### Course Syllabus

<table>
<thead>
<tr>
<th>Course Number:</th>
<th>COSC 5361</th>
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<tbody>
<tr>
<td>Course Title:</td>
<td>Digital Image Processing</td>
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**Course Description:** This course introduces basic concepts in Digital Image Processing. Topics include: two dimensional transforms, filtering, enhancement, restoration, edge detection, segmentation, texture, matching, image representation, feature detection, and applications.

<table>
<thead>
<tr>
<th>Pre-requisites:</th>
<th>COSC 2336, COSC 2315</th>
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<tbody>
<tr>
<td>Credits:</td>
<td>3 hours lecture</td>
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**Text(s):**

<table>
<thead>
<tr>
<th>Languages Used:</th>
<th>Not Applicable</th>
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<tbody>
<tr>
<td>(if applicable)</td>
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</table>

**Topics:**
1. Introduction  
2. Image acquisition and digitization  
3. Enhancement techniques  
4. Geometric Corrections and registration  
5. Interpolation methods  
6. Image compression  
7. Segmentation  
8. Feature extraction  
9. Associative memory  
10. Applications

**Evaluation Method:** (only items in dark print apply)

1. Examination/Quiz  
2. Homework  
3. Paper/Report  
4. Computer Program  
5. Project  
6. Presentation  
7. Class Participation  
8. Peer Review  
9.  
10. 
### Course Objectives:

By the end of this course students are expected to:

1. Describe various stages in the knowledge discovery in databases (KDD) process [1, 7]
2. Demonstrate with the help of histograms how contrast enhancement is achieved [1,3,7]
3. Explain with the help of equations interpolation techniques [1,3]
4. Develop a software tool to implement various enhancement techniques [1,3,4,5]
5. Explain various data compression methods [1,3]
6. Design a software tool for image compression and decompression algorithms [1,3,4,5]
7. Compare various techniques for extracting texture features [1,7]
8. Discuss three applications of enhancement and feature extraction techniques. [1,7]
9. Develop a software tool to implement two well know algorithms for edge detection [1, 2, 45]

*Numbers in bracket refer to method(s) used to evaluate the course objective.*

### Relationship to Program Outcomes:

This course supports the following computer science graduate program outcomes, which state that our students at the time of graduation are expected to:

1. possess an enhanced breadth of knowledge in computer science, combined with a depth of knowledge in critical core areas of computing [1,2,5,7];
2. possess the skills and knowledge for lifelong learning in computer science;
3. possess knowledge of the theoretical foundations of computing and have strong practical application experience [4, 6, 8, 9];
4. posses and demonstrate oral and written communication skills;
5. understand and respect the professional standards of ethics expected of a computer scientist and be knowledgeable concerning the history of computing field;
6. possess a knowledge of computer security and computer security management;
7. **analyze and compare relative merits of alternative software design, algorithmic approaches, and computer system organization, with respect to a variety of criteria relevant to the task (e.g. efficiency, scalability, security) [5, 6, 9]; and**
8. implement algorithms in multiple programming languages, on multiple hardware platforms, and multiple operating system environments.

*Numbers in brackets refer to course objective(s) that address the Program Outcome.*

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**Prepared By:** Arun Kulkarni  
**Date:** October 31, 2007  
**Reviewed By:**  
**Date:**