EC 803 Computer Vision (3-0)

Textbook: Computer Vision : A Modern Approach, D. Forsyth and J. Ponce, PrenticeHall, 2001 (FP). ISBN-10: 0130851981, ISBN-13: 978-0130851987 **Reference Book:**

- Computer Vision: Algorithms and Applications, Richard Szeliski, 2009 (RS).
  ISBN-10: 1848829345, ISBN-13: 978-1848829343
- Computer Vision, Linda G. Shapiro and George Stockman, Prentice Hall, (2001).
- Computer Vision and Image Processing, Tim Morris, Palgrave Macmillan, (2004).

Objective:

The objective of this course is to understand the basic issues in computer vision and major approaches that address them. Even though Computer Vision is being used for many practical applications today, it is still not a "solved" problem. Hence, definitive solutions are available only rarely; most of the time, we will discuss alternatives and their limitations.

Course Outcome:

After completing the course, the students may expect to have the knowledge needed to read and understand the more advanced topics and current research literature, and the ability to start working in industry or in academic research. However, this course is not designed to be a "cookbook" course that gives just a survey of the methods needed in "practice", nor will it cover "commercial" systems in detail.

Course Outline:

The primary topics to be covered are chapters 13 through 21 in the textbook. Mostly, the material covered in the text book will be followed but in some cases, the material will be supplemented by newer methods, which are available only in the form of research papers or tutorial articles. Following is a list of topics expected to be covered, in anticipated order, and with expected time to be spent on them. This list is intended to be only indicative, the actual topics, the order and the time may vary somewhat depending on various factors including student interests and preparation.

Topics	Allocated Periods
Image Formation - Sampling - Quantization - Geometry - Photometry - Color **Calibration** **Filtering and Convolution** **Feature Extraction**	45
- Corners, edges, regions **Segmentation and grouping** - Parametric fitting, - Hough transform, - Tensor Voting **Stereo** **Structure and motion** **Dense motion and Optical flow** **Range Image Analysis** **Recognition**	