Functions of fuzzySets – Extension Principle, Fuzzy Transform (Mapping), Practical Considerations. Fuzzy Numbers IntervalAnalysis in Arithmetic, Approximate Methods of Extension – Vertex method, DSW Algorithm, RestrictedDSW Algorithm, Comparisons. Fuzzy Vectors. **RBT: L1, L2**	
Module – 5	
Fuzzy Rule Based Systems: Natural Language, Linguistic Hedges, Rule-Based Systems – Canonical RuleForms, Decomposition of Compound Rules, Likelihood and Truth Qualification, Aggregation of Fuzzy Rules.Graphical Techniques of Inference. **RBT: L1, L2**	08

Course outcomes: The students should be able to:

- Provide basic elements of fuzzy sets.
- Differentiate between fuzzy set and classical set theory.
- Apply fuzzy membership functions to solve value assignment problems.
- Explain approximate methods of fuzzy arithmetic and extension principle.
- Discuss the applications of fuzzy rule based systems.

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

1. Fuzzy Logic with EngineeringApplicationsTimothy J. Ross Wiley IndiaInternational edition,2010 reprint

Reference Books:

1. Fuzzy Logic- Intelligence,Control, and informationJohnYenRezaLangariPearson Education 1st Edition, 2004
2. Fuzzy Sets and Fuzzy Logic-Theory and ApplicationsGeorge J. KlirBoYuanPrentice Hall of India 1st Edition, 2000
3. Fuzzy Mathematical approach to pattern Recognition, S K Pal, and D Dutta majumder , John wiley 1986
4. Neuro-fuzzy pattern recognition: methods in Soft computing, S K Pal and S Mitra
5. Fuzzy set theory and its applications by H J Zimmermann, Springer Publications

COMPUTER VISION **(Effective from the academic year 2018 -2019)** **SEMESTER – VII**			
Subject Code	18AI742	**CIE Marks**	40
Number of Contact Hours/Week	3:0:0	**SEE Marks**	60
Total Number of Contact Hours	40	**Exam Hours**	3 Hrs
CREDITS – 03			

Course Learning Objectives: This course will enable students to:

- Learn basic principles of image formation, image processing algorithms and different

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algorithms for recognition from single or multiple images (video). • Understand the core vision tasks of scene understanding and recognition. • Applications to 3D modelling, video analysis, video surveillance, object recognition	
Module – 1	**Contact Hours**
Introduction and Image Formation: What is computer vision? A brief history, Geometric primitives and transformations, Photometric image formation, The digital camera. Pinhole Perspective, Weak Perspective, Cameras with Lenses, The Human Eye, Intrinsic Parameters and Extrinsic Parameters, Geometric Camera Calibration **T1: Chap 1-1.1 & 1.2, Chap 2-2.1 to 2.3. T2:Chap 1-1.1 to 1.3**	08
Module – 2	
Early Vision – One Image: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, Local Image Features, Texture **T2:Chap 4-4.1 to 4.5, Chap5-5.1 to 5.5, Chap6-6.1 to 6.3, 6.5**	08
Module – 3	
Early Vision – Multiple Images: Stereopsis and Structure from Motion **T2:Chap7-7.1 to 7.7, Chap 8-8.1 to 8.3**	08
Module – 4	
Mid-level Vision: Segmentation by Clustering, Grouping and Model fitting, Tracking **T2:Chap9-9.1 to 9.4, Chap 10-10.1 to 10.7, Chap 11-11.1 to 11.3**	08
Module – 5	
High-level Vision: Registration, Smooth Surface and their Outlines, Range Data Detecting Objects in Images, Recognition **T2:Chap12-12.1 to 12.3, Chap 13-13.1 to 13.3, Chap 14-14.1 to 14.4, Chap 17-17.1 to 17.3. T1:Chap 6-6.1 to 6.6**	08
Course outcomes: The students should be able to:	
• Implement fundamental image processing techniques required for computer vision • Understand Image formation process • Perform shape analysis • Develop applications using computer vision techniques • Understand video processing and motion computation	
Question Paper Pattern:	
• The question paper will have ten questions.	

- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Textbooks:

1. Computer Vision: Algorithms and Applications (CVAA), Richard Szeliski, Springer, 2nd edition, 2020, http://szeliski.org/Book/
2. Computer Vision – A modern approach, by D. Forsyth and J. Ponce, Prentice Hall, 2nd edition, 2012

Reference Books:

1. R. C. Gonzalez, R. E. Woods. Digital Image Processing. Addison Wesley Longman, Inc., 1992.
2. D. H. Ballard, C. M. Brown. Computer Vision. Prentice-Hall, Englewood Cliffs, 1982.
3. Image Processing, Analysis, and Machine Vision. Sonka, Hlavac, and Boyle. Thomson.
4. Simon J. D. Prince, Computer Vision: Models, Learning, and Inference, Cambridge University, Press, 2012
5. Introductory Techniques for 3D Computer Vision, by E. Trucco and A. Verri, Publisher: Prentice Hall.
6. Building Computer Vision Applications Using Artificial Neural Networks - With Step-by-step Examples in OpencvAndTensorflow With Python, Shamshad Ansari,Apress, 2020

SEMANTIC WEB AND SOCIAL NETWORKS

(Effective from the academic year 2018 -2019)
SEMESTER – VII

Subject Code	18AI743	**CIE Marks**	40
Number of Contact Hours/Week	3:0:0	**SEE Marks**	60
Total Number of Contact Hours	40	**Exam Hours**	3 Hrs

CREDITS – 03

Course Learning Objectives: This course will enable students to:

- To understand the components of the social network.
- To model and visualize the social network.
- To mine the users in the social network.
- To understand the evolution of the social network.
- To know the applications in real time systems.

Module – 1	**Contact Hours**
Web Intelligence: Thinking and Intelligent Web Applications, The Information Age ,The World Wide. Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map,Logic on the semantic Web. **T1: Chapter 1,3,4**	08

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