NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE PLAN – PART I			
Course Title	DIGITAL IMAGE PROCESSING		
Course Code	ECOE17	No. of Credits	3
Department	ECE	Faculty	Dr. S. Deivalakshmi
Pre-requisites Course Code	NONE		
Course Coordinator(s) (if, applicable)	-		
Other Course Teacher(s)/Tutor(s) E-mail	Research scholar/ Temporary Faculty	Telephone No.	deiva@nitt.edu 0431-2503321
Course Type	PE & OE		

Syllabus (approved in BoS)

Yes, Approved in the BoS-2018-2019.

COURSEOBJECTIVE

• To treat the 2D systems as an extension of 1D system design and discuss techniques specific to 2D systems

COURSE OUTCOMES (CO)

COURSE OUTCOMES	Aligned Programme Outcomes (PO)
At the end of the course students will be able to CO1: analyze the need for image transforms, types and their properties.	PO 1,2,3
CO2: become skilled at different techniques employed for the enhancement of images both in spatial and frequency domain.	PO 1,2,3
CO3: Explore causes for image degradation and to teach various restoration Techniques.	PO 1,2,3
CO4: evaluate the image compression techniques in spatial and frequency domain.	PO 1,2,3
CO5: gain knowledge of feature extraction techniques for image analysis and recognition.	PO 1,2,3

COURSE PLAN – PART II

COURSE OVERVIEW

To learn and understand the fundamentals of digital image processing, various image Transforms, Image Enhancement Techniques, Image restoration Techniques, image compression and Segmentation Techniques.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
I	**1WEEK** 22nd to 26th July (4 contact hours)	Linearity and space-invariance. PSF, Discrete images and image transforms.	Lecture C & T
2	**2 WEEK** 29th July to 2nd August (4 contact hours)	2-D sampling and reconstruction, Image quantization.	Lecture C & T
3	**3 WEEK** 5th to 9th August (4 contact hours)	2-D transforms and properties	Lecture C & T
4	**4 WEEK** 12th to 16th August (4 contact hours)	Image enhancement-Histogram modelling, equalization and modification.	Lecture C & T
5	**5 WEEK** 19th to 23rd August (4 contact hours)	Image smoothing, Image crispening. Spatial filtering, Replication and zooming.	Lecture C & T
6	**6 WEEK** 26th to 30th August (4 contact hours)	Generalized cepstrum and Homomorphic filtering.	Lecture C & T
		Assessment 1-20 Marks	**Written Test (Descriptive)**
7	**7 WEEK** 2nd to 6th September (4 contact hours)	Image restoration-image observation models.	Lecture C & T
8	**8 WEEK** 27th to 31th August (4 contact hours)	Inverse and Wiener filtering. Filtering using image transforms. Constrained least-square restoration.	Lecture C & T
9	**9 WEEK** 9th to 13thSeptember (4 contact hours)		Lecture C & T
10	**10 WEEK** 16th to 20thSeptember (4 contact hours)	Generalized inverse, SVD and interactive methods.	Lecture C & T
11	**11 WEEK** 23rd to 27th September (4 contact hours)	Recursive filtering. Maximum entropy restoration. Bayesian methods	Lecture C & T
		Assessment II-10 Marks	**Assignment**

12	12 WEEK 30th Sep to 4th October (4 contact hours)	Image data compression -sub sampling, Coarse quantization and frame repetition. Pixel coding -PCM, entropy coding, runlength coding Bit-plane coding.	Lecture C & T
13	13 WEEK 7th to 11th October (4 contact hours)	Predictive coding. Transform coding of images. Hybrid coding and vector DPCM. Interframe hybrid coding.	Lecture C & T
		Assessment III-20 Marks	Written Test (Descriptive)
14	14 WEEK 14th to 18th October (4 contact hours)	Image analysis-applications, Spatial and transform features. Edge detection, boundary extraction, AR models and region representation.	Lecture C & T
15	15 WEEK 21st Oct to 7th November (8 contact hours)	Moments as features. Image Structure. Morphological operations and transforms. Texture. Scene matching and detection. Segmentation and classification.	Lecture C & T
	END SEMESTER EXAMINATION- 50 Marks		Written Test (Descriptive)

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1 Descriptive Type Examination (Unit 1 & 2)	4th WEEK of August	60 minutes	20
2	Assessment II Assignment (Unit 1, 2 & 3)	3rd WEEK of September	-	10
3	Assessment III Descriptive Type Examination (Unit 3 & 4)	2nd WEEK of October	60 minutes	20
4	Compensation Assessment Descriptive Type Examination (Unit 1,2, 3 & 4)	3rd WEEK of October	60 minutes	Please refer course policy for more details
5	END SEMESTER Descriptive Type Examination (Unit 1,2, 3, 4 & 5)	Middle of November	180 minutes	50

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

TextBooks

1.A.K. Jain, "Fundamentals of Digital Image Processing", PHI,1995
2. R.C.Gonzalez& R.E. Woods," Digital Image Processing", (2/e), Pearson,2002.

ReferenceBooks
1. J.C. Russ, "The Image Processing Handbook", (5/e), CRC,2006.
2.E.S. Gopi,"Digital Image processing using Matlab", Scitechpublications,2006
3.Recent literatures in Digital Image processing

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. The students through class representative may give their feedback at any time which will be duly addressed.
2. Feedback from the students through MIS and class committee meetings.

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)
CORRESPONDENCE

All the students are advised to come to the class regularly. All the correspondence (schedule of classes/ schedule of assignment/ course material/ any other information regarding this course) will be intimated in the class only.

COMPENSATION ASSESSMENT POLICY

If any student who fails to attend assessment 1 or assesment 2 due to any **genuine reasons,** student is permitted to attend **compensation assessment** for the weightage of 20 % (Including assessment I & assessment 2 Portions)

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

➤ **At least 75% attendance in each course is mandatory.**

➤ **A maximum of 10% shall be allowed under On Duty (OD) category.**

➤ Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ASSESSMENT
1. Attending **all the assessments are mandatory** for every student.
2. Finally every student is expected to score minimum 1/3 rd of the top rank holder (or ½ of class average) of the class (including all assessments) to pass the course. Otherwise student would be declared fail and 'F' grade will be awarded. Further he can take up only FORMATIVE ASSESSMENT.
3. Please refer to B.Tech Regulations 2015 for the letter grades and corresponding grades.

ACADEMIC DISHONESTY & PLAGIARISM

- ➤ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

- ➤ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

- ➤ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.THE STUDENTS ARE EXPECTED TO FOLLOW INSTITUTE RULES.

ADDITIONAL COURSE INFORMATION

The faculty is available for consultation at times as per the intimation given by the faculty

FOR SENATE'S CONSIDERATION

Course Faculty _____ CC-Chairperson _____ HOD _____