SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2022-2023

(Bachelor of Science) (B.Sc. (Electronics & Communication))
(B.Sc.) (Electronics & Communication) Semester (IVth)

Course Code	US04CELC51	Title of the Course	Electromagnetics
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand the vector algebra and about electric field intensities and various Potentials

Course Content		
Unit	Description	Weightage* (%)
1.	**Vector Analysis:** Vector Analysis Vector algebra, dot product, cross product, differentiation of vectors, velocity & acceleration, gradient, divergence, curl & their application, Integration of vector, line integral.	25%
2.	**Coulomb law and Electric field intensity:** Coulomb's Law and Electric Field Intensity The experimental law of coulomb, electric field intensity, field due to continuous volume charge distribution, filed of a line charge, field of a sheet of charge.	25%
3.	**Electric flux density, Gauss Law and its applications:** Electric flux Density, Gauss's Law& Divergence Electric Flux density, Gauss's law, application of Gauss's law: for symmetrical charge distribution and differential volume element, Divergence, Maxwell's First Equation, Vector operator and Divergence theorem	25%
4.	**Energy and Potential:** Energy and Potential Energy expanded in moving a point charge in an electric field, line integral, definition of potential difference and potential, the potential field of a system of a charges, conservative property, dipole, energy density in the electrostatic field.	25%

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%

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2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	After studying this syllabus students will learn vectors analysis such as dot product, cross product, differentiation of vectors, velocity & acceleration, gradient, divergence, curl & their application, Integration of vector.
2.	With the background of Vector algebra, they will learn Coulomb's Law and Electric Field Intensity, the experimental law of coulomb, electric field intensity, field due to continuous volume charge distribution, filed of a line charge and field of a sheet of charge.
3.	This knowledge will be further enhanced by learning Electric flux Density, Gauss's Law& Divergence Electric Flux density, Gauss's law, application of Gauss's law: for symmetrical charge distribution and differential volume element, Divergence, Maxwell's First Equation, Vector operator and Divergence theorem which are important for learning electromagnetism.
4.	Student will be also exposed to other fundamental topics such as Energy and Potential Energy expanded in moving a point charge in an electric field, line integral, definition of potential difference and potential, the potential field of a system of a charges, conservative property, dipole, energy density in the electrostatic field.

Suggested References:	
Sr. No.	References
1.	Engineering Electromagnetics: W.H.Hayt & J.A.Buck.
2.	Theory & Problems of Electromagnetics: Joseph A.Edminister.

On-line resources to be used if available as reference material
On-line Resources

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(Bachelor of Science) (B.Sc. (Electronics & Communication))

(B.Sc.) (Electronics & Communication) Semester (4th)

Course Code	US04CELC52	Title of the Course	RADIO AND TELEVISION SYSTEM
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	The course is to make the students understand the Radio and Television system and various components involved different types of Radio transmitters and Receivers , B/W T.V.Receiver &camera tubes.

Course Content		
Unit	Description	Weightage* (%)
1.	**Radio Transmitters and Receivers:** Classification of Transmitters (According to type of Modulation, Service involved and Carrier frequency), Constituent stages of the AM Radio Transmitter, Constituent stage of the AM Transmitter (high and low power levels), Classification of Radio Receivers, Salient Features of Radio Receivers, Basic functions of Radio Receiver, Straight Receivers, Principle of Super Heterodyne Radio Receiver, Constituent of Super Heterodyne Radio Receiver.	25%
2.	**Radio Receiver Circuits:** RF Amplifier, Frequency Mixer, Local Oscillator, IF amplifier, Detector stage, Simple Automatic Gain Control, Automatic Frequency Control.	25%
3.	**Principle of Television:** Introduction, Aspect Ratio, Rectangular switching, Interlaced Scanning, Composite Video Signal, Video modulation, Sound modulation, Camera Tube Characteristics, Image Orthicon camera tube, Vidicon camera tube, video processing unit.	25%
4.	**Television Receiver:** Block diagram of B/W television receiver, RF Tuner, RF Tuner Circuits, Balun, IF Traps, RF Amplifier, Frequency Mixer, Local	25%

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	Oscillator ,Fault finding of B/W T V RECEIVER.	

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Helps to understand the concept of the Radio and Television system
2.	Make students understand various issue related to radio receiver and transmitter such as tunning , alignment and fault finding of radio receiver.and also T.V. receiver fault finding/ troubleshooting.

Suggested References:	
Sr. No.	References
1.	Radio Engineering .(Applied Electronics Vol -2) by G.K.Mitthal
2.	Electronics Communication by Danis Roddy and Jhon Coolen.
3.	Electronics Communication Systems by Kennedy.
4	Mono Chrome and Colour Television by R.R.Gulati.

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On-line resources to be used if available as reference material	
On-line Resources	

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(Bachelor of Science) B.Sc. (Electronics & Communication)

(B.Sc.) (Electronics & Communication) Semester (4ᵗʰ)

Course Code	US04CELC53	Title of the Course	PRACTICAL
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	Students will learn the basics of Vector analysis and Electrodynamic principles through various examples.

Course Content		
Unit	Description	Weightage* (%)
1.	Examples related Cross product and Dot product of Vector Algebra	10%
2.	Examples related Differentiation of Vector	10%
3.	Examples related on velocity and acceleration	10%
4.	Examples related Gradient, Divergence and Curl	10%
5.	Examples related on Coulomb's law	10%
6.	Examples related Electric field intensity	10%
7.	Examples related Electric Flux Density	10%
8.	Examples related on relation between D and E	10%
9.	Examples related to work	10%
10.	Examples related on potential	10%

Other experiments based on syllabus

Teaching-Learning Methodology	Online and Board work

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%

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2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	The practical course helps the students to understand vectors analysis such as dot product, cross product, differentiation of vectors, velocity & acceleration, gradient, divergence, curl & their application, Integration of vector.

Suggested References:	
Sr. No.	References
1.	Engineering Electromagnetics: W.H.Hayt & J.A.Buck.

On-line resources to be used if available as reference material
On-line Resources

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