Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed - to - be - University under section 3 of UGC Act 1956)
NAAC
BHARATH INSTITUTE OF SCIENCE AND TECHNOLOGY
No.173, Agharam Road, Selaiyur, Chennai , T.N - 600 073.

Requisition Letter

From
Dr. K.P Kaliyamurthie,
Professor & Head,
Department of CSE,
Bharath Institute of Higher Education and Research,
Chennai

Date: 27.02.2022

To
The Dean Engineering,
Bharath Institute of Higher Education and Research,
Chennai

Respected sir

Subject :Request of Permission to conduct a value added course on "**IMAGE PROCESSING FEATURES AND SEGMENTATION**" -Reg

With reference to above subject, I would like to bring to your kind notice that, our department interested to organize value added course on "**IMAGE PROCESSING FEATURES AND SEGMENTATION**" in our campus premises on **17/03/2022**.Students would be participating in this course. We request you kindly to give permission to organize this event.

Venue: CSE Smart Room

Timing : 1:30P.M-4.30PM

9.30A.M-4.30PM.

Submitted to Principal for approval to organize this value added course.

HOD

DEAN ENGINEERING

HEAD OF DEPARTMENT
Department of Computer Sci... & Engg.,
Bharath Institute of Higher Education & Research
(Declared as ... U/S 3 of UGC Act, 1956)
Chennai-600 073. INDIA

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CIRCULAR

14.03.2022

The School of computing, Bharath Institute of Higher Education and Research is planned to conduct a certification value added course on **IMAGE PROCESSING FEATURES AND SEGMENTATION** for the benefit of II, III and IV year students. This course is scheduled from 17-03-2022 for 30hours which includes theory and practical. The timings are 1:30 PM to 4:30 PM

All Registered Students must attend all the classes without fail. The following faculty members are assigned to handle the course. S.NO	**Name of the Faculty**	**Designation**
1	Dr.C.Nalini	Professor
2	Dr.C.Rajabhushanam	Professor

Head of Department

To

Copy to CSE

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Department of Com
Bharath Institute of
Declared as Deemed to b
Chennai
Engg.,
Research
Act, 1956)

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CERTIFICATE COURSE ON IMAGE PROCESSING FEATURES AND SEGMENTATION

Date of Introduction of the Course: 17-03-2022

COURSE SYLLABUS

1. **REVIEW OF DIGITAL IMAGE PROCESSING**
   Steps in digital image processing-Elements of visual perception- Connectivity and Relations between Pixels.- brightness adaptation,Simple Operations- Arithmetic, Logical, Geometric Operations. Mathematical Preliminaries - 2D Linear Space Invariant Systems - 2D Convolution - Correlation 2D Random Sequence - 2D Spectrum.Mach band effect.Image enhancement in spatial and frequency domain, Histogram equalization.

2. **Image transforms**
   Image 2D Orthogonal and Unitary Transforms-Properties and Examples. 2D DFT- FFT – DCT - Hadamard Transform - Haar Transform - Slant Transform - KL Transform - Properties And Examples.

3.Enhancement Image Transforms

ImageEnhancement:- Histogram Equalization Technique- Point Processing-Spatial Filtering-In Space And Frequency - Nonlinear Filtering-Use Of Different Masks.

4. Image Segmentation

Edge detection, Thresholding, Region growing, Fuzzy clustering, Watershed algorithm, Active contour models, Texture feature based segmentation, Graph based segmentation, Wavelet based Segmentation - Applications of image segmentation.

Line Detection - Curve Detection - Edge Linking And Boundary Extraction, Boundary Representation, Region Representation And Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis

5.FEATURE EXTRACTION

First and second order edge detection operators, Phase congruency, Localized feature extraction -detecting image curvature, shape features, Hough transform, shape skeletonization, Boundary descriptors, Moments, Texture descriptors- Autocorrelation, Co-occurrence features, Runlength features, Fractal model based features, Gabor filter, wavelet features.

6. Image restoration and construction

Image Restoration: Image Observation And Degradation Model, Circulant And Block Circulant Matrices and Its Application In Degradation Model - Algebraic Approach to Restoration- Inverse By Wiener Filtering - Generalized Inverse-SVD And Interactive Methods - Blind Deconvolution-Image Reconstruction From Projections.

7. Image compression

Image Compression: Redundancy And Compression Models -Loss Less And Lossy. Loss Less-Variable-Length, Huffman, Arithmetic Coding - Bit-Plane Coding, Loss Less Predictive Coding, Lossy Transform (DCT) Based Coding, JPEG Standard - Sub Band Coding.

8. Image Segmentation

Edge Detection - Line Detection - Curve Detection - Edge Linking And Boundary Extraction, Boundary Representation, Region Representation And Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis.

9. REGISTRATION

Registration - Preprocessing, Feature selection - points, lines, regions and templates Feature correspondence - Point pattern matching, Line matching, Region matching, Template matching.Transformation functions - Similarity transformation and Affine Transformation. Resampling – NearestNeighbour and Cubic Splines.

10. IMAGE FUSION

Image Fusion - Overview of image fusion, pixel fusion, wavelet based fusion -region based fusion.

11.Image compression & segmentation

Image Compression:Redundancy And Compression Models -Loss Less And Lossy. Loss Less-Variable-Length, Huffman, Arithmetic Coding - Bit-Plane Coding, Loss Less Predictive Coding, Lossy Transform (DCT) Based Coding, JPEG Standard - Sub Band Coding. Image Segmentation: Edge Detection - Line Detection - Curve Detection - Edge Linking And Boundary

Extraction, Boundary Representation, Region RepresentationAnd Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis.

12.**Color**

Color Image-Processing Fundamentals, RGB Models, HSI Models, Relationship Between Different Models.

13.**Multispectral image processing**

Multispectral Image Analysis - Color Image Processing Three Dimensional Image Processing-Computerized Axial Tomography-Stereometry-Stereoscopic Image Display-Shaded Surface Display.

14.**3D Image Visualization**

Sources of 3D Data sets, Slicing the Data set, Arbitrary section planes, The use of color, Volumetric display, Stereo Viewing, Ray tracing, Reflection, Surfaces, Multiple connected surfaces, Image processing in 3D, Measurements on 3D images.

15.Image Quality

Natural scene statistics, quality assessment based on structural and statistical approaches, blind quality assessment

COURSE OBJECTIVES

In this course we plan to give students an overview of the field of Image Processing, features and Segmentation will gain hands-on experience in solving relevant problems through projects that will utilize existing public tools monitoring one's progress. It is our objective that students will develop the skills needed to become a practitioner or carry out research projects in this domain.

Specifically, the course has the following objectives:

Students will learn

1) The fundamental ideas behind,Image Processing, features and Segmentation, the evolution of the paradigm, its applicability; Benefits, as well as current and future challenges;

2) The basic ideas and principles ofImage Processing, features and Segmentationis the subjectivity of consciousness and professional activity.

deployment considerations;

3) To understand the challenges in extracting objects/regions of interest from a given images providing user-friendly Web interfaces, curriculum materials, and professional development

4) Engaging with authentic scientific tools and practices such as controlling remote laboratory experiments or telescopes can build science inquiry skills, improve conceptual understanding, and increase motivation

5) The variety of programming models and develop working experience in several of them.

COURSE COORDINATOR

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CERTIFICATE COURSE ON IMAGE PROCESSING FEATURES AND SEGMENTATION

Date of Introduction of the Course: 17.03.2022

The timings are 1:30 PM to 4:30 PM from Friday (AN) and Saturday (FN&AN).

Time Table& Lesson plan

CLASS	DATE	TOPIC
1,2	17-03-2022(AN)	**1. REVIEW OF DIGITAL IMAGE PROCESSING** Steps in digital image processing-Elements of visual perception- Connectivity and Relations between Pixels.- brightness adaptation, Simple Operations- Arithmetic, Logical, Geometric Operations. Mathematical Preliminaries - 2D Linear Space Invariant Systems - 2D Convolution - Correlation 2D Random Sequence - 2D Spectrum. Mach band effect. Image enhancement in spatial and frequency domain, Histogram equalization.
3,4	17-03-2022(AN) 18-03-2022(FN)	**2. Image transforms** Image 2D Orthogonal and Unitary Transforms-Properties and Examples. 2D DFT- FFT – DCT - Hadamard Transform - Haar Transform - Slant Transform - KL Transform -Properties And Examples
5,6	17-03-2022(FN)	**3.Enhancement Image Transforms** Image Enhancement:- Histogram Equalization Technique- Point Processing-Spatial Filtering-In Space And Frequency - Nonlinear Filtering-Use Of Different Masks
7,8	17-03-2022 (FN) 17-03-2022(AN)	**4.Image Segmentation** Edge detection, Thresholding, Region growing, Fuzzy clustering, Watershed algorithm, Active contour models, Texture feature based segmentation, Graph based segmentation, Wavelet based Segmentation - Applications of image segmentation. Line Detection - Curve Detection - Edge Linking And Boundary Extraction, Boundary Representation, Region Representation And

		Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis
9,10	**17-03-2022 (AN)**	**5.FEATURE EXTRACTION** First and second order edge detection operators, Phase congruency, Localized feature extraction -detecting image curvature, shape features, Hough transform, shape skeletonization, Boundary descriptors, Moments, Texture descriptors-Autocorrelation, Co-occurrence features, Runlength features, Fractal model based features, Gabor filter, wavelet features.
11,12	**17-03-2022 (AN)**	**6.Image restoration and construction** Image Restoration: Image Observation And Degradation Model, Circulant And Block Circulant Matrices and Its Application In Degradation Model - Algebraic Approach to Restoration- Inverse By Wiener Filtering - Generalized Inverse-SVD And Interactive Methods - Blind Deconvolution-Image Reconstruction From Projections
13,14	**17-03-2022 (AN) 18-03-2022 (FN)**	**7.Image compression** Image Compression: Redundancy And Compression Models -Loss Less And Lossy. Loss Less- Variable-Length, Huffman, Arithmetic Coding - Bit-Plane Coding, Loss Less Predictive Coding, Lossy Transform (DCT) Based Coding, JPEG Standard - Sub Band Coding.
15,16	**18-03-2022 (FN)**	**8.Image Segmentation** Edge Detection - Line Detection - Curve Detection - Edge Linking And Boundary Extraction, Boundary Representation, Region Representation And Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis.
17,18	**18-03-2022 (FN) 18-03-2022 (AN)**	**9.REGISTRATION** Registration - Preprocessing, Feature selection - points, lines, regions and templates Feature correspondence - Point pattern matching, Line matching, Region matching, Template matching.Transformation functions - Similarity transformation and Affine Transformation. Resampling – NearestNeighbour and Cubic Splines.
19,20	**18-03-2022 (AN)**	**10.. IMAGE FUSION** Image Fusion - Overview of image fusion, pixel fusion, wavelet based fusion -region based fusion.
21,22	**18-03-2022 (AN)**	**11.. Image compression & segmentation** Image Compression:Redundancy And Compression Models -Loss Less And Lossy. Loss

		Less- Variable-Length, Huffman, Arithmetic Coding - Bit-Plane Coding, Loss Less Predictive Coding, Lossy Transform (DCT) Based Coding, JPEG Standard - Sub Band Coding. Image Segmentation: Edge Detection - Line Detection - Curve Detection - Edge Linking And Boundary Extraction, Boundary Representation, Region RepresentationAnd Segmentation, Morphology-Dilation, Erosion, Opening And Closing. Hit And Miss Algorithms Feature Analysis.
	18-03-2022 (AN) 24-03-2022 (FN)	**12.Color** Color Image-Processing Fundamentals, RGB Models, HSI Models, Relationship Between Different Models
25,26	**24-03-2022 (FN)**	**13. Multispectral image processing** Multispectral Image Analysis - Color Image Processing Three Dimensional Image Processing-Computerized Axial Tomography-Stereometry-Stereoscopic Image Display-Shaded Surface Display.
27,28	**24-03-2022 (FN) 25-03-2022 (AN)**	14.**3D Image Visualization** Sources of 3D Data sets, Slicing the Data set, Arbitrary section planes, The use of color, Volumetric display, Stereo Viewing, Ray tracing, Reflection, Surfaces, Multiple connected surfaces, Image processing in 3D, Measurements on 3D images.
29,30	**25-03-2022 (AN)**	**15.Image Quality** Natural scene statistics, quality assessment based on structural and statistical approaches, blind quality assessment

COURSE COORDINATOR **HEAD OF THE DEPARTMENT**

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CERTIFICATE COURSE ON IMAGE PROCESSING FEATURES AND SEGMENTATION

Date of Introduction of the Course: 17.03.2022

School of Computing
Registered Students Name List

S.NO	REG.NO	NAME OF THE STUDENT
1	U14CS111	NAGINENI SRIKANTH CHOWDARY
2	U14CS112	NAGIREDDY MOHAN KRISHNA REDDY
3	U14CS113	NALLAJARLA CHAKRADHAR
4	U14CS114	NANDALA SWETHA
5	U14CS115	NANDIPALLI MOUNICA
6	U14CS116	NAYANA.P. BALA CHANDRAN
7	U14CS117	NEERAJAN SAHA
8	U14CS118	NETHI MUKESH
9	U14CS120	NIRUPAMA CHAKRABORTY .S
10	U14CS121	NITISH SINGH CHAUHAN
11	U14CS122	NITYANAND BHARDWAJ
12	U14CS123	PANKAJ SARKAR
13	U14CS124	PARVATHA NIRANJAN REDDY
14	U14CS126	PAYAL SINGH
15	U14CS127	PELVIN CHRISTY
16	U14CS128	PENAGALAPATI MARUTHI RAO
17	U14CS129	PIYALI CHAKRABORTHY.M
18	U14CS130	POOJA KUMARI
19	U14CS131	PRAGYA ADITI
20	U14CS132	PRASHANTH.B
21	U14CS166	SHAFAN HASIM.N
22	U14CS167	SHAIK AATIKA
23	U14CS168	SHAIK MEERA SHARIF
24	U14CS169	SHAIK YASMIN

25	U14CS170	SHANKAR KUMAR GUPTA
26	U14CS171	SHARSHI KANT PRASAD
27	U14CS172	SHASHI BHUSHAN BHAGAT
28	U14CS173	SHEKH ADNAN NIYARIYA
29	U14CS174	SHIVANI GUPTA.M
30	U14CS175	SHUBHAM
31	U14CS176	SIREESHA.M
32	U14CS178	SK MD TAUQEER
33	U14CS179	SNEHA ROY
34	U14CS180	SABUJ BARMAN
35	U14CS181	SOURABH PRIYADARSHI
36	U14CS182	SRI DHARSHINI .P
37	U14CS183	SULEKHA KUMARI
38	U14CS184	SUNITA.S
39	U14CS185	SURENDAR.K
40	U14CS186	SURIYA.A.
41	U14CS187	SURYA.A
42	U14CS188	SUSINDHAR .P
43	U14CS190	SWEETY SHIMAL
44	U14CS192	THARIGOPULA LOKESH
45	U14CS193	THEJA.T

COURSE COORDINATOR

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CERTIFICATE OF PARTICIPATION

This certificate is presented to

Pooja kumari

For actively participating in the value added course **"IMAGE PROCESSING FEATURES AND SEGMENTATION**

Conducted by School of Computing, BIHER from 17.03.2022 to 25.03.2022

COURSE COORDINATORS

HEAD OF THE DEPARTMENT

DIRECTOR

COURSE FEEDBACK FORM

Academic Year		2022					
Term		Even					
Course Number							
Course Title		IMAGE PROCESSING, FEATURES & SEGMENTATION					
Number of Credits							
Type of Course	Regular		Elective		Add-on	✓	

I. Information on the Respondent: (Tick (√) Appropriately)

1. **Percentage of classes attended**

0-20		20-40		40-60		60-80	✓	80-100	

2. **Number of hours per week spent on the course (Other than lecture hours)**

0-2		2-4		4-6		6-8		8-10	

3. **Preparation for the course by the student:**

(i)	Have done part of this course earlier	No
(ii)	Has adequate prior exposure to the prerequisites	NO
(iii)	Had to pickup relevant additional topics through concurrent study	yes
(iv)	Have no exposure to the background material	NO

4. **The expectations for taking the course by the student are:**

(a)	Enhance by skill base in the area of specializations	yes
(b)	Get exposed to a relevant subject	yes
(c)	Curiosity	yes
(d)	Better Employment Opportunity	yes
(e)	Complete Course requirements	yes
(f)	To Improve CGPA	

About the Instructor: Information on the Respondent: (Tick (√) Appropriately)

		A	B	C	D	E
1.	Pace of the Teaching/lecture	✓				
2.	Comment of the Subject	✓				
3.	Clarity of expression	✓				
4.	Level of preparation		✓			
5.	Level of interaction	✓				
6.	Accessibility outside the class		✓			
7.	Others (please specify					

A: Excellent		B: Very Good		C: Good		D: Satisfactory		E: Poor	

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COURSE FEEDBACK FORM

Academic Year		2022					
Term		Even					
Course Number							
Course Title		IMAGE PROCESSING, FEATURES & SEGMENTATION					
Number of Credits							
Type of Course	Regular		Elective		Add-on	✓	

I. Information on the Respondent: (Tick (√) Appropriately)

1. **Percentage of classes attended**

0-20		20-40		40-60		60-80	✓	80-100	

2. **Number of hours per week spent on the course (Other than lecture hours)**

0-2		2-4		4-6		6-8	✓	8-10	

3. **Preparation for the course by the student:**

(i)	Have done part of this course earlier	No
(ii)	Has adequate prior exposure to the prerequisites	NO
(iii)	Had to pickup relevant additional topics through concurrent study	yes
(iv)	Have no exposure to the background material	NO

4. **The expectations for taking the course by the student are:**

(a)	Enhance by skill base in the area of specializations	yes
(b)	Get exposed to a relevant subject	yes
(c)	Curiosity	yes
(d)	Better Employment Opportunity	yes
(e)	Complete Course requirements	yes
(f)	To Improve CGPA	yes

About the Instructor: Information on the Respondent: (Tick (√) Appropriately)

		A	B	C	D	E
1.	Pace of the Teaching/lecture	✓				
2.	Comment of the Subject	✓				
3.	Clarity of expression	✓				
4.	Level of preparation		✓			
5.	Level of interaction	✓				
6.	Accessibility outside the class		✓			
7.	Others (please specify					

A: Excellent		B: Very Good		C: Good		D: Satisfactory		E: Poor	

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CERTIFICATE COURSE ON IMAGE PROCESSING FEATURES AND SEGMENTATION

Date of Introduction of the Course: 14.03.2022

School of Computing

COURSE CO ORDINATOR

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