

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Electronics and Computer Engineering**

1. Subject Code: **EC - 202** Course Title: **Signals and Systems**

2. Contact Hours: **L: 3 T: 1 P: 0**

3. Examination Duration (Hrs.): **Theory**

0	3
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Practical

0	0
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4. Relative Weight: **CWS**

25

PRS

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MTE

25

ETE

50

PRE

00

5. Credits:

0	4
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 6. Semester

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Autumn Spring Both

7. Pre-requisite: **MA - 102**

8. Subject Area: **DCC**

9. Objective: To provide a thorough understanding of the fundamentals of signals and systems required in the study of signal processing, communication systems and control systems.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	Classification and representation of signals and systems, examples; Impulse response and step response of a system.	6
2.	Review of Fourier series and its exponential representation; Review of Fourier transform and its properties, relationship between Fourier transform and Fourier series; Generalized Fourier transform; Amplitude and phase spectra, energy and power spectral density, signal bandwidth.	6
3.	Relationship of Laplace and Fourier transforms; Transfer function and its block diagram representation, convolution integral and the Fourier transfer function; System properties, linearity and time invariance, bandwidth.	6
4.	Review of z-transform and its properties, geometric evaluation of Fourier transform from pole-zero plot; Discrete time Fourier transform and its properties; Discrete convolution and duality; Discrete Fourier transform and its properties; Computation of discrete time Fourier transform and discrete Fourier transform, approximation of Fourier transform and discrete convolution using discrete Fourier transform.	10
5.	Difference equation, impulse response, convolution sum and transfer function representation of discrete time linear time invariant systems; Transform analysis and networks structures for discrete-time systems.	8

6.	Distortionless transmission, ideal and non-ideal filters, Butterworth and Chebyshev filters; Time and frequency domain analysis of continuous time LTI systems.	6
Total		42

11. Suggested Books:

Sl. No.	Name of Books / Authors	Year of Publication
1.	Oppenheim, A.V., Willsky, A.S. and Nawab, S.H., "Signals & Systems", 2 nd Ed., Prentice-Hall of India.	1997
2.	Haykin, S. and Van Been, B., "Signals and Systems" 2 nd Ed., John Wiley & Sons.	2003
3.	Roberts, M.J., "Fundamentals of Signals & Systems", Tata McGraw-Hill.	2007
4.	Ziemer, R.E., Tranter, W.H. and Fannin, D.R., "Signals and Systems: Continuous and Discrete", 4 th Ed., Pearson Education.	2001
5.	Lathi, B. P., "Linear Systems and Signals", 2 nd Ed., Oxford University Press.	2006