PVP-19

SOFTWARE DEFINED RADIO

Course Code	19EC4602E	**Year**	III	**Semester**	II
Course Category	**Programme Elective-III**	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Basic knowledge of Signal processing and communication
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Understandrequirements, benefits and different models for Software Defined Radio.
CO2	Understand in detail about Software Defined Radio Architecture for performance optimization.
CO3	Acquire complete knowledge regarding functioning of different blocks associated with Software Defined Radio.
CO4	Design circuits at different multirate signalling technique for frequency conversion and sampling issues.

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												2
CO2	3	3	3	3	3	2						1		2
CO3	3	3	3	3	3	2						1		2
CO4	3	3	3	3	3	2						1		2
Average* (Rounded to nearest integer)	3	3	3	3	3	2						1		2

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Introduction**: The requirement for software defined radio, the benefits of multi-standard terminals, operational requirements, business models for software defined radio, new base station and network architectures, smart antenna systems.	CO1
II	**Basic Architecture of a Software Defined Radio**: Software defined radio architectures; Ideal Software defined radio architectures, Required hardware specifications, Digital aspects of a Software Defined radio, Current technology limitations.	CO2

III	**Flexible RF receiver architectures**: Receiver architecture options, implementation of a digital receiver: frequency up conversion using under sampling, achieving processing gain using oversampling, Noise figure, Receiver sensitivity, ADC spurious signals.	CO3
IV	**Multi-Band and General Coverage Systems**: Multiband Flexible receiver design, The problem of the Diplexer, Achieving Image rejection, Dynamic range enhancement, feedback and feed forward techniques	CO3, CO4
V	**Flexible transmitters and Power amplifiers**: Analog quadrature up conversion, quadrature up conversion with interpolation, Interpolated band pass up conversion, PLL based transmitters, Active All-pass filter, Use of high pass and low pass filters, Polyphase filtering.	CO3, CO4

Learning Resources
Text Books
1. P Kenington, "RF and Baseband Techniques for Software Defined Radio", Artec House,2005
Reference Books
1. Jouko Vanakka, "Digital Synthesizers and Transmitter for Software Radio", Springer,2005 2. Wally H. W. Tuttlebee, "Software Defined Radio: Baseband Technologies for 3G Handsets and Base stations", John Wiley & sons, 2003.
e-Resources: 1. https://en.wikipedia.org/wiki/Software-defined_radio 2. https://www.wiley.com/en- 3. us/Software+Defined+Radio%3A+Architectures%2C+Systems+and+Functions-p-9780470851647
