Education Committee Meeting
Friday, Oct 16, 2020

Agenda

1. [DaveM] Add 472, 473, 476 into Area-2 (Information Processing) **[Vote]**
    a. CMSC472 – Introduction to Deep Learning
    b. CMSC473 – Capstone in Machine Learning
    c. CMSC476 – Introduction to Robotics and Perception

2. [AbhinavB] CMSC 498X (Introduction to Parallel Computing) **[Vote]**
    a. Create a permanent number
    b. Add to Area-1 (Systems)

3. [Yiannis] Permanent number for CMSC 4xx (Robotic Perception and Planning) for the Robotics & Autonomous Systems Minor **[Vote]**

4. [Ramani & TomH] Graduate Affairs [Presentation/Discussion]
    a. Grad student intake. Survey of faculty
    b. Changes to spring admits (information)

5. [Kate & Jan] Undergraduate Affairs [Presentation/Discussion]
    a. Class Concerns / Incident Reporting
    b. UMD Accommodations Faculty Resources
    c. President Commission on Disability Issues: Disability Awareness Month
    d. Access Computing Resources
    e. Entry survey

6. [Roger] IMDM updates

Additional Information:

1. Courses CMSC 472, 473, and 476 were assigned permanent numbers recently. The proposal is to add them all to the Area-2 (Information Processing) list of upper-level electives. (Students must select 5 courses from at least 3 of the areas.)
2. This proposal is to assign a permanent number (in the 41X series) to the course CMSC 498X, “Introduction to Parallel Computing”. The course description is given below. There is also a proposal to add it to the Area-1 (Systems) list of upper-level electives. The course description appears below.

3. This proposal is to create a permanent number for the course “Robotics Perception and Planning”. This course is among the electives in the Robotics and Autonomous Systems minor, and a permanent number has been requested for PCC purposes. The course description appears below.

CMSC 41?: Introduction to Parallel Computing

Course Description:

This is a 400-level course for computer science majors. Topics include programming for shared memory and distributed memory parallel architectures, and fundamental issues in the design of parallel algorithms, and development and analysis of parallel programs.

The objective of this course is to study the theory and practice of high performance and parallel computing. The overall goal is to provide exposure to programming tools and techniques for parallel environments. This course will focus on current practices in high performance computing technologies, including parallel architectures, parallel programming models, parallel algorithms, performance issues, and software tools for performance analysis.

Credits:

3

Prerequisites:

Minimum grade of C- in CMSC330 and CMSC351; or permission of instructor.

Restrictions:

Must be a Computer Science major; or permission of instructor.

Possible Instructors:

Alan Sussman, Jeff Hollingsworth, Anwar Mamat

CMSC 4??: Robotic Perception and Planning

Course Description:

This course teaches the fundamentals of robot perception and robot path planning. The syllabus and course is divided into two segments, as per the major aspects involved in robotics. There will be lectures on (a) planning and control and (b) perception, with projects and homework. The syllabus includes the following: Motion Planning Introduction, Rigid Body Transformations, Velocity, Velocity Dynamics, Vehicle Controls, Graph Based Planning, Sampling Based Planning, Trajectory Planning, Navigation, Baeyesian and Kalman Filtering, Camera Model and Calibration, Projective Geometry, Visual Perception features, Optical Flow, Pose Estimation, 3D Velocities, Basics of Machine Learning, Structure from Motion, Visual Odometry, and Recognition and Learning. There are two examinations, three projects in multiple phases, and two homeworks. The class uses robots, mobile platforms with sensors and effectors. Drone experiments are done in simulation or in the Brin Family Aerial Robotics Lab, space permitting.

How different from other undergrad courses:

The class is different from the existing classes offered in Computer Science, because there does not exist an undergraduate class on planning. There is an advanced class in computer vision (CMSC426), which also covers the material that is here in four lectures (lectures 13-16).

Resources:

An investment of $50,000 will be made by the Maryland Robotics Center to support the hardware/software needed for student projects. The hardware includes about 15 computer-controlled cars equipped with cameras and IMUs. Student projects will be performed initially in the Robotics Realization Lab in the Engineering Annex Building and, eventually, in the IDEA Factory Robotics and Autonomy Laboratory.

Prerequisites:

- For RAS Minor students: ENME 488* Introduction to Robotics, ENAE488* Robotic Programming, and ENEE46*: Robotics Project Class
- For non-minor CS students: MATH 240 Linear Algebra and CMSC131 Object-Oriented Programming

Possible Instructors:

Yiannis Aloimonos, Dinesh Manocha, Pratap Tokekar

First Semester Offered:

Spring 2022

By the way, this course is distinct from CMSC476: Introduction to Robotics with Perception. Here is the description for that course:

Introduction to the programming of robots with perception. Topics covered include navigation using vision and 3D depth sensors, localization and map making, image processing for visual navigation and recognition, and basic vision and depth-based manipulation. Develop algorithms and learn how to use vision and software tools, such as Open CV, MoveIt, and the Point Cloud Library. Programming done in Python and C++ under the Robotic Operating System (ROS).