

गुरु घासीदास विश्वविद्यालय  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
Koni, Bilaspur - 495009 (C.G.)

List of New Course(s) Introduced

Department : Computer Science and Information Technology

Programme Name : B.Sc.(CS), M.Sc.(CS),MCA, PhD

Academic Year : 2016-17

List of New Course(s) Introduced

r. No	Course Code	Name of the Course
01.	PHDCS05	Machine Vision

*Aravind*  
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DEPT OF CSIT  
G.G.V. BILASPUR (C.G.)

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## Minutes of Meetings (MoM) of Board of Studies (BoS)

**Academic Year : 2016-17**

**School : School of Mathematical And Computational Science**

**Department : Computer Science and Information**

**Date and Time : Feb 24<sup>th</sup>, 2017 - 11:30 AM**

**Venue : CSIT Department**

The Board of Studies (BoS) of Department of Computer Science and Information, School of Studies of Mathematical And Computational Science, Guru Ghasidas Vishwavidyalaya, Bilaspur was held to design and discuss the introduction of new courses.

The following members were present in the meeting:

1. Prof. M. Surendra Prasad Babu (External Expert Member BoS, Dept. of Computer Science and System engineering, Andhra University)
2. Prof. A. K. Saxsena (Dean of School, Prof., Dept. of Computer Science and Information, GGU Bilaspur)
3. Mrs P.L. Pujari (Asst. Prof., Dept. of Computer Science and Information, GGU Bilaspur)

Following points were discussed during the meeting

1. **Machine Vision (PHDCS05)** is introduced as **a new course in PhD program.**

*Agave*  
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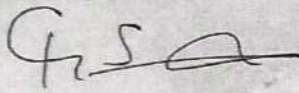
## Minutes of the meeting of Board of Studies

The Board of studies meeting in Computer Science and Information Technology was held on 24<sup>th</sup> Feb 2017 in the CSIT department. Following members were present

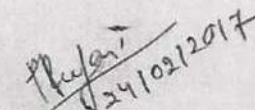
- i. Prof. M. Surendra Prasad Babu, Professor  
Department Of Computer Science & Systems Engineering, College Of Engineering  
Andhra University, Visakhapatnam - 530 003
- ii. Prof A K Saxena, Dept of CSIT GGV Bilaspur
- iii. Mrs. P L Pujari, Asst. Prof. Dept of CSIT, GGV Bilaspur

Following are the resolutions of the meeting

- a. The existing syllabus for BSc, MSc (CS), MCA, PhD to continue with minor changes in papers Software Engineering and JAVA programming.
- b. For the next academic session, enclosed scheme is recommended. The contents of each paper will be supplied by dept of CSIT through Head of the Department CSIT. Similarly elective papers can be modified by Head, CSIT depending on availability and suitability of the course to be introduced as elective.
- c. The PhD course work syllabus of Machine Vision is approved with immediate effect.
- d. A new paper can be introduced at PhD course work in MOOC based on concept that the candidate pursuing Ph D can opt this paper (not repeated with the paper which he/she opts for course work as optional paper) from a list of papers supplied by Dept of CSIT. The paper will be evaluated using (i) certificate by Stanford/MIT institutions or any such institution and (ii) a viva voce conducted by the Dept of CSIT. Introduction of this paper (MOOC) is subject to the approval from competent authorities of Vishwavidyalaya.

  
(Prof. M. Surendra Prasad Babu)  
24/2/2017

  
(Prof A K Saxena)  
24/2-17

  
(Mrs. P L Pujari)  
24/02/2017



Faculty of Mathematical and Computational Science  
Dept of Computer Science and Information Technology (CSIT)  
Guru Ghasidas Vishwavidyalaya, Bilaspur

Session 2016-17

Scheme and syllabus for Ph. D. Course Work in Computer Science

Code	Subject	Max Marks	Min Passing Marks
PHDCS01	Fundamentals of Research in Science	100	55
PHDCS02	Soft Computing Techniques	100	55
PHDCS03	Pattern Recognition	100	55
PHDCS04	Nature Inspired Computing	100	55
PHDCS05	Machine Vision	100	55
PHDCS07	Seminar	Open Viva – Qualified / Not Qualified	

General Instruction

1. There shall be three theory papers.
2. There shall be an Open Seminar/ Evaluation that will be organized in the University Campus. An Examinee shall be awarded either “Qualified” or “Not Qualified”. Marks shall not be allotted for it.
3. Duration of the theory paper shall be three hours.
4. The duration of the course work shall be six months / one Semester.
5. Student has to choose any two subjects from PHDCS02, PHDCS03, PHDCS04 and PHDCS05.





PHDCS05:

## Machine Vision

### Aim

The objective is to provide the Students with an overview of Machine Vision Systems, their applications, algorithms, Graphics and modeling.

### Content

1. Machine Vision: Introduction of Machine Vision, Applications, Algorithms.
2. Image Formation and Image Analysis: Image enhancement, Frequency analysis, Segmentation, Morphology and Object analysis, Augmented Reality and Virtual Reality, Construction of 3D model from images, Image Processing and Feature Extraction, Image Watermarking, Motion Estimation.
3. Camera Technology, Systems For Machine Vision and Digital Imaging: Analog and digital Camera, Pinhole camera model, Perspective geometry , Simple Lens Model  
, Selection of Lens, Camera Parameters. Calibration : Perspective Projection  
, Calibration Matrix , Orthographic projection, Calibration Procedure, Solving for Calibration Matrix  
, Solving for Camera Parameters.
4. Graphics and 2D Measurement Methods : Introduction of Graphics and Its applications, Modeling transformation, Coordinate systems, Clipping, Windows and Viewports, Wireframe models, Models for illumination (Diffused, directed, structured, and polarized light), Optics , Animation Techniques.
5. 3D Measurement Methods: Visual Reconstructions and Image Recognition, Object/scene/activity categorization, Object detection and algorithms, Supervised and Unsupervised classification algorithms, Probabilistic models for sequence data , Learning to rank , Active learning , Dimensionality reduction and manifold learning, Non- parametric methods and big data, Deep learning, convolution neural networks, Scene Recognition with Bag of Words, Shading and smoothing techniques, Crowdsourcing and dataset creation.

### Reference Books:

- Carsten Steger Markus Ulric, Christian Wiedermann, Machine Vision Algorithms and Applications, Wiley-VCH, 978-3-527-40734-7. □
- Faugeras, O. Three Dimensional Computer Vision. The MIT Press, 1993. □
- Gonzales/ Woods/ Eddins, Digital Image Processing using MATLAB, 2nd edition, Gatesmark Publishing, ISBN 9780982085400. □



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- N.Efford, Digital Image Processing, Addison Wesley 2000, ISBN 0-201-59623-7.
  - M Sonka, V Hlavac and R Boyle, Image Processing, Analysis and Machine Vision, PWS 1999, ISBN 0-534-95393-X.
  - W K Pratt, Digital Image Processing, John Wiley and Sons, 1991, ISBN 0-471-85766-1.
  - R Jain, R Kasturi and B G Schunck, Machine Vision, McGraw-Hill, 1995, ISBN 0-07-113407-7.
  - Goodfellow, Bengio, and Courvill, Deep Learning, 2016. <http://www.deeplearningbook.org/>
  - Hearn and Baker, Computer Graphics, C Version, 2nd ed. ISBN 0-13-530924-7.
  - Alan Watt, 3D Computer Graphics, 3rd ed. ISBN 0-20-139855-9.
  - Understanding Virtual Reality, interface, Application and Design, William R. Sherman, Alan Craig, Elsevier (Morgan Kaufmann).

Additional reading: Research Papers.

*Kavens*  
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