



SCHEME AND SYLLABUS - B.E. COMPUTER ENGINEERING



Bias Stabilization: Need for stabilization, fixed bias, emitter bias, self bias, bias stability with respect to variation in I_{CO} , V_{BE} & β , Stabilization factors, thermal stability.

SUGGESTED READINGS

- (1) Vincent Del Toro , “Electrical Engineering Fundamentals,”
- (2) Basic Electrical Engineering: Mittle and Mittal, TMH
- (3) Electronic Devices and Circuit Theory: Boylestad and Nashelsky, 10th Edition, Pearson.
- (4) Microelectronics: Millman & Grabel. TMH.

Course Code	Type	Subject	L	T	P	Credits	CA	MS	ES	CA	ES	Pre-Requisites
FC004	FC	Physics	3	0	2	4	15	15	40	15	15	None

COURSE OUTCOMES

1. Knowing important concepts and phenomena linked to relativity, waves and oscillations and be able to do analytical and numerical calculations for faithful measurements, observations and gravitational wave communications.
2. The course is helpful to the students in understanding various optical wave phenomena which are required for optical & electromagnetic wave communications and in optical devices.
3. Concepts of Laser and Optical Fiber for modern developments in physics which are helpful in designing and developing new devices used in optical communications, medicine, environment, industries and related physics.

COURSE CONTENT

Relativity: Special Relativity, Lorentz Transformations, Velocity addition, Time dilation, Length Contraction, Variation of mass with velocity, Mass and energy,



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Relativistic momentum and relativistic energy, General theory of relativity, Einstein's theory of Gravitation, Gravitational waves, Gravity and Light.

Oscillations and Waves: Damped and forced oscillations, Sharpness of resonance, Q-factor, Application in resonance, Acoustic waves, Pressure wave equations, Intensity pressure relation, Acoustic impedance, Reflection and transmission of acoustic waves, Impedance matching; Ultrasonics and its applications.

Optics: Interference: Interference due to thin films, Newton's rings, and determination of the wavelength of sodium light, Interference due to wedge shaped film. Diffraction: Fraunhofer diffraction due to single slit and N Slits, Plane transmission grating, Rayleigh criterion of resolution, Resolving power of a grating, Polarization: Polarization in light, Birefringence, Nicol prism, Quarter and half wave plates, Production and analysis of plane, Circularly and elliptically polarized light, Optical rotation, specific rotation, Polarimeter.

Quantum Theory of Light : Hertz's Experiments- Light as an Electromagnetic Wave, Blackbody radiation, Light Quantization, Compton Effect , X-rays.

LASERS : Absorption and emission of radiation, Main features of a laser, Spatial and temporal coherence, Einstein Coefficients, condition for light amplification, Basic requirement for Laser, Population Inversion - Threshold Condition, Line shape function , Optical Resonators , Three level and four level systems. Classification of Lasers: Solid State Laser-Ruby laser and Gas Laser- He-Ne laser (Principle, Construction and working), Optical properties of semiconductor, Semiconductor laser (Principle, Construction and working), Applications of lasers in the field of medicine, Industry, Environment and Communication.

Fibre Optics : Need for fiber Optic Communication, Physical nature of Optical fiber, Theory of Light propagation in optical fiber, Acceptance angle and numerical aperture, Step index and graded index fibers, Single mode and multimode fibers, Losses in optical fiber, Optical Fiber cables and bundles, Dispersion in optical fibers: Intermodal and Intramodal dispersion.

Term work Experiments: Any ten experiments based on the theory course or related subject as above. For examples : Wavelength by diffraction grating, Newton's rings experiments and bi-prism assembly, resolving power of a Telescope, Nodal-Slide assembly , specific rotation of cane sugar by Polarimeter, dispersive power of Prism, Wavelength of He-Ne laser by diffraction, refractive index for O-ray and E-ray, Brewster's law, Ultrasonic interferometer, numerical aperture of an optical fibre, other experiments based on LASER and optical fiber.



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SUGGESTED READINGS

1. Arthur Beiser, Shobhit Mahajan, "Concepts of Modern Physics," McGraw Hill
2. Serway, Moses, Moyer, "Modern Physics," Cengage Learning
3. S Chand & co., "Mechanics", D S Mathur
4. Jenkins and White, "Fundamentals of Optics", McGraw Hill
5. N. Subramaniam and Brij Lal (S Chand), "A Text Book of Optics"
6. Indu Prakash, "A Text Book of Practical Physics, Volume-1", Kitab Mahal Publication.

Course Code	Type	Subject	L	T	P	Credits	CA	MS	ES	CA	ES	Pre-requisites
FC005	FC	English-I	2	0	0	2	25	25	50	-	-	None

COURSE OUTCOMES

1. The course will focus on the four integral skills of language, improving the proficiency levels in all of them and to learn to use language as a tool for effective communication.
2. This course will widen the understanding of the learners in all genres of literature (short stories, poetry, autobiographies..) with the help of expository pieces .
3. The course will strive to equip the learner with the ability to express oneself and be understood by others with clarity and precision, in both written and spoken forms.
4. This course will encourage creative use of language through translation, paraphrasing and paragraph writing.
5. Along with the above, the course will also build confidence and encourage the students to use a standard spoken form of English in order to prepare them to face job interviews, workplace and in higher studies.

COURSE CONTENT

1. Practice in dictation, punctuation and spellings, listening and reading comprehension.
2. Practice with well formed sentences with stress on remedial grammar.