Introduction to Pattern Recognition

Description: This course provides a basic introduction to pattern recognition systems. Topics include vector space representation of patterns, supervised and unsupervised systems, distance matrices, discriminant functions, probability density and parameter estimation, maximum likelihood and minimum risk classification, potential functions, feature selection and clustering, as well as applications and special topics in pattern recognition (e.g., biometric and biomedical systems). A design project is also required.

Prerequisites: Permission from the instructor is required prior to registration in EE 813.

Corequisites: None

Instructor: F. Bui
Assistant Professor, Department of Electrical and Computer Engineering
Office: Room 3B43, Engineering Building
Phone: (306) 966-1332
Email: francis.bui@usask.ca

Lectures: Tuesday, 1:00pm – 3:50 p.m., Room AGRI 2E19

Tutorials: To be scheduled when needed

Laboratory: None

Website: Assignments, general course information, and announcements will be posted on the course website. Students are responsible for keeping up-to-date with the information on the course website.

General site: http://www.engr.usask.ca/classes/EE/813/
Blackboard Content: https://bblearn.usask.ca (login with your NSID)

Course Reference Numbers (CRNs): 29009 (lectures)


Office Hours: Students are welcome to drop by the instructor’s office at any time for help with the course (open-door policy). Students may also schedule a specific, mutually convenient, time for a meeting, arranged via email or phone.

Reading List: none
Assessment:  
The methods of assessment and their respective weightings are given below:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>10%</td>
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<tr>
<td>Project Report and</td>
<td>20% + 10%</td>
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<tr>
<td>Presentation</td>
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<tr>
<td>Final Exam</td>
<td>60%</td>
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Final Grades:  
The final grades will be consistent with the “literal descriptors” specified in the university’s grading system.

http://students.usask.ca/current/academics/grades/grading-system.php

For information regarding appeals of final grades or other academic matters, please consult the University Council document on academic appeals.

http://www.usask.ca/university_secretary/honesty/StudentAcademicAppeals.pdf

Course Content:  
The course uses content mainly from the textbooks.

1. Introduction to Pattern Recognition
2. Classifiers Based on Bayes Decision Theory
3. Linear and Nonlinear Classifiers
4. Data Transformation: Feature Generation and Dimensionality Reduction
5. Feature Selection and Data Fusion
6. Clustering
7. Special Topics: Applications of Pattern Recognition, including Biometric and Biomedical Systems (as time permits)

Assignments:  
Assignments are posted on the Blackboard course website, and must be electronically submitted on Blackboard prior to 11:59 pm on the due date. Late assignments will not be marked, and will be given a mark of zero.

Tutorials:  
No regularly scheduled tutorials for this class. However, when needed, tutorials may be arranged to cover specific topics.

Quizzes:  
None

Exams:  
There will be one final exam. All exams are open textbook, with non-programmable calculator permitted.

Important Dates:  

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<th>Date</th>
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<tbody>
<tr>
<td>January 13, 2015</td>
<td>Course begins</td>
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<tr>
<td>April 7, 2015</td>
<td>Course ends</td>
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Student Conduct:  

Ethical behaviour is an important part of engineering practice. Each professional engineering association has a Code of Ethics, which its members are expected to follow. Since students are in the process of becoming Professional Engineers, it is expected that students will conduct themselves in an ethical manner.

The APEGs (Association of Professional Engineers and Geoscientists of Saskatchewan) Code of Ethics states that engineers shall “conduct themselves with fairness, courtesy and good faith towards clients, colleagues, employees and others; give credit where it is due and accept, as well as give, honest and fair professional criticism” (Section 20(e), The Engineering and Geoscience Professions Regulatory Bylaws, 1997).

The first part of this statement discusses an engineer’s relationships with his or her colleagues. One of the ways in which engineering students can demonstrate courtesy to their colleagues is by helping to maintain an atmosphere that is conducive to learning, and minimizing disruptions
in class. This includes arriving on time for lectures, turning cell phones and other electronic devices off during lectures, not leaving or entering the class at inopportune times, and refraining from talking to others while the instructor is talking. However, if you have questions at any time during lectures, please feel free to ask (chances are very good that someone else may have the same question as you do).

For more information, please consult the University Council Guidelines for Academic Conduct.

http://www.usask.ca/university_secretary/council/reports_forms/reports/guide_conduct.php

Academic Honesty: The latter part of the above statement from the APEGs Code of Ethics discusses giving credit where it is due. At the University, this is addressed by university policies on academic integrity and academic misconduct. In this class, students are expected to submit their own individual work for academic credit, properly cite the work of others, and to follow the rules for examinations. Academic misconduct, plagiarism, and cheating will not be tolerated. Copying of assignments and lab reports is considered academic misconduct. Students are responsible for understanding the university’s policies on academic integrity and academic misconduct. For more information, please consult the University Council Regulations on Student Academic Misconduct and the university’s examination regulations.

http://www.usask.ca/university_secretary/honesty/StudentAcademicMisconduct.pdf
http://www.usask.ca/university_secretary/council/academiccourses.php

Safety: The APEGs Code of Ethics also states that Professional Engineers shall “hold paramount the safety, health and welfare of the public and the protection of the environment and promote health and safety within the workplace” (Section 20(a), The Engineering and Geoscience Professions Regulatory Bylaws, 1997).

Safety is taken very seriously by the Department of Electrical and Computer Engineering. Students are expected to work in a safe manner, follow all safety instructions, and use any personal protective equipment provided. Students failing to observe the safety rules in any laboratory will be asked to leave.