Redacted]  
   E-Mail: [Redacted]
**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;
- 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:**
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:

<table>
<thead>
<tr>
<th>Contribution to Class</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Presentation</td>
<td>30%</td>
</tr>
<tr>
<td>Final Project</td>
<td>50%</td>
</tr>
</tbody>
</table>
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

2019.10
• 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'

### Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Capstone Project</td>
</tr>
<tr>
<td>2</td>
<td>Project Idea Identification/ Selection</td>
</tr>
<tr>
<td>3</td>
<td>Project Adviser Selection</td>
</tr>
<tr>
<td>4</td>
<td>Roadmap Generation</td>
</tr>
<tr>
<td>5</td>
<td>Relevant Work review and reuse</td>
</tr>
<tr>
<td>6</td>
<td>Code of ethics in intellectual Property use</td>
</tr>
<tr>
<td>7</td>
<td>PROPOSAL</td>
</tr>
<tr>
<td>8</td>
<td>Project Development methodology</td>
</tr>
<tr>
<td></td>
<td>How to present the potential Project Idea</td>
</tr>
<tr>
<td>9</td>
<td>Proposal Preparation and Presentation</td>
</tr>
<tr>
<td></td>
<td>Introduction to Presentation Skills</td>
</tr>
<tr>
<td>10</td>
<td>Project Presentation —Final</td>
</tr>
<tr>
<td></td>
<td>Report Generation</td>
</tr>
<tr>
<td>11</td>
<td>Introduction to Capstone</td>
</tr>
<tr>
<td>12</td>
<td>PRESENTATION</td>
</tr>
</tbody>
</table>

### 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:

2019.10
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:

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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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.

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  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.

- 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.

---

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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:       [Redacted]
   Office Hours:     SA, SU 1:00 – 2:30 P. M.
   Telephone:        [Redacted]

   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:

Revised 2019.10
Midterm: 6th class

Final: last class

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

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

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| (b) The concept of representation.  
| (c) Negative Numbers and Two’s complement  
| (d) The evils of floating point.  
| i. All that you needed to know about floating point.  
| ii. Floating point addition is not associative |  
| 5 | Implementing Addition, Ripple adder, Faster Adder.  
| Reading Tanenbaum  
| 3.2.3. Handout on the ripple carry adder. | Ch. 6, 7  
| 6 | Midterm Exam |  
| 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:**

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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]

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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:

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

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.

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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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:**

   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.

12. **Special Needs and Accommodations:**

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13. **The Learning Environment:**

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Revised 2019.10
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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: [Name]
   Office Hours: SA – 1:00 – 2:30 P. M.
   Telephone:
   E-Mail: [Email]

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;
- 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.

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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:

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- 70 – 79% = C
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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:**

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. 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>

Revised 2019.10
### 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.

### 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:

Revised 2019.10
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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- All backgrounds and cultures are respected.
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Revised 2019.10
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 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: [Redacted]
   Office Hours: SA 11:00 – 1:00
   Telephone:
   E-Mail: [Redacted]
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

Revised 2019.10
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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## 10. Course Outline:

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<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>
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:**

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Reagan National University

Syllabus

1. Administrative Information:

   Course Number: CSC 521
   Course Title: Artificial Intelligence
   Credit Hours: 3
   Prerequisite: CSC 511
   Term: WI 2019
   Class Time: SA 9:00 –12:45
   Class Room: 1
   Instructor: [redacted]
   Office Hours: Wed 1:00 –3:00
   Telephone: [redacted]
   E-Mail: [redacted]
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

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Semantic networks
- Representing knowledge in semantic networks
  - Semantic networks with binary relations
- Representing non-binary predicates
  - Implementing a semantic network in LISP

Reasoning with semantic networks
- The treatment of the relationships Isa and instance-of
  - The transitivity of Isa and Instance-of
- Implementing the transitivity of Isa and LISP

Intersection search

Network matching

General features of the semantic networks

Exercises

Frames
- Representing knowledge in frames
- Reasoning with frames
  - Instantiation (or filling in slots)
  - The “criteriality” inference
  - Triggers (event or data-driven processing)
- Matching
  - Implementing frames
  - General features of the frames
  - Exercises

Exercises

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

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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?
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

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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:
   o Explain basic concepts of machine learning and classical AI

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- Compare advantages and disadvantages of some basic AI algorithms
- 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.

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13. **Special Needs and Accommodations:**

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14. **The Learning Environment:**

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Revised 2019.10
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]

Revised 2019.10
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

Revised 2019.10
Final: last class

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:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 – 100%</td>
<td>A</td>
</tr>
<tr>
<td>80 – 89%</td>
<td>B</td>
</tr>
<tr>
<td>70 – 79%</td>
<td>C</td>
</tr>
<tr>
<td>Below 70%</td>
<td>F</td>
</tr>
</tbody>
</table>

**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 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.

Revised 2019.10
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 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>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>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Network timing and Congestion Control.</td>
<td>Ch. 10, 13</td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>12</td>
<td>Final Exam</td>
<td></td>
</tr>
</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 an 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 quadrant 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:**

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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.

Revised 2019.10
Reagan National University
Syllabus

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:
   - Office hour: F 9:00 – 12:00
   - Telephone:
   - E-Mail:

Revised 2019.10
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:

- **Titles:**
  - 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:

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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.

10. 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.

11. The Learning Environment:

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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: [Redacted]
   - Office Hours: M 9:00 – 12:00
   - Telephone:
   - E-Mail: [Redacted]
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 Revised 2019.10
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 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.

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

Revised 2019.10
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.

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

11. Course Outline:

Week 1  An overview of software engineering Ch. 1
         The impact of software

Week 2  The software crisis Ch. 5
         Computer system engineering

Week 3  Discussion of group project Ch. 2, 3, 4
         Software and management metrics
         Project planning

Week 4  Analysis fundamentals Ch. 6

Week 5  Data flow techniques Ch. 7, 8
         Object-oriented analysis

Week 6  Midterm

Week 7  Data modeling, formal methods Ch. 9

Week 8  Elements of software design Ch. 10
         Architectural, Data and Procedural Design

Week 9  Data flow oriented design Ch. 11

Week 10 Object-oriented design Ch. 12, 13
         Data-oriented design

Week 11 Interface design Ch. 14, 22
         CASE tools

Week 12 Final Exam

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.

Revised 2019.10
3. Become familiar with popular models of the software development and maintenance process.
4. Using the waterfall model, study the inputs, outputs, and processes present in each phase.
5. Study the core concepts present in several popular methodologies and be able to identify strengths and weaknesses of each.
6. Study existing CASE tools to be able to identify opportunities to automate tasks through the use of such tools.
7. Consider the issues and techniques present in confidence gaining measures residing in each phase of the software lifecycle.
8. Briefly investigate problems present in project management.

13. 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.

14. Special Needs and Accommodations:

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15. The Learning Environment:

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Revised 2019.10
• Consideration is always given to other classes that are taking place in adjoining classrooms.

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Revised 2019.10
Reagan National University

Syllabus

1. Administrative Information:
   
   Course Number: CSC 545
   
   Course Title: Programming Languages Topic: Java
   
   Credit Hours: 3
   
   Prerequisite: CSC 540
   
   Term: WI 2019
   
   Class Time: Thursday 14:00-17:45
   
   Class Room: 4
   
   Instructor: [Name Redacted]
   
   Office Hours: F 9:00 – 12:00
   
   Telephone: [Number Redacted]
   
   E-Mail: [Redacted]

Revised 2019.10
2. COURSE DESCRIPTION

This course provides an overview to basic concepts and techniques of programming in Java. It focuses on the fundamental areas of software development: syntax, control-flow mechanisms, keyboard and mouse interactions, object modelling, and debugging. Topics covered include the Java language syntax, object oriented programming using Java, exception handling, file input/output, threads, collection classes, and networking.

3. TEACHING PROCEDURE

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;
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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


5. COURSE REQUIREMENTS/GRADING

1. Mid-term examination
2. Final examination
3. Completion of all written and oral assignments
4. Active class participation
5. Regular class attendance

Final Grade:
Mid-Term Examination 40%
Final Examination 40%

Revised 2019.10
The course grades are assigned as:

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

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**Computer laboratory**

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6. Final Project:

Starting back in the early 1990's with the introduction of Java to the computer scene there has been many updates and advances in how languages interact with web based programs. In this paper we are going to highlight several areas of several different Java flavors. The flavors we are addressing are Java, JavaScript, Java Applets and JavaBeans.

7. Classroom Policies:

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

8. 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.

Revised 2019.10
9. CLASS CALENDAR AND SCHEDULE OF DUE DATES

<table>
<thead>
<tr>
<th>WEEK</th>
<th>MATERIAL COVERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Java Intro</td>
</tr>
<tr>
<td></td>
<td>Basic Java Syntax</td>
</tr>
<tr>
<td></td>
<td>Arrays, Strings, Control Structures</td>
</tr>
<tr>
<td>2</td>
<td>Classes (1): members, this, constructors, packages</td>
</tr>
<tr>
<td></td>
<td>Classes (2): References &amp; Static</td>
</tr>
<tr>
<td></td>
<td>Conceptual OO Definition</td>
</tr>
<tr>
<td></td>
<td>Inheritance</td>
</tr>
<tr>
<td></td>
<td>Interfaces</td>
</tr>
<tr>
<td></td>
<td>Clone</td>
</tr>
<tr>
<td>3</td>
<td>Some JDK 1.1 API</td>
</tr>
<tr>
<td></td>
<td>Javadoc</td>
</tr>
<tr>
<td></td>
<td>Using New Features</td>
</tr>
<tr>
<td></td>
<td>JDK 1.2 Collections</td>
</tr>
<tr>
<td></td>
<td>Exceptions</td>
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<tr>
<td>4</td>
<td>Java IO part 1</td>
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<tr>
<td></td>
<td>Java IO part 2</td>
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<tr>
<td></td>
<td>Nested &amp; Inner Classes</td>
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<tr>
<td>5</td>
<td>Threads, part 1</td>
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<tr>
<td></td>
<td>Nested Classes Addendum</td>
</tr>
<tr>
<td></td>
<td>Threads part 2</td>
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<tr>
<td></td>
<td>Threads part 3</td>
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<tr>
<td></td>
<td>Threads part 4</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
</tr>
<tr>
<td>7</td>
<td>JFC Errata</td>
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<tr>
<td></td>
<td>JFC Basics</td>
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<tr>
<td></td>
<td>Some Graphics</td>
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<tr>
<td>8</td>
<td>Model-View</td>
</tr>
<tr>
<td>9</td>
<td>Events, Containers</td>
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<tr>
<td>10</td>
<td>Layouts</td>
</tr>
<tr>
<td>11</td>
<td>Applets</td>
</tr>
<tr>
<td>12</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

10. Course Outcome:

By the end of this course you will have:

1. mastered fundamental concepts that underlie programming language syntax and semantics through a comparative study of several languages and their features;
2. learned several new programming language features and paradigms;
3. gained the ability to study conceptual linguistic issues without being blinded by a particular language's implementation; and
4. gained insight into the problem of designing new languages.

11. Academic Honesty:

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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.

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:

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.
• 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@mu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts,

Revised 2019.10
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.
Reagan National University

Syllabus

1. Administrative Information:
   
   Course Number: CSC 552
   Course Title: Computer Graphics
   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]

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2. **Catalog Description:**

The course is an introduction to theory and praxis of computer graphics. It covers the fundamental concepts and terminology for creating and editing basic electronic paint and draw-type graphics. It introduces techniques for 2D and 3D computer graphics, including modeling and representation, illumination and shading, rendering, texturing, and advanced software tools.

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:**

The quadmester grade will be based upon assignments issued in class, which might involve some small programming exercises (20%), term project (20%), midterm (20%) and a comprehensive final examination (40%). 25% credit per day will be deducted from late homework or project submissions.

The course grades are assigned as:

- $90 - 100\% = A$
- $80 - 89\% = B$
- $70 - 79\% = C$

Revised 2019.10
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 project requires students to write a report on “Image-based Rendering and Animation”. This paper shall develop new hybrid rendering and animation techniques combining the advantages animation flexibility of Computer Graphics with the photorealism of real images and videos. You shall use images and video snippets for subtle details and classic CG models for coarse animation yielding highly photorealistic animations with low complexity. 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:**

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.

8. **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.

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

9. **Course Outline:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction: History of computer graphics, graphics</td>
<td>Ch. 1</td>
</tr>
</tbody>
</table>

Revised 2019.10
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>OpenGL: architecture, displaying simple two-dimensional geometric objects, positioning systems, working in a windowed environment</td>
</tr>
<tr>
<td>3</td>
<td>Color: Color perception, color models (RGB, CMY, HLS), color transformations. Color in OpenGL. RGB and Indexed color</td>
</tr>
<tr>
<td>4</td>
<td>Input: working in a network environment, client-server computing; input measure, event, sample and request input, using callbacks, picking.</td>
</tr>
<tr>
<td>5</td>
<td>Geometric transformations: affine transformations (translation, rotation, scaling, shear), homogeneous coordinates, concatenation, current transformation and matrix stacks.</td>
</tr>
<tr>
<td>6</td>
<td>Midterm Exam</td>
</tr>
<tr>
<td>7</td>
<td>Three dimensional graphics: classical three dimensional viewing, specifying views, affine transformation in 3D, projective transformations.</td>
</tr>
<tr>
<td>8</td>
<td>Ray Tracing. Shading: illumination and surface modeling, Phong shading model, polygon shading.</td>
</tr>
<tr>
<td>9</td>
<td>Rasterization: line drawing via Bresenham's algorithm, clipping, polygonal fill, BitBlt. Introduction to hidden surface removal (z buffer).</td>
</tr>
<tr>
<td>10</td>
<td>Discrete Techniques: buffers, bitblt, reading and writing bitmaps and pixelmaps, texture mapping, compositing.</td>
</tr>
<tr>
<td>11</td>
<td>Advanced Topics.</td>
</tr>
<tr>
<td>12</td>
<td>Final Exam</td>
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</tbody>
</table>

### 10. Course Outcome:

By the end of this course:

- Students will have an appreciation of the history and evolution of computer graphics, both hardware and software. Assessed by written homework assignment.

- Students will have an understanding of 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations. They will be able to implement these. Assessed by tests and programming assignments.

- Students will understand the concepts of and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping. Students will be exposed to current computer graphics research areas. Assessed by tests, homework and programming assignments.

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• Students will be able to use a current graphics API (OpenGL). Assessed by programming assignments.

• Students will be introduced to algorithms and techniques fundamental to 3D computer graphics and will understand the relationship between the 2D and 3D versions of such algorithms. Students will be able to reason about and apply these algorithms and techniques in new situations. Assessed by tests and programming assignments.

11. Academic Honesty:

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Reagan National University

Syllabus

Administrative Information:

Course Number: CSC 553
Course Title: Digital Electronic
Credit Hours: 3
Prerequisite: CSC 511
Term: WI 2019
Class Time: Friday 2:00 – 5:45
Class Room: 1
Instructor: 
Office Hours: F 9:00 – 12:00
Telephone: 
E-Mail: 

Revised 2019.10
Course Description:

This course covers the principles of digital electronics and the electronic circuits that are used to process and control digital signals. It focuses on the design process of combinational and sequential logic design, engineering standards, and technical documentation. Topics include are: Boolean algebra, basic gates, logic circuits, flip-flops, registers, arithmetic circuits, counters, interfacing with analog devices, and computer memory.

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;
- 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.

Required Text and Materials:

Textbook:


Research and Review of Literature

The intent of the review of relevant literature is to expose the student to the vast array of material available on most topics. Graduate students must be able to search through the volume of material and select relevant articles and evaluate research as it applies to their field of study. The articles that the student chooses should be from the acceptable, and recognized sources of documented information.

Students should provide written reports on no less than two articles of at least five pages each. The “Class Reporting Standard” for doing the reporting should include:

1. Students name, course number and date.
2. Bibliographic citation

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A brief review of article (Two to four typed lines)
An analysis of the article (minimum of one page)
Attachment of the article being reviewed.

Grades:

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Quiz/Assignment</td>
<td>20%</td>
</tr>
<tr>
<td>Research</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>35%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35%</td>
</tr>
</tbody>
</table>

Note: Up to 20% of the students may not be required for Final exam based on the evaluation of Mid-term exam and outstanding academic performance.

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

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Class Activities:

CLASS ACTIVITIES will emphasize hands-on exercises and selected short answer questions from the text. Assignments will be evaluated for technical accuracy and design practice. Due dates will be specified. Project will be presented as requirements that you will implement digital system.

Examination:

Exams will cover a combination of concepts and practice. Exam content will include lecture notes, thus attendance is important. Make-up exams will be considered on a case by case basis. When taking final examination, be sure to bring a photo ID with you.

Attendance:

Attendance is not graded. Lecture notes, cooperative learning exercises will all impact your ability to complete homework and examinations. Thus attendance is very important. See RNU Catalog for the attendance policy.

Incomplete:

Refer to the RNU Catalog for specific guidelines.

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**Academic Integrity and Dishonesty:**

All students, as well as myself, are expected to adhere to RNU Policy.

**Class Schedule**

The following lists schedules for topics in Textbook. Each week, there will be reading assignments and topic discussion. The topics will be provided during each class.

**Lesson One**  *Digital Computer and Information* (Ch1)

1. Digital Computer
2. Number System
3. Arithmetic Operation
4. Decimal Codes
5. Alphanumeric Code
6. Elective Topics on Solution Architecture (1)

**Lesson Two**  *Combinational Logic Circuits I* (Ch2)

0. Quiz 1
1. Binary Logic And Gates
2. Boolean Algebra
3. Standard Forms
4. Map Simplification
5. Map Manipulation
6. NAND And NOR Gates
7. Exclusive-OR Gates
8. Integrated Circuits
9. Elective Topics on Solution Architecture (2)

**Lesson Three**  *Combinational Logic Design II* (Ch3)

0. Quiz 2
1. Combinational circuits
2. Design Topics
3. Analysis Procedure
4. Design Procedure
5. Decoders
6. Encoders
7. Multiplexers
8. Binary Adders
9. Binary Subtraction
10. Binary Addor-Subtractor
11. Binary Multipliers

Revised 2019.10
Lesson Four  *Combinational Logic Design II* (Continue)

Lesson Five  *Combinational Logic Design Review* (Ch1 - 3)

1. Review
2. Research Topic Study (I)

Lesson Six  *Midterm Exam*

Lesson Seven  *Sequential Circuits* (Ch4)

1. Sequential Circuit Definitions
2. Latches
3. Flip-Flops
4. Sequential Circuit Design
5. Designing with D Flip-Flops
6. Designing with JK Flip-Flops
7. Elective Topics on Solution Architecture (4)

Lesson Eight  *Registers and Computers* (Ch5)

1. Definition of Register And Counter
2. Registers
3. Shift Registers
4. Ripple Counter
5. Synchronous Binary Counters
7. Elective Topics on Solution Architecture (5)

Lesson Nine  *Registers and Computers* (Continue)

Lesson Ten  *Memory and Programmable Logic Devices* (Ch6)

1. Memory And Programmable Logic Device Definitions
2. Random-Access Memory
3. RAM Integrated Circuits
4. Array of RAM ICs
5. Error Detection And Correction
6. Read-only Memory (ROM)
7. Elective Topics on Solution Architecture (6)

Lesson Eleven  *Memory and Programmable Logic Devices* (Continue)

Lesson Twelve  *Review and Final Exam*

1. Review
2. Research Topic Study
3. Final Exam (1 hour)

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