SRR & CVR GOVT. DEGREE COLLEGE
(Autonomous)
PHONE NO : 9848732916
NAAC : B+ (III Cycle with CGPA : 2.60) - Estd: 1937
ISO 9001 - 2015 Certified
Institution is ranked by NIRF 101 -150 band at NIRF - 2020
WEBSITE : www.srrcvr.ac.in
EMAIL : srrandcvr@gmail.com

BOARD OF STUDIES

UNDERGRADUATE

Annual Year 2020-21

COURSE CODE :301,302,303

Minutes of Meeting &
Curriculum

PHYSICS & ELECTRONICS

SRR&CVR GOVT DEGREE COLLEGE (A)

VIJAYAWADA-4

DEPT OF PHYSICS & ELECTRONICS

BOS RESOLUTIONS

IN

PHYSICS

2020-2021

SRR & CVR GOVT. DEGREE COLLEGE (Autonomous)

Machavaram, VIJAYAWADA – 4, Krishna Dist, A. P.

Minutes of the meeting of the Upgradation of Syllabus U. G. (B.O.S.) in the Subject of Physics

A. Y.: 2020- 2021

The meeting of the Upgradation of Syllabus (B O S) in the subject of Physics , Electronics, solar energy and electrical appliances was held on 26 - 11 - 2020 , SRR & CVR Govt. Degree College (Autonomous), Vijayawada- 520004.

The following members attended the meeting: (Offline / Online / Blended)

1. Smt.P.Sailaja	(In-charge of the Dept& Chairperson, BOS)
2. Dr. Sandhya Cole	(University Nominee)
3. B.Nagamani	(Subject Expert)
4. Dr. R.kameswari	(Faculty Member)
5. Dr.K.Sujatha	(Faculty Member)
6 .Md.I.Pasha	(Faculty Member)
7. T.V.Rambabu	(Faculty Member)
8. T.V..V.Priya	(Faculty Member)

Agenda :

1. Approval of the i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters I and II of Physics
2. Approval of the duration of the Examination for 3 hours.
3. Approval of the stipulated Credits, Work Load, Internal Marks breakup etc...
4. Approval of Online Examination pattern in case COVID 19 doesn't subside at the time of Examinations (MCQs Pattern).

The Chairperson welcomed the members and had discussion on the Agenda. He / She apprised the members of the guidelines of the UGC, APSCHE, Krishna University and the CCE regarding the framing of Syllabus, etc., and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

The members of BOS Meeting Resolved:

1. To approve the syllabus for Semesters I, II, (APSCHE's Syllabus, for the announced Subjects and the modified Syllabus for Other Subjects) Physics.

   Sem III Details: .Syllabus approved in BOS 2019-2020 will be followed.

   Sem V Details: Syllabus approved in BOS 2019-2020 will be followed. (Due to COVID - 19 consequences, as per the Staff Council Resolutions, II Sem is also included along with the I Semester. Please include the details of BOS of III and V Semesters above, if any).

2. To approve the i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters I &II

3. To approve the validity of this Syllabus for next 2 years.

4. To follow Autonomous pattern of Total 100 marks as: i. Theory of 60 Marks, and ii. Internal Assessment of 40 marks.

5. To follow the Practicals components' Structure as resolved by the Science groups and other groups.

6. To follow Internal Assessment of 40 Marks Uniform pattern breakup resolved by the Autonomous Body / Committee.

7. ***meet.google.com/wtu-wywi-wtk date : 26-11-2020, time: 3-5 pm***

Details of Members attended:

S No	Name, Designation	Status of the Expert	Offline / Online/ Blended
1	P.Sailaja	In-charge of the Dept& Chairperson, BOS	offline
2	Dr. Sandhya cole	University Nominee	online
3	B.Nagamani	Subject Expert	offline
4	Dr. R. Kameswari	Faculty Member	offline
5	Dr. K.Sujatha	Faculty Member	offline
6	Md. I. Pasha	Faculty Member	offline
7	T.V.Rambabu	Faculty Member	offline
8	T.V.V. Priya	Faculty Member	offline

9 : To approve the stipulated Credits, Work Load, Internal Marks breakup etc.,.

10: To approve Online Examination pattern in case COVID 19 doesn't subside at the time of Examinations (MCQs Pattern).

11. Any other Resolutions, with the approval of the Chair:

i. BOS members resolved to make changes in physics/ electronics syllabus Sem I & Sem II according to affiliating university.

ii. Resolved to conduct at least 2 experiments be performed through virtual labs .

12. To approve valid inclusion (attached in syllabus) in B O S, with the permission of the Principal and Controller of Examinations (C O E).

Note:

1. Copies of i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters are enclosed.
2. Above Resolutions have to be Recorded / Documented in the Individual Departments B O S Meetings Register, with the counter signature of the Principal.
3. If the B O S Meeting is conducted online, the Recording of the Meeting is to be preserved in C D and has to be submitted to the College.

Signatures of the members of the BOS Meeting:

S No	Name & Designation	Status	Signature
1	P. Sailaja	In-charge of the Dept& Chairman, BOS	P. Sailaja
2	Dr. Sandhya cole	University Nominee	
3	B.Nagamani	Subject Expert	B Nagamani
4	Dr. R. Kameswari	Faculty Member	R Kameswari
5	Dr. K.Sujatha	Faculty Member	K. Sujatha
6	Md. I. Pasha	Faculty Member	
7	T.V.Rambabu	Faculty Member	
8	T.V.V. Priya	Faculty Member	

Counter signed by:

Principal

SRR & CVR Govt Degree College (A)

Vijayawada

PRINCIPAL (FAC)
SRR & CVR GOVT. DEGREE COLLEGE
(Autonomus)
Machavaram, VIJAYAWADA-520 004.

SRR&CVR GOVT DEGREE COLLEGE (A)

VIJAYAWADA-4

DEPT OF PHYSICS & ELECTRONICS

BOS RESOLUTIONS

IN

ELECTRONICS

2020-2021

SRR & CVR GOVT. DEGREE COLLEGE (Autonomous)

Machavaram, VIJAYAWADA – 4, Krishna Dist, A. P.

Minutes of the meeting of the Upgradation of Syllabus U. G. (B.O.S.) in the Subject of Electronics

A. Y.: 2020- 2021

The meeting of the Upgradation of Syllabus (B O S) in the subject of Physics , Electronics, solar energy and electrical appliances was held on 26 - 11 - 2020 , SRR & CVR Govt. Degree College (Autonomous), Vijayawada- 520004.

The following members attended the meeting: (Offline / Online / Blended)

1. Smt.P.Sailaja	(In-charge of the Dept& Chairperson, BOS)
2. Dr. Sandhya Cole	(University Nominee)
3. B.Nagamani	(Subject Expert)
4. Dr. R.kameswari	(Faculty Member)
5. Dr.K.Sujatha	(Faculty Member)
6 .Md.I.Pasha	(Faculty Member)
7. T.V.Rambabu	(Faculty Member)
8. T.V..V.Priya	(Faculty Member)

Agenda :

1. Approval of the i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters I and II of Electronics
2. Approval of the duration of the Examination for 3 hours.
3. Approval of the stipulated Credits, Work Load, Internal Marks breakup etc...
4. Approval of Online Examination pattern in case COVID 19 doesn't subside at the time of Examinations (MCQs Pattern).

The Chairperson welcomed the members and had discussion on the Agenda. He / She apprised the members of the guidelines of the UGC, APSCHE, Krishna University and the CCE regarding the framing of Syllabus, etc., and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

The members of BOS Meeting Resolved:

1. To approve the syllabus for Semesters I, II, (APSCHE's Syllabus, for the announced Subjects and the modified Syllabus for Other Subjects) Electronics for the academic year 2020- 2021.

   Sem III Details: .Syllabus approved in BOS 2019-2020 will be followed.
   Sem V Details: Syllabus approved in BOS 2019-2020 will be followed.
   (Due to COVID - 19 consequences, as per the Staff Council Resolutions, II Sem is also included along with the I Semester. Please include the details of BOS of III and V Semesters above, if any).

2. To approve the i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters I &II
3. To approve the validity of this Syllabus for next 2 years.
4. : To follow Autonomous pattern of Total 100 marks as: i. Theory of 60 Marks, and ii. Internal Assessment of 40 marks.
5. To follow the Practicals components' Structure as resolved by the Science groups and other groups.
6. To follow Internal Assessment of 40 Marks Uniform pattern breakup resolved by the Autonomous Body / Committee.
7. ***meet.google.com/wtu-wywi-wtk date : 26-11-2020, time: 3-5 pm***

I. Details of Members attended:

S No	Name, Designation	Status of the Expert	Offline / Online/ Blended
1	P.Sailaja	In-charge of the Dept& Chairperson, BOS	offline
2	Dr. Sandhya cole	University Nominee	online
3	B.Nagamani	Subject Expert	offline
4	Dr. R. Kameswari	Faculty Member	offline
5	Dr. K.Sujatha	Faculty Member	offline
6	Md. I. Pasha	Faculty Member	offline
7	T.V.Rambabu	Faculty Member	offline
8	T.V.V. Priya	Faculty Member	offline

9 : To approve the stipulated Credits, Work Load, Internal Marks breakup etc.,.

10: To approve Online Examination pattern in case COVID 19 doesn't subside at the time of Examinations (MCQs Pattern).

11. Any other Resolutions, with the approval of the Chair:

i. BOS members resolved to make changes in electronics syllabus Sem I & Sem II according to affiliating university.

ii. Resolved to conduct at least 2 experiments be performed through virtual labs .

iii. Resolved to conduct certificate course in computer Hardware and Networking and in Electrical appliances.

12. To approve any other valid inclusion in B O S, with the permission of the Principal and Controller of Examinations (C O E).

Note:

1. Copies of i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters are enclosed.
2. Above Resolutions have to be Recorded / Documented in the Individual Departments B O S Meetings Register, with the counter signature of the Principal.
3. If the B O S Meeting is conducted online, the Recording of the Meeting is to be preserved in C D and has to be submitted to the College.

Signatures of the members of the BOS Meeting:

S No	Name & Designation	Status	Signature
1	P. Sailaja	In-charge of the Dept& Chairman, BOS	P. Sailaja
2	Dr. Sandhya cole	University Nominee	
3	B.Nagamani	Subject Expert	B Nagamani
4	Dr. R. Kameswari	Faculty Member	R Kameswari
5	Dr. K.Sujatha	Faculty Member	K. Sujatha
6	Md. I. Pasha	Faculty Member	
7	T.V.Rambabu	Faculty Member	
8	T.V.V. Priya	Faculty Member	

Counter signed by:

Principal

SRR & CVR Govt Degree College (A)

Vijayawada

PRINCIPAL (FAC)
SRR & CVR GOVT. DEGREE COLLEGE
(Autonomus)
Machavaram, VIJAYAWADA-520 004.

SRR&CVR GOVT DEGREE COLLEGE (A)

VIJAYAWADA-4

DEPT OF PHYSICS & ELECTRONICS

BOS RESOLUTIONS

IN

SKILL DEVELOPMENT COURSES

2020-2021

SRR & CVR GOVT. DEGREE COLLEGE (Autonomous)

Machavaram, VIJAYAWADA – 4, Krishna Dist, A. P.

Minutes of the meeting of the Upgradation of Syllabus U. G. (B.O.S.) in the Subject of Skill Development Coures

A. Y.: 2020- 2021

The meeting of the Upgradation of Syllabus (B O S) in the subject of Physics , Electronics, solar energy and electrical appliances was held on 26 - 11 - 2020 , SRR & CVR Govt. Degree College (Autonomous), Vijayawada- 520004.

The following members attended the meeting: (Offline / Online / Blended)

1. Smt.P.Sailaja	(In-charge of the Dept& Chairperson, BOS)
2. Dr. Sandhya Cole	(University Nominee)
3. B.Nagamani	(Subject Expert)
4. Dr. R.kameswari	(Faculty Member)
5. Dr.K.Sujatha	(Faculty Member)
6 .Md.I.Pasha	(Faculty Member)
7. T.V.Rambabu	(Faculty Member)
8. T.V..V.Priya	(Faculty Member)

Agenda :

1. Approval of the i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters I and II of skill development courses (Electrical appliances and Solar energy)
2. Approval of the duration of the Examination for 2 hours.
3. Approval of the stipulated Credits, Work Load, Internal Marks breakup etc...

4. Approval of Online Examination pattern in case COVID 19 doesn't subside at the time of Examinations (MCQs Pattern).

The Chairperson welcomed the members and had discussion on the Agenda. He / She apprised the members of the guidelines of the UGC, APSCHE, Krishna University and the CCE regarding the framing of Syllabus, etc., and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

The members of BOS Meeting Resolved:

1. To approve the syllabus for Semesters I, II, (APSCHE's Syllabus, for the announced Skill development courses for the academic year 2020- 2021.

   (Due to COVID - 19 consequences, as per the Staff Council Resolutions, II Se is also included along with the I Semester. Please include the details of BOS III and V Semesters above, if any).

2. To approve the i. Syllabus, ii. Model Question paper, iii. Blue Print and iv.

   Question Bank of the Semesters I &II

3. To approve the validity of this Syllabus for next 2 years.

4. :To follow Autonomous pattern of Total 50 marks.

5. To follow the Practicals components' Structure as resolved by the Science groups and other groups.

6. Online meeting link: meet.google.com/wtu-wywi-wtk date : 26-11-2020, time: 3-pm

Details of Members attended:

S No	Name, Designation	Status of the Expert	Offline / Online/ Blended
1	P.Sailaja	In-charge of the Dept& Chairperson, BOS	offline
2	Dr. Sandhya cole	University Nominee	online
3	B.Nagamani	Subject Expert	offline
4	Dr. R. Kameswari	Faculty Member	offline
5	Dr. K.Sujatha	Faculty Member	offline
6	Md. I. Pasha	Faculty Member	offline
7	T.V.Rambabu	Faculty Member	offline
8	T.V.V. Priya	Faculty Member	offline

7. To approve the stipulated Credits, Work Load, etc.,.
8. To approve Online Examination pattern in case COVID 19 doesn't subside at the time of Examinations (MCQs Pattern).
9. Details of Skill Dev. Courses: 1) Electrical appliances –sem I
   2) Solar energy -sem II
10. Any other Resolutions, with the approval of the Chair:
11. To approve valid inclusion in B O S, with the permission of the Principal and Controller of Examinations (C O E).

LCD projection

Note:

1. Copies of i. Syllabus, ii. Model Question paper, iii. Blue Print and iv. Question Bank of the Semesters are enclosed.
2. Above Resolutions have to be Recorded / Documented in the Individual Departments B O S Meetings Register, with the counter signature of the Principal.
3. If the B O S Meeting is conducted online, the Recording of the Meeting is to be preserved in C D and has to be submitted to the College.

Signatures of the members of the BOS Meeting:

S No	Name & Designation	Status	Signature
1	P. Sailaja	In-charge of the Dept& Chairman, BOS	P Sailaja
2	Dr. Sandhya cole	University Nominee	
3	B.Nagamani	Subject Expert	B Nagamani
4	Dr. R. Kameswari	Faculty Member	R Kameswari
5	Dr. K.Sujatha	Faculty Member	K. Sujatha
6	Md. I. Pasha	Faculty Member	
7	T.V.Rambabu	Faculty Member	
8	T.V.V. Priya	Faculty Member	

Counter signed by:

Principal

SRR & CVR Govt Degree College (A)

Vijayawada

PRINCIPAL (FAC)
SRR & CVR GOVT. DEGREE COLLEGE
(Autonomus)
Machavaram, VIJAYAWADA-520 004.

Model pattern for syllabus: SEM -1 (Mechanics, Waves and Oscillations)

S.NO	Title of Unit	Title of topic/sub Topic, etc	Reference
Unit- 1 Mechanics of particle and Rigid bodies	**Mechanics of Particles**	Review of Newton's Laws of Motion, Motion of variable mass system, Motion of a rocket, Multistage rocket, Concept of impact parameter, scattering cross-section, Rutherford scattering(concept only)	1. Principles of Mechanics, By **Salma Alrasheed** http://www.springer.com/series/15883 2. Rocket Staging - NASA www.grc.nasa.gov › www › rocket › rktstage 3. Learn About the Different Purposes of Each Rocket Stage www.masterclass.com › articles › what-is-rocket-staging... 4. Dynamics of Systems of Variable Mass 10.1007/978-1-4614-3740-6_8 5. Equations of motion for the variable mass system. WILEY-VCH THOMSON Published Online:17 May2012 https://doi.org/10.2514/3.3544
	Mechanics of Rigid bodies	Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular momentum and Moment of inertia tensor, Euler equations, Precession of a spinning top, Precession of the equinoxes	
UNIT -2 Motion in a Central Force Field	**Motion in a Central Force Field**	Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force, Kepler's laws of planetary motion - Proofs, Motion of satellites	1. University of Nebraska - Lincoln University of Nebraska - Lincoln DigitalCommons@University of Nebraska - Lincoln Robert Katz Publications Research Papers in Physics and Astronomy 1-1958. 2. Eur J Dent. 2019 Feb; 13(1): 124–128. Published online 2019 Jun 6. doi: 10.1055/s-0039-1688654 MCID: PMC6635960 PMID: 31170770 3. https://www.scientificamerican.com/article/gps-is-doing-more-than-you-thought/ GPS Is Doing More Than You Thought

Unit -3 Relativistic Mechanics	Relativistic Mechanics	Introduction to relativity, Frames of reference, Galilean transformations, absolute frames, Michelson-Morley experiment, negative result, Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation (concept only)	1. http://sitn.hms.harvard.edu/flash/2018/free-falling-the-science-of-weightlessness/
Unit-4 Oscillators	Un damped, Damped and Forced oscillations	Simple harmonic oscillator and solution of the differential equation, Damped harmonic oscillator, Forced harmonic oscillator (no derivation) – Their differential equations and solutions, Resonance, Logarithmic decrement, Relaxation time and Quality factor.(concept only)	1. Real-life applications - Oscillation - Springs and Damping ... www.scienceclarified.com › ... › Oscillation 2 .7 Examples Of Simple Harmonic Motion In Everyday Life ... studiousguy.com › Physics 3. www.motioncontroltips.com › motion-systems-applicati... . Application examples: Shock + vibration-damping components
	FOURIER ANALYSIS	Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave.	1.Research progress of the fractional Fourier transform in signal processing https://doi.org/10.1007/s11432-005-0240-y 2.International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 12 | Dec 2018 www.irjet.net p-ISSN: 2395-0072

Unit-5 Strings and their behaviour	**Vibrating Strings**	Transverse wave propagation along a stretched string, General solution of wave equation and its significance, Modes of vibration of stretched string clamped at ends, Overtones and Harmonics.	1. Everything in life is Vibration - Esalq www.esalq.usp.br › lepse › imgs › conteudo_thumb 2. (PDF) A vibrating string experiment - ResearchGate www.researchgate.net › publication › 249322456_A_vi...
	Ultra sonics	Ultrasonics, General Properties of ultrasonicwaves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves, SONAR	1. Fundamentals and Applications of Ultrasonic Waves April 2002 DOI: 10.1201/b12260 2. Application of Ultrasound in Medicine - NCBI - NIH www.ncbi.nlm.nih.gov › pmc › articles › PMC3564184
ADD ON UNIT	PRINCIPLES BEHIND COVID PROTECTION EQUIPMENT	FOG SANITIZER MACHINE, GERMICIDAL UVDIS INFECTENT LAMP. UV STERILIZER BOX	Waste Water Treatment Methods By Adina Elena Segneanu, Cristina Orbeci, Carmen Lazau, Paula Sfirloaga, Paulina Vlazan, Cornelia Bandas and Ioan Grozescu Submitted: April 23rd 2012Reviewed:: January 16th 2013 DOI: 10.5772/53755 October 21st 2012Published

Bibliography :

1. B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
2. Fundamentals of Physics Vol. I - Resnick, Halliday, Krane ,Wiley India 2007
3. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
4. University Physics-FW Sears, MW Zemansky & HD Young,Narosa Publications, Delhi
5. Mechanics, S.G.Venkatachalapathy, Margham Publication, 2003.
6. Waves and Oscillations. N. Subramanyam and Brijlal, VikasPulications.
7. Unified Physics - Waves and Oscillations, Jai PrakashNath&Co.Ltd.
8. Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
9. The Physics of Waves and Oscillations, N.K.Bajaj, Tata McGraw Hill
10. Science and Technology of Ultrasonics- Baldevraj, Narosa, New DelhiB.,2004
11. "Geometrical and physical optics" by P.K.Chakrabarty
12. B. Sc Practical physics by C.L ,Arora, S.Chand & Co
13. B.Sc Practical physics 3year degree course by K. Hanumantha Rao, Guntur, Maruthi series Publications.

MODEL PATTERN FOR SYLLABUS :**SEM-2**(Wave Optics)

S.NO	Title of unit	Title of Topic /sub topic,etc	Reference
UNIT-1	**Interference of light**	Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude,Phase change on reflection- Stokes' treatment, Lloyd's single mirror,Interference in thin films: Plane parallel and wedge- shaped films, colours in thin films, Newton's rings in reflected light-Theory and experiment, Determination of wavelength of monochromatic light, Michelson interferometer and determination of wavelength.	**1.High visibility first-order subwavelength interference based on light pulse storage via electromagnetically induced transparency** https://doi.org/10.1038/s41598-017-02504-7 **2.Interference of Light in a Michelson-Morley Interferometer: A Quantum Optical Approach** https://doi.org/10.1155/2012/408067
UNIT-2	**Diffraction of light**	Introduction, Types of diffraction: Fresnel and Fraunhoffer diffractions, Distinction between Fresnel and Fraunhoffer diffraction,Fraunhoffer diffraction at a single slit, Plane diffraction grating,Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Explanation of rectilinear propagation of light, Zone plate, comparison of zone plate with convexlens.	1. The diffraction of light by high frequency sound waves: Part https://doi.org/10.1007/BF03035840 2. Diffraction of light by plasma in the solar system https://orcid.org/0000-0003-4255-9497 3. Quantum theory of light diffraction https://doi.org/10.1080/09500340.2010.521593
UNIT-3	Polarisation of light	Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly	1. **Polarization in social media assists influencers to become more influential: analysis and two inoculation strategies** https://doi.org/10.1038/s41598-019-55178-8

		and Elliptically polarized light(concept only)-Production and detection, Optical activity, Laurent's half shade polarimeter(deleted) determination of specific rotation, Basic principle of LCDs	**2.Atomic polarization visualized** American Journal of Physics 69, 450 (2001); https://doi.org/10.1119/1.1344166
UNIT-4	**Aberrations andFibreOptics**	Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by adistance. Fibre optics: Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, Principles of fiber communication (qualitative treatment only), Advantages of fiber opticcommunication.	***1. Methods of Operations Research*** **Physics Today 4, 11, 18** **(1951); https://doi.org/10.1063/1.3067068** 2. The development of scientific identification theory to conduct operation research in education management https://doi.org/10.1088/1757-899X/166/1/012007 3. Most Downloaded Optical Fiber Technology Articles https://doi.org/10.1016/j.yofte.2020.102355
UNIT-5	**Lasers and it`s Applications**	Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle, Einstein coefficients(concept only), Types of lasers-He-Ne laser, Ruby laser, Applications of lasers;	**1.Coherent artifact and time-dependent polarization in amplified ultrafast erbium-doped fibre lasers** https://doi.org/10.1016/j.optlastec.2021.107018

BIBLIOGRAPHY:

1. B. Sc Physics, Vol.2, Telugu Akademy, Hyderabad
2. A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand &Co.
3. Optics-Murugeshan, S.Chand &Co.
4. Unified Physics Vol.II Optics, Jai Prakash Nath &Co.Ltd., Meerut
5. Optics,F.A. Jenkins and H.G.White, McGraw-Hill
6. Optics, Ajoy Ghatak, Tata McGraw -Hill.
7. Introduction of Lasers – Avadhanulu, S.Chand &Co.

Practical Course II: Wave Optics

Workload:30hrs **2 hrs/week**

Course outcomes (Practicals):

On successful completion of this practical course the student will be able to,

1. *Gain hands-on experience of using various optical instruments like spectrometer, polarimeter and making finer measurements of wavelength of light using Newton Rings experiment, diffraction grating etc.*
2. *Understand the principle of working of polarimeter and the measurement of specific rotatory power of sugarsolution*
3. *Know the techniques involved in measuring the resolving power of telescope and dispersive power of the material of theprism.*
4. *Be familiar with the determination of refractive index of liquid by Boy's method and the determination of thickness of a thin wire by wedgemethod.*

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton'srings.
2. Resolving power ofgrating.
3. Study of optical rotation–polarimeter.
4. Dispersive power of aprism.
5. Determination of wavelength of light using diffraction grating-minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidence method.
7. Resolving power of atelescope.
8. Refractive index of a liquid-hallowprism
9. Determination of thickness of a thin wire by wedgemethod
10. Determination of refractive index of liquid-Boy'smethod.

CO-CURRICULAR ACTIVITIES:

SRR&CVR Government Degree College (A), Vijayawada
Physics Paper III: Wave Optics
III SEMESTER

Work load:60 hrs per semester **4 hrs/week**

UNIT-I (8 hrs)

1. Aberrations:
Introduction – monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration-the achromatic doublet. Achromatism for two lenses (i)in contact and (ii) separated by a distance.

UNIT-II (14hrs)

2. Interference
Principle of superposition – coherence-temporal coherence and spatial coherence-conditions for interference of light.Fresnel's biprism-determination of wavelength of light –change of phase on reflection.Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (cosine law) –colors of thin films-
Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film). Determination of diameter of wire, Newton's rings in reflected light. Michelson interferometer-working and construction, Determination of wavelength of monochromatic light using Newton's rings

UNIT-III (14hrs)

3. Diffraction
Introduction,distinction between Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction –Diffraction due to single slit-Fraunhoffer diffraction due to double slit-Fraunhoffer diffraction pattern with N slits (diffraction grating).Resolving power of grating
Fresnel's half period zones-area of the half period zones-zone plate-comparison of zone plate with convex lens-

UNIT-IV(10 hrs)

4.Polarisation:
Polarized light: methods of polarization polarization by reflection, refraction, double refraction, scattering of light-Brewster's law-Mauls law-Nicol prism polarizer and analyzer- Quarter wave plate, Half wave plate-optical activity, Babinet's compensator

UNIT-V (14hrs)

5. Lasers and Holography
Lasers: introduction, spontaneous emission, stimulated emission. Population Inversion, Laser principle Einstein coefficients (Qualitative treatment only) , Types of lasers-He-Ne laser, Ruby laser-Applications of lasers. Holography: Basic principle of holography-Gabor hologram and its limitations, Applications of holography.

6. Fiber Optics Introduction- different types of fibers, rays and modes in an optical fiber, fiber material, principles of fiber communication (qualitative treatment only), advantages of fiber optic communication.

REFERENCE BOOKS:

1. BSc Physics, Vol.2, Telugu Akademy, Hyderabad
2. A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand& Co.
3. Unified Physics Vol.II Optics & Thermodynamics – Jai Prakash Nath&Co.Ltd., Meerut
4. Optics,F..A. Jenkins and H.G. White, Mc Graw-Hill
5. Optics, AjoyGhatak,Tata Mc Graw-Hill.
6. Introduction of Lasers – Avadhanulu, S.Chand& Co.
7. Principles of Optics- BK Mathur, Gopala Printing Press, 1995

Practical Paper III: Wave Optics

Work load:30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Dispersive power of a prism.
4. Determination of wavelength of light using diffraction grating-minimum deviation method.
5. Determination of wavelength of light using diffraction grating-normal incidence method.
6. Resolving power of a telescope.
7. Determination of thickness of a thin wire by wedge method
8. Determination of refractive index of liquid-Boy's method.

P. Gopala

S. S. Rishi 21.3.2018

B Nagamani

SRR&CVR Government Degree College (A), Vijayawada
Physics Paper IV: Thermodynamics &Radiation Physics
IV SEMESTER

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (10 hrs)

1. Kinetic theory of gases
Introduction –Deduction of Maxwell's law of distribution of molecular speeds, Transport phenomena – Mean free path - Viscosity of gases-thermal conductivity-diffusion of gases.

UNIT-II(12 hrs)

2. Thermodynamics
Introduction- Isothermal and adiabatic process- Reversible and irreversible processes- Carnnot's engine and its efficiency-Carnot's theorem-Second law of thermodynamics. Kelvin's and Claussius statements-Entropy, physical significance –Change in entropy in reversible and irreversible processes-Entropy and disorder-Entropy of Universe– Temperature-Entropy (T-S) diagram and its uses –

UNIT-III(12 hrs)

3. Thermodynamic potentials and Maxwell's equations
Thermodynamic potentials-Derivation of Maxwell's thermodynamic relations-Clausius- Clayperon's equation-Derivation for ratio of specific heats-Derivation for difference of two specific heats for perfect gas.Joule Kelvin effect-expression for Joule Kelvin coefficient for perfect

UNIT-IV(12 hrs)

4. Low temperature Physics
Introduction-Joule Kelvin effect-Porous plug experiment - Joule expansion-Distinction between adiabatic and Joule Thomson expansion-Expression for Joule Thomson cooling- Liquefaction of helium, Kapitza's method-Adiabatic demagnetization, -applications of substances at low temperature-effects of chloro and fluoro carbons on ozone layer.

UNIT-V(14 hrs)

5. Quantum theory of radiation
Blackbody-Ferry's black body-distribution of energy in the spectrum of black body-Wein's displacement law,Wein's law, Rayleigh-Jean's law(Qualitative treatment)-Quantum theory of radiation-Planck's law-Measurement of radiation-Types of pyrometers-Disappearing filament optical pyrometer-experimental determination – Angstrompyrheliometer-determination of solar constant, Temperature of Sun.

REFERENCE BOOKS:
1. BSc Physics, Vol.2, Telugu Akademy, Hyderabad

J.S.R.K 21.3.2018 P. Gopal

B Nagamani

2. Thermodynamics, R.C.Srivastava, S.K.Saha& Abhay K.Jain, Eastern Economy Edition

3. Unified Physics Vol.2, Optics & Thermodynamics, Jai Prakash Nath&Co.Ltd., Meerut
4. Fundamentals of Physics. Halliday/Resnick/Walker.C. Wiley India Edition 2007
5. Heat, Thermodynamics and Statistical Physics-N Brij Lal, P Subrahmanyam, PS Hemne, S.Chand& Co.,2012
6. Heat and Thermodynamics- MS Yadav, Anmol Publications Pvt. Ltd, 2000
7. University Physics, HD Young, MW Zemansky,FW Sears, Narosa Publishers, New Delhi

Practical Paper IV: Thermodynamics & Radiation Physics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. Thermal conductivity of bad conductor-Lee's method
2. Measurement of Stefan's constant.
3. Verify Newton's law of cooling
4. Heating efficiency of electrical kettle with varying voltages.
5. Thermoemf- thermo couple
6. Thermal behavior of an electric bulb (filament/torch light bulb)
7. Study of variation of resistance with temperature - thermistor.
8. Determination of wavelength of laser light using diffraction grating.

P. Gopal
J. S. Rao 21.3.2018

B Nagamani

S.R.R & C.V.R GOVT. DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA – 520 004

B.Sc. Vth Semester Physics

(w.e.f 2019-2020)

Paper V: Electricity, Magnetism& Electronics

V Semester

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (12 hrs)

1. **Electric field intensity and potential:**
   Gauss's law statement and its proof- Differential form-Electric field intensity due to uniformly charged sphere. Electrical potential – equi-potential surfaces- potential due to i) a point charge, ii) Uniformly charged sphere.
2. **Dielectrics:**
   Electric dipole moment and molecular polarizability- Polarization and Polarizability-Electric displacement D, electric polarization P – relation between D, E and P- Dielectric constant and susceptibility.

UNIT-II (12 hrs)

3. **Electric and magnetic fields**
   Biot-Savart's law, explanation and calculation of B due to long straight wire, a circular current loop and solenoid-Hall effect and its applications (No derivation-only formulas)
4. **Electromagnetic induction**
   Faraday's law-Lenz's law- Self and mutual inductance, coefficient of coupling, calculation of self inductance of a long solenoid, energy stored in magnetic field.

UNIT-III (12 hrs)

5. **Alternating currents and electromagnetic waves**
   Alternating current - Relation between current and voltage in LR and CR circuits, vector diagrams, LCR series and parallel resonant circuit, Q –factor, power in ac circuits.
6. **Maxwell's equations**
   Idea of displacement current - Maxwell's equations (integral and differential forms)-Derivation of Maxwell's equation- Maxwell's wave equation (with derivation).

UNIT-IV (12 hrs)

7. **Basic electronics:**
   PN juction diode, Zener diode, I-V characteristics, PNP and NPN transistors, CB, CE and CC configurations – Relation betweenα, β and γ - transistor (CE) characteristics -Determination of hybrid parameters.

UNIT-V: (12 hrs)

8. **Digital electronics**
   Number systems - Conversion of binary to decimal system and vice versa. Binary addition and subtraction (1's and 2's complement methods).Laws of Boolean algebra - De Morgan's laws-statement and proof, Basic logic gates, NAND and NOR as universal gates, exclusive-OR gate, Half adder and Full adder.

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REFERENCE BOOKS

1. BSc Physics, Vol.3, Telugu Akademy, Hyderabad.
2. Electricity and Magnetism, D.N. Vasudeva. S. Chand & Co.
3. Electricity, Magnetism with Electronics, K.K.Tewari, R.Chand& Co.,
4. Principles of Electronics, V.K. Mehta, S.Chand& Co.,
5. Digital Principles and Applications, A.P. Malvino and D.P.Leach, Mc GrawHill Edition.

Practical Paper V:Electricity, Magnetism & Electronics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. LCR circuit series/parallel resonance, Q factor.
2. Determination of ac-frequency–sonometer.
3. Verification maximum power transfer theorem.
4. PN Junction Diode Characteristics
5. Zener Diode Characteristics
6. Transistor CE Characteristics- Determination of hybrid parameters
7. Logic Gates- OR,AND,NOT and NAND gates. Verification of Truth Tables.
8. Verification of De Morgan's Theorems.
9. A.C Impedance and power factor.
10. Half adder and full adder.
11. Bridge rectifier-Filters

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and asked to discuss and debate on it.

Assignment - Few problems may be given to the students from the different units and asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills *** **Documental evidence is to be maintained for the above activities.**

P. Sridhar

B. Nagamani

S.R.R & C.V.R GOVT. DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA – 520 004

B.Sc. Vth Semester Physics

(w.e.f 2019-2020)

Paper VI: Modern Physics

V Semester

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I (12 hrs)

1. **Atomic and molecular physics**

Introduction –Vector atom model and Stern-Gerlach experiment - quantum numbers associated with it. L-S and j- j coupling schemes. Zeeman effect (Only Concept)

Raman effect, hypothesis, Stokes and Anti Stokes lines. Quantum theory of Raman effect. Experimental arrangement – Applications of Raman effect.

UNIT-II (12 hrs)

2. **Matter waves & Uncertainty Principle**

Matter waves, de Broglie's hypothesis - wavelength of matter waves, Properties of matter waves - Davisson and Germer experiment – Phase and group velocities.

Heisenberg's uncertainty principle for position and momentum (x and p), & energy and time (E and t). Experimental verification-Applications of Uncertainty Principle

UNIT-III (12 hrs)

3. **Quantum (wave) mechanics**

Basic postulates of quantum mechanics-Schrodinger time independent and time dependent wave equations-derivations. Physical interpretation of wave function. Eigen functions, Eigen values. Application of Schrodinger wave equation to particle in one dimensional infinite box.

UNIT-IV(12 hrs)

4. **General Properties of Nuclei**

Basic ideas of nucleus -size, mass, charge density (matter energy), binding energy, angular momentum, parity, magnetic moment, electric moments. Liquid drop model, Shell model(Concept only)

5. **Radioactivity decay:**

Alpha decay-Basics of α-decay processes, Gamow's theory of α-decay , Geiger Nuttal law, Theory of β-decay, positron emission, electron capture, neutrino hypothesis.

UNIT-V (12 hrs)

6. **Crystal Structure**

Amorphous and crystalline materials, unit cell, Crystal Systems, Miller indices, Bravais Lattices, Bragg's law, diffraction of X-rays by crystals.

7. **Superconductivity:**

Introduction - experimental facts, critical temperature - critical field - Meissner effect – Isotope effect - Type I and type II superconductors - applications of superconductors.

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REFERENCE BOOKS

1. BSc Physics, Vol.4, Telugu Akademy, Hyderabad
2. Molecular Structure and Spectroscopy by G. Aruldhas. Prentice Hall of India, New Delhi.
3. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. S. Chand & Co.
4. Modern Physics by G. Aruldhas & P. Rajagopal. Eastern Economy Edition.
5. Concepts of Modern Physics by Arthur Beiser. Tata McGraw-Hill Edition.
6. Quantum Mechanics, Mahesh C Jain, Eastern Economy Edition.
7. Nuclear Physics, Irving Kaplan, Narosa publishing House.
8. Nuclear Physics, D.C.Tayal, Himalaya Publishing House.
9. Elements of Solid State Physics, J.P.Srivastava, Prentice Hall of India Pvt., Ltd.
10. Solid State Physics, A.J. Dekker, McMillan India.

Practical Paper VI:Modern Physics

Work load: 30 hrs **2 hrs/week**

Minimum of 6 experiments to be done and recorded

1. e/m of an electron by Thomsonmethod.
2. Determination of Planck's Constant (photocell).
3. To study the phenomena of Photoelectric effect
4. Verification of inverse square law of light using photovoltaic cell.
5. Determination of M & H.
6. Energy gap of a semiconductor using junction diode.
7. Energy gap of a semiconductor using thermister.
8. To find refractive index of the given liquid samples-Abbe's Refractometer(Virtual Lab)
9. Experimental demonstration of Millikan's Oil drop Experiment-Virtual Lab
10. Study the phenomena of magnetic hysteresis of a material using a hysteresis loop tracer
11. Hall effect Experiment-Virtual Lab
12. Crystal Structure-Virtual Lab

Suggested student activities

Student seminars, group discussions, assignments, field trips, study project and experimentation using virtual lab

Examples

Seminars - A topic from any of the Units is given to the student and asked to give a brief seminar presentation.

Group discussion - A topic from one of the units is given to a group of students and askedto discuss and debate on it.

Assignment - Few problems may be given to the students from the different unitsand asked them to solve.

Field trip - Visit to Satish Dhawan Space Centre, Sriharikota / Thermal and hydroelectric power stations / Science Centres, any other such visit etc.

Study project - Web based study of different satellites and applications.

Domain skills:

Logical derivation, experimentation, problem solving, data collection and analysis, measurement skills

***** Documental evidence is to be maintained for the above activities.**

P. Lilak

R. Nagamani

Syllabus From 2019-20 Academic Year

Semester –VI

Paper–VII-(A)

Elective Paper –VII-A: Renewable Energy

No. of Hours per week: 03 **Total Lectures:45**

UNIT-I (9 hrs)

1. Energy Sources: Common forms of Energy-Conventional Energy resources-Non conventional energy resources-Advantages and Disadvantages of Conventional Energy resources-Importance of Non-Conventional Energy sources-Energy flow from sun to earth

2. Environmental aspects of Energy: Green house effect-Global warming-Consequences of Global warming-Various pollutants and their harmful effect-Pollution due to Thermal station.

UNIT-II (9 hrs)

3. Energy Conservation and Efficiency: Important terms used in Energy Conservation and Efficiency-Aspects of Energy Conservation – Schemes for Energy Conservation & Efficiency.

4. Energy Storage: Specifications of Energy storage device-Energy Storage methods-Chemical Energy storage methods-Electromagnetic Energy Storage method -Electrostatic energy Storage method

UNIT-III (9hrs)

5. Solar Energy: Sun as Source of Energy-Extra terrestrial and Terrestrial radiations-Solar radiation Geometry-Flat plate Collector-Solar Heating system-Solar Cooker-Solar cell

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6. Wind Energy: Origin of Winds-Major applications of Wind power-Principle of wind energy conversion, Components of wind turbines, Operation and characteristics of a wind turbine

UNIT-IV (9Hrs)

7. Ocean Energy: Origin and nature of Tides-Ocean Tidal Energy Conversion schemes (Single Basin method)-Wave Energy-Wave Energy Technology (Heaving Float Type)- Ocean Thermal Energy-Open Cycle OTEC plant

8. Hydrogen Energy: Hydrogen as Energy Carrier-Hydrogen production methods (Electrolysis of water)- Hydrogen storage options-Hydrogen safety-Uses of hydrogen as fuel.

UNIT-V (9 hrs)

9. Bio-Energy: Introduction-Useful forms of Biomass-Biomass conversion technologies- Urban waste to Energy Conversion (MSW Incineration Plant)-Biogas production from Waste Biomass- Biochemical Conversion technology (Aerobic and Anaerobic bio conversion methods.

10. Geothermal Technology: Origin of Geothermal Energy-Applications of Geothermal Energy-Geo thermal resources-Hydro thermal Resources (Dry steam & Wet steam systems)

References:

1. Non-Conventional Energy Resources by B.H. Khan, Tata McGraw Hill Pub., 2009.

2. Fundamentals of Renewable Energy Resources byG.N.Tiwari, M.K.Ghosal, Narosa Pub.,2007.

3. Non-Conventional Energy Sources, G.D.Rai, New Delhi.

4. Renewable Energy, power for a sustainable future, Godfrey Boyle, 2004

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Elective Paper-VII-A: Practical: Renewable Energy
3hrs/Week

Minimum of 5 experiments to be done and recorded

1. Performance testing of solar cooker.
2. Determination of solar constant using pyrheliometer.
3. Measurement of I-V characteristics of solar cell.
4. Estimation of wind speed using anemometer.
5. Study the characteristics of wind.
6. Wind turbine-power production in Wind turbine
7. Study the effect of number and size of blades of a wind turbine on electric power output.
8. Ultra capacitor (Super capacitor)-Charging and Discharging

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Paper VII-(B) Elective (Materials Science)

Semester –VI

Elective Paper –VII-(B): Materials Science

No. of Hours per week: 03 **Total Lectures:45hrs**

UNIT-I (9 hrs)

1.Materials and Crystal Bonding: Materials, Classification, Crystalline, Amorphous, Glasses; Metals, Alloys, Semiconductors, Polymers, Ceramics, Plastics, Bio-materials, Composites, Bulk and nano-materials.

UNIT-II (9 hrs)

Review of atomic structure – Interatomic forces – Different types of chemical bonds – Ioniccovalent bond or homopolar bond – Metallic bond – Dispersion bond – Dipole bond – Hydrogenbond – Binding energy of a crystal.

UNIT-III (9 hrs)

2. Defects and Diffusion in Materials: Introduction – Types of defects - Point defects- Line defects- Surface defects- Volume defects- Production and removal of defects- Deformation irradiation-quenching

UNIT-IV (9 hrs)

4. Magnetic Materials:Dia-, Para-, Ferri- and Ferromagnetic materials, Langevin theory of para magnetism, Quantum mechanical treatment of para magnetism. Curie's law, Weiss's theory of ferromagnetism, Ferromagnetic domains. Discussion of B-H Curve-Hysteresis and energy Loss.

UNIT-V (9 hrs)

5. Dielectric Materials: Dielectric constant, dielectric strength and dielectric loss, polarizability, mechanism of polarization, factors affecting polarization, polarization curve and hysteresis loop, types of dielectric materials, applications.

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Reference books

1. Materials Science by M.Arumugam, Anuradha Publishers. 1990, Kumbakonam.

2.Materials Science and Engineering V.Raghavan, Printice Hall India Ed. V 2004. New Delhi.

3. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India

4. Solid State Physics, M.A. Wahab, 2011, Narosa Publications

Elective Paper-VII-B Practical: Materials Science

2hrs/Week

Minimum of 5 experiments to be done and recorded

1. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method)

2. Measurement of magnetic susceptibility of solids.

3. Determination of coupling coefficient of a piezoelectric crystal.

4. Measurement of the dielectric constant of a dielectric Materials

5. Study the complex dielectric constant and plasma frequency of metal using surface Plasmon resonance (SPR)

7. Study the hysteresis loop of a Ferroelectric Crystal.

8. Study the B-H curve of 'Fe' using solenoid and determine energy loss from hysteresis.

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Semester –VI

Cluster Electives –VIII-A1

Solar Thermal and Photovoltaic Aspects

No. of Hours per week: 03 **Total Lectures:45**

UNIT-I (10 hrs)

1. Basics of Solar Radiation: Structure of Sun, Solar constant, Concept of Zenith angle and air mass, Definition of declination, hour angle, solar and surface azimuth angles; Direct, diffuse and total solar radiation, Solar intensity measurement – Thermoelectric pyranometer and pyrheliometer.

2. Radiative Properties and Characteristics of Materials: Reflection, absorption and transmission of solar radiation through single and multi covers; Kirchoff's law – Relation between absorptance, emittance and reflectance

UNIT-II (8 hrs)

3. Flat Plate Collectors: Description of flat plate collector, Liquid heating type FPC, Energy balance equation, efficiency, Temperature distribution in FPC, Evacuated tubular collectors.

Unit-III (10 hrs)

4. Solar photovoltaic (PV) cell: Physics of solar cell –Type of interfaces, homo, hetero And schottky interfaces, Photovoltaic Effect, Equivalent circuit of solar cell, Solar cell output parameters, Series and shunt resistances and its effect on cell efficiency.

5. Solar cell fabrication: Production of single crystal Silicon: Czokralski (CZ) and Float Zone (FZ) methods, Thin film solar cells, Advantages, Multi-junction solar cell.

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UNIT-IV (9 hrs)

6. Solar PV systems: Solar cell module assembly – Steps involved in the fabrication of solar module, Module performance, I-V characteristics, Modules in series and parallel, Module Protection – use of Bypass and blocking diodes, Solar PV system and its components, PV array, inverter, battery and load- SPV systems; Stand alone, hybrid and grid connected systems

UNIT-V (8 hrs)

7. Solar thermal applications: Solar hot water system (SHWS), Types of SHWS. Passive space heating and cooling concepts, solar desalinator and drier, solar thermal power generation.

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers

2. Solar Energy- Fundamentals, design, modeling and applications, G.N. Tiwari, Narosa Pub.,2005.

3. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata McGraw Hill Publishers, 1999.

4. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,

5. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

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Cluster Elective Paper- VIII-A-1: Practical: Solar Thermal and Photovoltaic Aspects- 3hrs/Week

Minimum of 5 experiments to be done and recorded

1. Measurement of global and diffuse solar radiation using pyranometer.
2. Measurement of emissivity, reflectivity and transivity.
3. Measurement of efficiency of solar flat plate collector.
4. Performance testing of solar air dryer unit.
5. Effect of tilt angle on the efficiency of solar photovoltaic panel.
6. Study on solar photovoltaic panel in series and parallel combination.
7. PV cells in series and parallel, with different loads.

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Semester –VI

Cluster Electives –VIII-A

Elective Paper –VIII-A2

Wind Energy and Weather forecasting

No. of Hours per week: 03 **Total Lectures: 45**

UNIT-I (9 periods)

1. **Wind Energy:** Nature of Winds-Beaufort Scale-Wind Data- Variation of Wind speed with height-Wind Rose-Power in Wind-Presentation of Wind Data-Wind Data statistics-Capacity factor
2. **Wind turbine Aerodynamics**-Power Extraction from wind-Betz criterion-Axial Thrust on Turbine- Variation of C_P with interference factor-Axial thrust on Turbine F_A- Torque developed by the turbine -Tip speed Ratio-

UNIT-II (9 periods)

3. **Types of Wind Turbines**-Horizontal Axis Turbine-Vertical Axis wind turbine-Parts and working-Types of Rotors in VAWT
4. **Wind measurements**: Eolian features-Biological indicators-Types of Anemometers-Applications of wind power

UNIT-III (9periods)

5. **Introduction to atmosphere**: Physical structure and composition of atmosphere-Layering of the atmosphere-Variation of pressure and temperature with height- air temperature; requirements to measure air temperature; temperature sensors: types- atmospheric pressure: its measurement; cyclones and anticyclones: its characteristics.

UNIT-IV (9)

6. **Measuring the weather:** Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws

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7. **Weather systems:** Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes.

UNIT-V (9)

8. **Basics of weather forecasting:** Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.

REFERENCE BOOKS

1. Dan Charis, Mick Sagrillo, LanWoofenden, "Power from the Wind", New Society Pub., 2009.
2. Erich Hau, "Wind Turbines-Fundaments, Technologies, Applications, Economics",
2ndEdition, Springer Verlag, BerlinHeidelberg, NY, 2006.
3. Paul Gipe, "Wind Energy Basics", Chelsea Green Publications, 1999.
4. Khan, B.H., "Non-Conventional Energy Resources", TMH, 2nd Edition, New Delhi, 2009.
5. Tiwari, G.N., and Ghosal, M.K, Renewable Energy Resources – Basic Principles and
applications, Narosa Publishing House,2007.
6. Aviation Meteorology, I.C. Joshi, 3rd edition 2014, Himalayan Books
7. The weather Observers Hand book, Stephen Burt, 2012, CambridgeUniversity Press.
8. Meteorology, S.R. Ghadekar, 2001, Agromet Publishers, Nagpur.
9. Atmosphere and Ocean, John G. Harvey, 1995, The Artemis Press.

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Cluster Elective Paper- VIII-A2:

Project:3 hrs per week **MARKS:50 Marks**

Concepts that may be covered:

1. Renewable energy
2. Solar energy
3. Determination of characteristics of a wind generator
4. Processing and analysis of weather data:

(a) To calculate the sunniest time of the year.

(b) To study the variation of rainfall amount and intensity by wind direction.

(c) To observe the sunniest/driest day of the week.

(d) To examine the maximum and minimum temperature throughout the year.

(e) To evaluate the relative humidity of the day.

(f) To examine the rainfall amount month wise.

5. Study of synoptic charts & weather reports, working principle of weather station.

6. Exercises in chart reading: Plotting of constant pressure charts, surfaces charts, upper wind charts and its analysis.

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Semester –VI

Cluster Electives –VIII-A

Elective Paper –VIII-A3

BASIC ELECTRONICS

No. of Hours per week: 03 **Total Lectures:45**

UNIT-I (9Hrs)

POWER SOURCES and NETWORK THEOREMS

Important terms of Circuit analysis- Power Sources- Constant current source- Constant voltage source- Source transformation- Conversion of Voltage source to current source and viceversa- Superposition theorem, Thevenin's Theorem, Norton's theorem- Reciprocity Theorem and Maximum power transfer theorem (Simple problems).

UNIT-II (9Hrs)

RECTIFYING CIRCUITS AND FILTERS

Half wave rectifier-Full wave rectifier-Comparison- Efficiency-Peak inverse Voltage- Ripple factor-Advantages and disadvantages-Center tapped full wave rectifier-Full wave bridge rectifier- Types of Filters-Series Inductor Filter-Shunt capacitor filter- Full wave rectifier with Capacitor Filter- LC Filter- CLC Filter

UNIT-III (9Hrs)

POWER SUPPLIES

Three terminal fixed voltage IC regulators- 78XXSeries regulators -79XXSeries regulators- Zener diode as voltage regulator-Series Voltage regulator-Shunt Voltage regulators-Comparison of Shunt and Series voltage Regulator-Principle and working of Switch mode power supply- Applications

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UNIT-IV (9Hrs)

AMPLIFIERS AND OSCILLATORS

Transistor as an amplifier-RC Coupled transistor Amplifier-Analysis-Frequency response and Bandwidth -Feed back-General theory of Feedback-Oscillators-Barkhausen Condition-Phase shift Oscillators

UNIT-V (9Hrs)

PHOTO ELECTRIC DEVICES

Construction-Working-Characteristics of- Photo electric effect-LDR-Photo diode-Photo transistor-Light Emitting diode-Photovolatic cell-Solar cell

Textbooks

1. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*

2. Principles of Electronics by V.K. Mehta – *S. Chand & Co.*

3. Basic Electronics (Solid state) – B. L. Theraja , S. Chand & Co.

4. A First Course in Electronics- Anwar A. Khan&Kanchan K. Dey, PHI.

5. Electrical technology –B.L.Theraja, S.Chand & Co

Reference Books

1. Basic Electronics – BernodGrob.

2. Third year Electronics – Telugu Academy

3. Digital Principles & Applications – A.P. Malvino and D.P. Leach

4. Circuit theory- Umesh.

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VI SEMISTER Practicals Paper -- VIII-A3 :

Basic Electronics

1. Characteristics of a Transistor in CE configuration
2. R.C. coupled amplifier – frequency response.
3. Verification Thevenin's theorem.
4. Maximum Power Transfer theorem
5. Zener diode as a voltage regulator
6. Construction of a model D.C. power supply
7. R C phase shift Oscillator –determination of output frequency
8. 7805 & 7905 Voltage regulators
9. Characteristics of Photo diode
10. Characteristics of Photo transistor
11. Characteristics of LDR
12. Characteristics of LED

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Semester –VI

Cluster Electives –VIII-B

Elective Paper –VIII-B1

Semiconductor Devices & its applications

No. of Hours per week: 03 **Total Lectures:45hrs**

Unit-I: (9hrs)

Introduction to Semiconductor: Conductors, Semiconductors, forbidden orbits, energy levels, crystals and covalent bonds, free electrons and holes, recombination and life-time, energy bands. Intrinsic Semiconductor- intrinsic carrier concentration, density of electrons in conduction band, fermi-level, mass action law. Carrier transport phenomena- mobility, resistivity, diffusivity, Einstein's relation, current density equation.

UNIT-II (9Hrs)

Extrinsic semiconductors-Extrinsic Semiconductor-n-type semiconductor, p-type semiconductor, energy band diagram of extrinsic semiconductor. Hall effect- mobility and Hall angle, experiment arrangement for the study of Hall effect, significance of Hall effect.

Elementary band theory: Kronig Penny model (Qualitative). Band Gap.Brillouin zones, effective mass of electron. Conductor, Semiconductor (P and N type) and insulator

Unit –III (9Hrs)

JUNCTION DIODES: P-N junction-Depletion layer, Energy level diagram of p-n junction, Band structure of an open circuited p-n junction, Biasing of p-n junction, effect of barrier potential on forward bias, reverse leakage current, reverse breakdown, P-n junction under various conditions thermal equilibrium, forward and reverse bias, current-voltage characteristics. Derivation of ideal diode equation of p-n junction- diode model and its approximations-Forward and reverse resistance of diode-Dynamic characteristic of diode.

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Unit-IV (9Hrs)

Control devices- Shockty Diode, Silicon Controlled Rectifier (SCR), Silicon Controlled Switch (SCS), Unijunction transistor (UJT),

Solar Cells(Introduction), Opto-couplers (Introduction).

UNIT-V (9Hrs)

Lasers: Einstein's A and B coefficients- Metastable states- Spontaneous and Stimulated emissions- Optical Pumping and Population Inversion.-Three-Level and Four-Level Lasers- Semiconductor Lasers

Textbooks

1. A First Course in Electronics- Anwar A. Khan&Kanchan K. Dey, PHI
2. Physics of Semiconductor Devices- S. M. Sze
3. Physics of Semiconductors- Streetman
4. Solid-state Physics, H. Ibach and H. Luth, 2009, Springer
2. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
3. Solid State Physics, M.A. Wahab, 2011, Narosa Publications
4. Solid State Physics – S. O. Pillai (New Age Publication)

Reference Books:

1. Introduction to Solid State Physics, Charles Kittel, 8th Edition, 2004, Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, 2nd Edition, 2006, Prentice-Hall of India
3. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill
4. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning
5. Solid State Physics- R.K.Puri&V.K. Babbar (S.Chand Publication)2013
6. Lasers and Non linear Optics –B.B.Laud-Wiley Eastern.
7. LASERS: Fundamentals and Applications – Thyagarajan and Ghatak (McMillanIndia)

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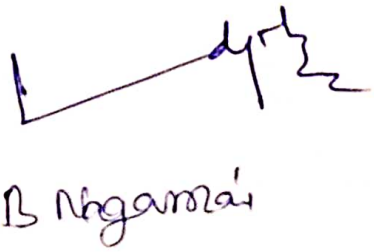
VI SEMISTERPracticals Paper – VIII-B1 : Physics of Semiconductor Devices

1. To draw the BH curve of Fe using Solenoid & determine energy loss from Hysteresis.
2. To measure the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 1500 C) and to determine its band gap.
3. To determine the Hall coefficient of a semiconductor sample.
4. To study the spectral characteristics of a Photo- Voltaic cell.
5. Efficiency of a LED
6. Solar cell: fill factor and efficiency
7. FET characteristics
8. SCR characteristics
9. UJT characteristics



Semester –VI

Cluster Electives –VIII-B

Elective Paper –VIII-B2

INTRODUCTION OF NANOMATERIALS

(w. e. f. 2019-20)

No. of Hours per week: 03 **Total Lectures:45hrs**

UNIT- I (9 hrs)

Background and history: Importance of Nano-technology, Emergence of Nano-Technlogy, Bottom-up and Top-down approaches, challenges in Nano Technology-Role of particle size; Spatial and temporal scale; Concept of confinement-Development of quantum structures, Basic concept of quantum well, quantum wire and quantum dot.

UNIT- II (9 hrs)

Nanostructures: Zero-, One-, Two- and Three- dimensional structure, Size control of metal Nanoparticles and their properties: Optical, Electronic, Magnetic properties; Surface plasmon Resonance, Change of bandgap; Application: catalysis, electronic devices

UNIT- III (9 hrs)

Bonding in Nanostructures: Graphite – Fullerenes – Carbon nanotubes – bonding in armchair, zigzag, chiral tubes – inorganic nanotubes – Sheets vs tubes – nature of Frontier bonds – Band gap Engineering – Deltahedral nanotubes – Saturated Nanowires – Reactivity of nanotube surfaces – Funtionalization of nanotubes.

UNIT- IV (9hrs)

Chemical Routes for Synthesis of Nano materials : Chemical precipitation and co-precipitation; Sol-gel synthesis;Microemulsions or reverse micelles; Solvothermal synthesis; Thermolysis routes, Microwave heating synthesis; Sonochemical synthesis; Photochemical synthesis; Synthesis in supercritical fluids

UNIT- V (12 hrs)

Characterization Methods: XRD, SEM, TEM, FTIR , UV-Visible, characterization techniques for nano materials.

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TEXTBOOKS

1. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell.
2. CARBON NANOTECHNOLOGY- Liming Dai.
3. Nanotubes and Nanowires- CNR Rao and A Govindaraj RCS Publishing.
4. T. Pradeep: Textbook of Nanoscience and Nanotechnology Chapter (McGraw-Hill
Professional, 2012), Access Engineering.
5. C. N. R. Rao, A. Mu¨ller, A. K. Cheetham, "The Chemistry of Nanomaterials :Synthesis,
Properties and Applications", Wiley-VCH, 2006.
6.Chemistry of nanomaterials : Synthesis, properties and applications by CNR Rao et.al.

REFERENCE BOOKS

1. Novel Nanocrystalline Alloys and Magnetic Nanomaterials- Brian Cantor
2. Nanoscale materials -Liz Marzan and Kamat.
3. Physical properties of Carbon Nanotube-R Satio.
4. Polymer nanocomposites: Edited by Yiu-Wing Mai and Zhong-Zhen Yu, First published
2006, Woodhead Publishing Limited and CRC Press LLC, USA.

PAPER VII-A - INTRODUCTION OF NANOMATERIALS

Project:3 hrs per week **MARKS:50 Marks**

Concepts that may be covered:

1. **Material Science concepts**
2. **Physics of Semiconductor Devices**
3. **Nano Sciences**

1.To study Hydrogen bonding by FT-IR spectroscopy.
2. Preparation of metal oxide nano particles by sol-gel technique.
3. Characterization of prepared metal oxide nanoparticles by XRD and determination of their size by Scherrer's Equation.
4. To determine the Band-Gap of given Semiconductor Using Four Probe Method from Room Temperature to 100 C
5. Determine the wavelength of given Laser , estimate the slit width using Laser
6. Calculate the diameter of given thin wire using Laser.

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Semester –VI

Cluster Electives –VIII-B

Elective Paper –VIII-B3

BASIC ELECTRONICS

No. of Hours per week: 03 **Total Lectures:45**

UNIT-I (9Hrs)

POWER SOURCES and NETWORK THEOREMS

Important terms of Circuit analysis- Power Sources- Constant current source- Constant voltage source- Source transformation- Conversion of Voltage source to current source and viceversa- Superposition theorem, Thevenin's Theorem, Norton's theorem- Reciprocity Theorem and Maximum power transfer theorem (Simple problems).

UNIT-II (9Hrs)

RECTIFYING CIRCUITS AND FILTERS

Half wave rectifier-Full wave rectifier-Comparison- Efficiency-Peak inverse Voltage- Ripple factor-Advantages and disadvantages-Center tapped full wave rectifier-Full wave bridge rectifier- Types of Filters-Series Inductor Filter-Shunt capacitor filter- Full wave rectifier with Capacitor Filter- LC Filter- CLC Filter

UNIT-III (9Hrs)

POWER SUPPLIES

Three terminal fixed voltage IC regulators- 78XXSeries regulators -79XXSeries regulators- Zener diode as voltage regulator-Series Voltage regulator-Shunt Voltage regulators-Comparison of Shunt and Series voltage Regulator-Principle and working of Switch mode power supply- Applications

UNIT-IV (9Hrs)

AMPLIFIERS AND OSCILLATORS

Transistor as an amplifier-RC Coupled transistor Amplifier-Analysis-Frequency response and Bandwidth -Feed back-General theory of Feedback-Oscillators-Barkhausen Condition-Phase shift Oscillators

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UNIT-V (9Hrs)

PHOTO ELECTRIC DEVICES

Construction-Working-Characteristics of- Photo electric effect-LDR-Photo diode-Photo transistor-Light Emitting diode-Photovolatic cell-Solar cell

Textbooks

1. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*

2. Principles of Electronics by V.K. Mehta – *S. Chand & Co.*

3. Basic Electronics (Solid state) – B. L. Theraja , S. Chand & Co.

4. A First Course in Electronics- Anwar A. Khan&Kanchan K. Dey, PHI.

5. Electrical technology –B.L.Theraja, S.Chand & Co

Reference Books

1. Basic Electronics – BernodGrob.

2. Third year Electronics – Telugu Academy

3. Digital Principles & Applications – A.P. Malvino and D.P. Leach

4. Circuit theory- Umesh.

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MODEL PATTERN FOR SYLLABUS : SEM-1 (CURCUIT THEORY AND ELECTRIC DEVICES)

S.NO	Title of Unit	Title of Topic /Sub Topic, etc	Reference
UNIT -1	**NETWORKS ANALYSIS & THEOREMS(DC)**	Mesh Analysis, Nodal Analysis(Problems on mesh & nodal analysis). Superposition Theorem, Thevenin's Theorem,Norton's Theorem, Maximum Power Transfer theorem ,Millman and Reciprocity theorems **(problems).**	1.Passive Integrator and Differentiator Circuits Worksheet - AC ... www.allaboutcircuits.com › ... › AC Electric Circuits
UNIT-2	**RC AND RL CIRCUIT**	Frequency response of RC and RL circuits, their action as low pass, high pass fliters Passive differentiating and integrating circuits. (problems)	
	SERIES AND PARALLEL RESONANCE CIRCUITS	Series resonance and parallel resonance circuits, Q - Factor, Selectivity and band width, Comparison of series and parallel resonance.	
UNIT-3	**DIODES**	V-I characteristics varactor diode, and Tunnel diode , Zener Diode as voltage regulator.	
	BIPOLAR JUNCTION TRANSISTOR AND ITS BIASING: (D.C)	Introduction, Transistor Construction, Operation, and characteristics of CB, CE, and CC – Configurations. Complete hybrid equivalent model, DC load line analys **BJT Biasing:** Fixed-Bias Circuit, Voltage-Divider Bias, Bias Stabilization.	
UNIT-4	**FIELD EFFECT TRANSISTORS**	Introduction, Construction, Operation and Characteris FET/JFET, Drain and Transfer characteristics, Depletion-type, and Enhancement-Type MOSFETs. **FET Biasing:** Fixed-Bias Configuration, Voltage-Divider Biasing.	Field-Effect Transistor Biosensors for Biomedical Applications ... www.mdpi.com ›
UNIT-5	**Uni-Junction Transistor (UJT)**	UJT construction-working, V-I characteristics, UJT as a Relaxation oscillator	1.Applications of UJT –

	Silicon Controlled Rectifier (SCR):	Structure and working of SCR. Two transistor representation, Characteristics of SCR. Experimental set up to study the SCR characteristics, simple applications of SCR.	Semiconductor for You www.semiconductorforu.com › Articles 2.What is SCR (Silicon Controlled Rectifier), How it works ... components101.com › articles › scr-introduction-worki... 3 Silicon-Controlled Rectifier - an overview | ScienceDirect Topics www.sciencedirect.com › topics › engineering › silicon-c... 4.Silicon Controlled Rectifiers - New Applications in the Home ... www.rfcafe.com › references › electronics-world › silic

TEXT BOOKS:

1. Introductory circuit Analysis (UBS Publications) ---- **Robert L. Boylestad.**
2. Principles of Electronics by V.K. Mehtha
3. Electronic Devices and Circuit Theory --- **Robert L. Boylestad & Louis Nashelsky.**
4. Circuit Analysis by **P.Gnanasivam- Pearson Education.**
4. Electronic Devices and Circuits I – **T.L.Floyd- PHI Fifth Edition**

REFERENCE BOOKS:

1. Engineering Circuit Analysis **By: Hayt & Kemmerly - MG.**
2. Networks and Systems – **D.Roy Chowdary.**
3. Unified Electronics (Circuit Analysis and Electronic Devices) **by Agarwal-Arora**
4. Electric Circuit Analysis- **S.R. Paranjothi-** New Age International.
5. Integrated Electronics – **Millmam & Halkias.**
6. Electronic Devices & Circuits – **Bogart.**
7. Sedha R.S., A Text Book Of Applied Electronics, S.Chand & Company Ltd

ELECTRONICS LAB-1(50M, Internal 25+ External 25)

(ELECTRONIC DEVICES AND CIRCUITS LAB)

Demonstration of C.R.O: Demonstration using CRO Kit - Block diagram concepts etc., in lab session (Using slides.)

(Assignments are to be given-Marks shall be allotted to this work as internal part.)

LAB LIST:

1. Measurements of D.C & A.C voltage, frequency using CRO
2. Network theorems verification.
3. RC circuit-Frequency response (low, high pass)
4. RL circuit-Frequency response (low, high pass)
5. LCR series resonance circuits-Frequency response-Determination of Q and Band Width.
6. LCR parallel resonance circuits-Frequency response-Determination of Q and Band Width.
7. Zener Diode as a Voltage Regulator
8. BJT input and output characteristics
9. FET input and output characteristics
10. UJT characteristics
11. LDR characteristics
12. V-I characteristics of SCR

Lab experiments are to be done on breadboard and simulation software (using Multisim) and output values are to be compared and justified for variation.

MODEL PATTERN FOR SYLLABUS : SEM – 2 (DIGITAL ELECTRONICS)

S.NO	Title of Unit	Title of Topic /Sub Topic, etc	Reference
UNIT -1	NUMBER SYSTEM AND CODES	Decimal, Binary, Hexadecimal, Octal, BCD, Conversions, Complements (1's, 2's,9's and 10's), Addition, Subtraction, Gray, Excess-3 Code conversion from one to another.	The simple math behind decimal-binary conversion algorithms ... indepth.dev › the-simple-math-behind-decimal-binary-...
UNIT-II	BOOLEAN ALGEBRA AND THEOREMS	Boolean Theorems, De-Morgan's laws. Digital logic gates, Universal logic gates-NAND & NOR gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 4,5 variables), don't care condition.	Binary to Decimal Conversion – x-engineer.org x-engineer.org › ... › Mathematics › Arithmetics
UNIT-III	COMBINATIONAL DIGITAL CIRCUITS	Adders-Half & full adder, Subtractor-Half and full subtractors, Parallel binary adder, Magnitude Comparator, Multiplexers (2:1,4:1)) and De multiplexers (1:2,4:1), Encoder (8-line-to-3-line) and Decoder (3-line-to-8-line). IC-LOGIC FAMILIES: TTL logic, DTL logic, RTL Logic, CMOS inverter	Half Adder and Full Adder Circuit-Truth Table,Full Adder using ... www.circuitstoday.com › half-adder-and-full-adder
UNIT- IV	SEQUENTIAL DIGITAL CIRCUITS	Flip Flops: S-R FF , J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables, Registers:-shift left register, shift right register, Counters - Asynchronous-Mod16 (up & down) Counter Mod-10,Synchronous-4-bit up counter& Ring counter.	(PDF) Incorporation of Reduced Full Adder and Half Adder ... www.researchgate.net › publication › 305623785_Incorp..
UNIT-V	MEMORY DEVICES	General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, PLA (Programmable logic Array),PAL (Programmable Array Logic)	

TEXT BOOKS

1. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI. New Delhi. 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford university press
4. S.Salivahana&S.Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar

Reference Books

1. Herbert Taub and Donald Schilling. "Digital Integrated Electronics" . McGraw Hill. 1985.
2. S.K. Bose. "Digital Systems". 2/e. New Age International. 1992.
3. D.K. Anvekar and B.S. Sonade. "Electronic Data Converters : Fundamentals & Applications". TMH. 1994.
4. Malvino and Leach. " Digital Principles and Applications". TMG Hill Edition.

ELECTRONICS LAB-2

(DIGITAL ELECTRONICS LAB)

LAB LIST:

1. Verification of IC-logic gates
2. Realization of basic gates using discrete components (resistor, diodes & transistor)
3. Realization of basic gates using Universal gates (NAND & NOR gates)
4. Verify Half adder and full adder using gates
5. Verify Half subtractor and full subtractor using gates.
6. Verify the truth table of RS , JK, T-F/F using NAND gates
7. 4-bit binary parallel adder and subtractor using IC 7483
8. BCD to Seven Segment Decoder using IC -7447/7448

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

S.R.R & C.V.R GOVERNMENT DEGREE COLLEGE(AUTONOMOUS), VIJAYAWADA
B.Sc. Electronics Syllabus, Semester-3
w.e.f. 2018-19

SEMESTER – III **PAPER – 3**

Digital Electronics

Unit – I (9hrs)

NUMBER SYSTEM AND CODES: Decimal, Binary, Hexadecimal, Octal, BCD. Conversions, Complements (1's, 2's,9's and 10's), Addition, Subtraction, Gray, Excess-3 Code conversion from one to another.

Unit- II (12hrs)

BOOLEAN ALGEBRA AND THEOREMS: Boolean Theorems, De-Morgan's laws. Digital logic gates, Universal NAND & NOR gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 4,5 variables),don't care condition.

Unit-III (15hrs)

COMBINATIONAL DIGITAL CIRCUITS:

Adders-Half & full adder, Subtractor-Half and full subtractors, Parallel binary adder, Magnitude Comparator, Multiplexers (2:1,4:1)) and Demultiplexers (1:2,4:1), Encoder (8-line-to-3-line) and Decoder (3-line-to-8-line). IC-LOGIC FAMILIES: TTL logic, DTL logic, RTL Logic, CMOS inverter.

UNIT-IV (14hrs)

SEQUENTIAL DIGITAL CIRCUITS:
Flip Flops: S-R FF , J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables. Registers:-shift left register, shift right register, Counters - Asynchronous-Mod16 up & down counter, Mod-10, Synchronous-4-bit up counter.

UNIT-V (10hrs)
MEMORY DEVICES:
General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM, PLA (Programmable logic Array),PAL(Programmable Array Logic)

J.S.R. 21-3-2018 P. Sekhar

B Nagamani

TEXT BOOKS:

1. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci, "Digital Systems-Principles and Applications" 6/e, PHI, New Delhi 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford university press
4. S.Salivahana&S.Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar

Reference Books :

1. Herbert Taub and Donald Schilling, "Digital Integrated Electronics" , McGraw Hill, 1985.
2. S.K. Bose, "Digital Systems", 2/e, New Age International, 1992.
3. D.K. Anvekar and B.S. Sonade, "Electronic Data Converters : Fundamentals & Applications", TMH, 1994.
4. *Malvino and Leach, " Digital Principles and Applications", TMG Hill Edition.*

ELECTRONICS LAB-3 (50M, Internal 25+ External 25)

(DIGITAL ELECTRONICS LAB)

LAB LIST:

1. Verification of IC-logic gates
2. Realization of basic gates using discrete components (resistor, diodes & transistor)
3. Realization of basic gates using Universal gates (NAND & NOR gates)
4. Verify Half adder and full adder using gates
5. Verify Half subtractor and full subtractor using gates.
6. Verify the truth table of RS , JK, T-F/F using NAND gates
7. 4-bit binary Counter using Flip-Flops.
8. BCD to Seven Segment Decoder using IC -7447/7448

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

P Srilatha

J.S.N. Kiran 21.3.2018

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S.R.R & C.V.R GOVERNMENT DEGREE COLLEGE(AUTONOMOUS), VIJAYAWADA
B.Sc. Electronics Syllabus, Semester-4
w.e.f. 2018-19

SEMESTER 4 PAPER 4

Analog and Digital IC-Applications

Unit – I (10hrs)
OPERATIONAL AMPLIFIERS: Definition, Basic op-amp Ideal op-amp, Block diagram of op-amp, inverting, noninverting, virtualground, Adders, subtractors, summing amplifier, voltage follower, op-amp parameters, voltage to current convertor ,integrator, differentiator, differential amplifier, Logarithmic amplifier.

Unit- II (15 hrs)
OP-AMP CIRCUITS: voltage regulator, comparator, multivibrators-astable, monostable, Bi-stable, Schmitt trigger, sine wave generator, square wave generator, triangular wave generator, Active filters(Basics)-low pass, high pass, band pass filters

IC-555 –functional block diagram and mention its applications

Unit-III (15hrs):

COMBINATIONAL & SEQUENTIAL LOGIC CIRCUITS (IC-Applications):

Design of Code convertor: BCD to Seven Segment, BCD to Grey, Grey to Binary.

Design of Counters using State Machine: Mod N counter, Preset Table,Binary Up/Down Counter, Design of Universal Shift Register

UNIT-IV (10hrs)

DATA CONVERTERS:

A/D converter:- Successive Approximation ADC,-Single slope and dual slope converter, Sigma-delta ADC. D/A converter: R-2R Ladder network, Binary Weighted .

UNIT-V (10hrs)
DIGITAL SYSTEM INTERFACING AND APPLICATIONS: interfacing of LED's
Applications of Counters: Digital Clock
Applications of Shift Registers: Parallel to Serial ,Serial to Parallel, UART

21.3.2018

TEXT BOOKS:

6. G.K.Kharate-Digital electronics-oxford university press
7. M.Morris Mano. " Digital Design " 3rd Edition, PHI, New Delhi.
8. Op Amp and Linear Integrated Circuits By Ramakant Gaykwad
9. Linear Integrated Circuits By Roy Choudary

Reference Books :

5. Jacob Millman,Micro Electronics,McGraw Hill.
6. Mithal G K. Electronic Devices and Circuits Thana Publishers.
7. Allan Motter shead .Electronic Devices and Circuits – An Introduction- Prentice Hall

ELECTRONICS LAB-3 (50M, Internal 25+ External 25)

(Analog and digital IC-Applictions)

LAB LIST:

1. Op-Amp as inverting and non-inverting
2. Op-Amp as integrator and differentiator
3. Op-Amp as adder & subtractor
4. Op-Amp as voltage to current converter
5. Op-Amp as sine wave generator (Wien bridge oscillator)
6. Op-Amp as sine wave generator
7. Astable multivibrator determination of frequency (using IC 555)
8. Voltage Regulator Circuit Using OP-AMP.

Lab experiments are to be done on breadboard and simulation software (using Multisim) and output values are to be compared and justified for variation.

J.S.R. 21.3.2018

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SRR &CVR GOVT.DEGREE COLLEGE (AUTONOMOUS), VIJAYAWADA
B.Sc ELECTRONICS SYLLABUS
SEMESTER: V
PAPER 5 - MICROPROCESSORS (INTEL 8085) (60HOURS)
(w. e. f. 2019-20)

Work load:60hrs per semester **4 hrs/week**

UNIT- I (12 hrs)

ARCHITECTURE OF 8085 MICROPROCESSOR

Functional block diagram of Intel 8085-Register structure- address / data bus - Control Signals and status signals - 8085 pin diagram & functions - Interrupts - Priority Concept

UNIT - II (12 hrs)

INSTRUCTION SET OF 8085 -Instruction set classification - addressing modes

MEMORY-Instruction cycle - machine cycle - T-state -Timing diagrams for Opcode FetchCycle Memory Read, Memory Write, I/O Read, I/O Write.

UNIT- III (12 hrs)

PROGRAMMING 8085- addition & subtraction(8-bit &16-bit), multiplication, division, largest,smallest, block data transfer (all 8-bit data),Stack & Subroutines Concept - time delay using single and double register.

UNIT- IV (12 hrs)

INTERFACING MEMORY - 2K X 8, 4K X 8 ROM, RAM to 8085, Memory Mapped I/O and I/O Mapped I/O - Difference between I/O mapped and Memory Mapped I/O.

UNIT - V (12 hrs)

MICROPROCESSOR APPLICATIONS - Programmable peripheral Interface8255,Pin diagram, Operating modes of 8255, control word. Block Diagram of Keyboard and Display Interface 8279 (Architecture) - Simple temperature controller- Simple traffic light controller- stepper motor control interface.

P. Sridhar

B Nagamani

TEXTBOOKS

1.Ramesh S. Gaonakar, Microprocessor Architecture, Programming and Application with the8085-PenramLnternational Publishing, Mumbai.

2. Ram, Fundamentals of microprocessors and microcomputers - Dhanpat Rai Publications, New Delhi

3.Microprocessors & Microcontrollers by N .Senthilkumar, M. Saravanan & S. Jeevananthan, 1st edition, Oxford press(Helpful for interfacing applications)

4. Microprocessors & Microcontrollers by B.P.Singh, Galgotia publications Pvt.Ltd.

REFERENCE BOOKS

1.Mathur A.P., Introduction to Microprocessors. (3rd edn., Tata McGraw, New Delhi,

2.Leventhal L.A., Microprocessor Organisation and Architecture, Prentice Hall India.

3.Microprocessor lab premier by K.A.Krishna murthy

ELECTRONICS LAB -5
(MICROPROCESSORS LAB)

Work load: 30 hrs per semester **3hrs/week**

(Any six experiments should be done)

Programs using Intel 8085

1. Addition & Subtraction (8 & 16-bits)
2. Multiplication & Division (8 - bit)
3. Largest & Smallest number in the given array.
4. Ascending & Descending order.
5. Block Transfer of Data.
6. DAC interface.
7. Stepper motor interface.
8. ADC interface

LAB MANUAL

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.
2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.
3. Vijayendran V., Fundamentals ofmicroprocessor-8085, S.Viswanathan publishers Chennai.

B Nagamani

SRR &CVR GOVT.DEGREE COLLEGE (AUTONOMOUS), VIJAYAWADA

B.Sc- ELECTRONICS-SYLLABUS
SEMESTER: V
ELECTIVE-PAPER 6 (A) - ELECTRONIC COMMUNICATIONS (60 HOURS)
(w. e .f. -2019-20)

4 hrs/week

Work load: 60hrs per semester

UNIT- I (12 hrs)

BASICS OF COMMUNICATION SYSTEMS AND NOISE

Block diagram of communication system. Types of Electronic Communication systems: Simplex, Duplex. Analog /Digital Signals. Noise in communication: External noise- Atmospheric, space noise, man-made noise, internal noise- Thermal, Shot noise Definitions and relationship between Bit rate, Band rate, Bandwidth and signal to Noise Ratio.

UNIT - II (12 hrs)

AMPLITUDE MODULATION

Need for modulation. Amplitude modulation, Modulation index, frequency spectrum, generation of AM (Transistor modulator,), Amplitude Demodulation (diode detector), other forms of AM: Double side band suppressed carrier, DSBSC generation (Balanced modulator), Single side band suppressed carrier, SSBSC generation (Filter method, phase cancellation method, third method), SSB detection.

UNIT- III (12 hrs)

ANGLE MODULA TION

Frequency and phase modulation, modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM (FET reactance methods), FM detector (Slope detector, balanced slope detector, PLL).Comparison between AM, FM and PM.

UNIT- IV (12 hrs)

TRANSMITTERS& RECEIVERS

Transmitters: Communication channels for AM and FM broadcast, AM transmitter: Lowlevel and high level modulation, FM transmitter.

Receivers: Receiver parameters, sensitivity, selectivity and fidelity, Super Heterodynereceiver, AM receivers, FM receivers. Frequency division multiplexing.

UNIT - V (12 hrs)

DIGITAL COMMUNICATION

Sampling theorem, Pulse Amplitude Modulation (PAM), Time Division Multiplexing (TDM), Pulse Width Modulation (PWM) and Pulse Position Modulation(PPM), Pulse Code Modulation, Differential Pulse Code Modulation, Delta Modulation.

TEXTBOOKS

1. H. Taub and D. Schilling, Principles of Communication Systems, Tata McGraw-Hill (1999)
2. W.Tomasi, Electronic Communication Systems: Fundamental through Advanced,
3. Pearson Education (2004)
4. L.E.Frenzel, Communication Electronics, Principle and Applications, Tata Mcgraw-Hill (2002)
5. L. W. Couch II, Digital and Analog Communication Systems, Pearson Education (2005)
6. H.P.Hsu, Analog and Digital Communication, Tata McGraw-Hill (2006)

REFERENCE BOOKS

1. S.Haykin, Communication Systems, Wiley India (2006)
2. G. Kennedy and B. Davis, Electronic communication systems, Tata McGraw Hill (1999)
3. R. P. Singh and S. D. Sapre, Communication Systems: Analog and Digital, Tata McGraw Hill (2007)
4. L. E. Frenzel, Communication electronics: Principles and applications. Tata McGraw Hill (2002)
5. T.G. Thomas and S. Chandra Sekhar, Communication theory, Tata McGraw Hill (2006)

ELECTRONICS LAB -6(A)

ELECTRONIC COMMUNICATIONS LAB

Work load: 30 hrs per semester **2hrs/week**

(Any six experiments should be done)

1. Study of Amplitude Modulation and Demodulation.
2. Study of Frequency Modulation and Demodulation
3. Study of Pulse Amplitude Modulation
4. Study of Pulse Width Modulation
5. Study of Pulse Position Modulation
6. Study of Pulse Code Modulation
7. Simulation of AM modulation and Demodulation using software.
8. Simulation of FM modulation and Demodulation using software.

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SRR &CVR GOVT.DEGREE COLLEGE (AUTONOMOUS), VIJAYAWADA
B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VII-A - MICROCONTROLLERS & APPLICATIONS (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

UNIT- I

8051 ARCHITECTURE - Introduction to Microcontroller - Comparison of Microcontroller & Microprocessor-8051 Microcontroller - Block diagram – Pin Configuration, Memory Organization of 8051. Program Status word (PSW).

UNIT- II

8051 INSTRUCTION SET - Classification of instruction set- Arithmetic, Logical, Data transfer, Branch and Bit oriented Instruction -Addressing Modes

PROGRAMMING - Incrementing and Decrementing - Addition -Subtraction - Multiplication and Division programs , Swapping of content, Addition of BCD Numbers

UNIT- III

TIMERS/COUNTERS-Timer 0, Timer 1 Registers, TMOD Register ,TCON Register, Programming in MODE 0 ,MODE 1 and MODE 2, Difference between Timer and Counter.

INTRODUCTION TO SERIAL COMMUNICATION-Serial Transmission modes, Asynchronous Serial Communication and Data Framing, RS232,SBUF.

UNIT- IV

INTERFACING - Keyboards – Seven Segment Display –Stepper motor - ADC & DAC.

UNIT- V

INTRODUCTION TO OTHER MICROCONTROLLERS – PIC controllers – PIC16CXX-Block Diagram ,Pin Diagram, Memory Organization - Introduction to Embedded Systems.

TEXTBOOKS

1. Kenneth 1. Ayala, "The 8051 Microcontroller, Architecture, Program and Application" Pen ram International.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi "The 8051 Microcontroller and

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Embedded Systems" -Low Price Edition.
3.Microprocessors & Microcontrollers by N. Senthil kumar, M. Saravanan & S. Jeevananthan, 1st edition. Oxford press (Helpful for interfacing applications)
4.Micro corurollers: Theo & App by Ajay V. Deshmuk Tata McGraw-Hill Education, 2005.

REFERENCE BOOKS

1. Programming and customizing the 8051 Microcontroller- by Myke Predko-TMH
2. Design with Microcontrollers by- J.B.Peatma TMH
3. Microcontroller Hand Book, INTEL, 2008.
4. Microprocessor, Microcontroller & Applications by D.A Godse A.P Godse Technical Publications 2008.

PAPER VII-A - MICROCONTROLLERS LAB

Work load: 45 hrs per semester **3 hrs/week**

(Any six experiments should be done)

1. Addition and Subtraction of two numbers
2. Multiplication and Division of two numbers
3. Write a program to Display given String
4. Write a program on Swapping of content
5. Pick Largest & smallest number among a given set of numbers
6. Interface a DAC & Generate a stair case wave form with step duration and no. of steps as variables.
7. Interface a stepper motor and rotate Clockwise or anti clockwise through given angle step.
8. Using Keil software, write a program to pick the smallest among a given set of numbers.
9. Using Keil software, write a program to pick the largest among a given set of numbers.
10. Using Keil software, write a program to generate a rectangular wave form at a specified port terminal.

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B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VII-B - VLSI DESIGN (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

UNIT - I (12 hrs)

CMOS TECHNOLOGY

A brief History-MOS transistor, Ideal I-V characteristics, C-V characteristics, Non ideal I-V effects, DC transfer characteristics - CMOS technologies, Layout design Rules, CMOS process enhancements.

UNIT- II (12 hrs)

CIRCUIT CHARACTERIZATION AND SIMULATION

Delay estimation, Logical effect and Transistor sizing, Power dissipation, Interconnect, Design margin, Scaling- SPICE tutorial, Device models, Device characterization, Circuit characterization, Interconnect simulation.

UNIT- III (12 hrs)

COMBINATIONAL AND SEQUENTIAL CIRCUIT DESIGN

Circuit families -Low power logic design - comparison of circuit families - Sequencing static circuits, circuit design of flip flops, Static sequencing element methodology-sequencing dynamic circuits – synchronizers.

UNIT- IV (10 hrs)

CMOS TESTING

Need for testing- Testers, Test fixtures and test programs- Logic verification- Silicon debug principles- Manufacturing test - Design for testability - Boundary scan

UNIT- V (l4 hrs)

SPECIFICATION USING VERILOG HDL

Basic concepts- identifiers- gate primitives, gate delays, operators, Data flow and RTL, Structural gate level description of decoder, comparator, half adder, full adder, D flip flop.

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TEXTBOOKS

1. Weste and Harris: CMOS VLSI DESIGN (Third edition) Pearson Education
2. Uyemura J.P: Introduction to VLSI circuits and systems, Wiley

REFERENCE BOOKS

1. D.A Pucknell & K.Eshraghian Basic VLSI Design, Third edition, PHI
2. Wayne Wolf, Modern VLSI design, Pearson Education
3. M.J.S. Smith: Application specific integrated circuits, Pearson Education
4. J.Bhasker: Verilog HDL primer, BS publication
5. Ciletti Advanced Digital Design with the Veri log HDL, Prentice Hall of India

ELECTRONICS LAB - VII-B

(VLSI DESIGN LAB)

Work load: 45 hrs per semester **3 hrs/week**

(Any six experiments should be done)

1.Study of Simulation using tools
2.Design Entry and Simulation of Combinational Logic Circuits a) Basic logic gates b) Half adder and full adder c) Half Subtractor and full sub tractor d) 8 bit adder
3.Design Entry and Simulation of Combinational Logic Circuits a) 4 bit multiplier b) Encoder and Decoder c) Address Decoder d) Multiplexer
4.Design Entry and Simulation of Sequential Logic Circuits a) Flip-Flops b) Counter
5.Study of Synthesis tools
6.Place and Route and Back annotation for FPGAs
7.Schematic Entry and SPICE Simulation a) CMOS Inverter b) Universal Gate c) Differential Amplifier
8.Layout of a CMOS Inverter

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B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VIII-A1 - ELECTRONIC INSTRUMENTATION (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

UNIT-I

Measurements:

Basic block diagram of measurement system, Accuracy and precision, resolution, sensitivity, linearity, Errors, systematic and random errors.

Basic Measurement Instruments:

DC measurement-ammeter, voltmeter, ohm meter, AC measurement, Digital Multimeter-block diagram

UNIT –II

AC Bridges:

Measurement of Resistance (Hay's bridge) , Measurement of Impedance(schering bridge) ,Measurement of Self Inductance (Anderson's bridge), Measurement of Inductance (Maxwell's bridge),Measurement of Capacitance (De - Sauty bridge), Measurement of frequency (Wien's bridge).

UNIT-III

Lock-in-amplifier:

Basic Principles of phase locked loop (PLL), Phase detector (XOR), Voltage Controlled Oscillator , lock and capture.

Signal Generators: Function generator, Pulse Generator, (Qualitative only).

UNIT-IV

Analytical instruments

Spectrophotometer, working with block diagram, features of spectrophotometer, P_H meter - principle working with block diagram, features of P_H meter.

TEMPERATURE TRANSDUCERS

Types of transducers, Thermometer, Thermo couple and their characteristics.

UNIT-V :

Direct digital control (DDC), Distributed control system (DCS),

PLC'S: Block diagram, hardware, PLC operation, Applications of PLC'S.

TEXT BOOKS

1. Introduction to instrumentation and control By A.K.Ghosh
2. Sensors and transducers PHI 2Ed By D.Patranabis.
3. Industrial instrumentation –Eckman.P.

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4. Instrument measurement analysis By Nakra and chaudhry.

Reference Books:

1. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement Techniques, Prentice Hall (2005).
2. E.O. Doebelin, Measurement Systems: Application and Design, McGraw Hill Book - fifth Edition (2003).
3. David A. Bell, Electronic Devices and Circuits, Oxford University Press (2015).
4. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Butterworth Heinmann-2008).

ELECTRONIC INSTRUMENTATION LAB

LAB LIST:

1. Design of multi range ammeter and voltmeter using galvanometer.
2. Measurement of resistance by Wheatstone bridge and measurement of bridge sensitivity.
3. Measurement of Capacitance by De'Sautys bridge
4. Measurement of Inductance by Maxwell's bridge
5. Measurement of frequency by Wien's bridge
6. To determine the Characteristics of Thermistors and RTD.
7. Measurement of temperature by Thermocouples and study of transducers like AD590 (two terminal temperature sensor), PT-100, J- type, K-type.

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SRR &CVR GOVT.DEGREE COLLEGE (AUTONOMOUS), VIJAYAWADA
B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VIII-A2 - POWER ELECTRONICS (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

Unit- 1
Power Devices:
Need for semiconductor power devices, Power diodes, Enhancement of reverse blocking capacity, Introduction to family of thyristors.
Silicon Controlled Rectifier (SCR) Applications:
SCR as a static switch, single phase half wave, full wave and bridge rectifier switch inductive & non-inductive loads.

Unit- 2
Diac and Triac:
Basic structure, Working and V-I characteristic of Diac and Traic, Application of a Diac as a triggering device for a Triac, Differences between SCR,Diac and Triac.
Insulated Gate Bipolar Transistors (IGBT):
Basic structure, I-V Characteristics, switching characteristics.

Unit- 3
Choppers:
Basic chopper circuit, types of choppers (Type A-D), step-down chopper, step-up chopper, operation of d.c. chopper circuits using self commutation (A & B-type commutating circuit

Unit-4
Power Inverters:
Need for commutating circuits and their various types, d.c. link inverters, Parallel capacitor commutated invertors with and without reactive feedback and its analysis.

Unit- 5
Electromechanical Machines:
DC Motors, Basic understanding of field and armature, Principle of operation, Factors controlling motor speed, Thyristor based speed control of DC motors, AC motor (Induction Motor only)

Suggested Books:
1. Power Electronics, K. Hari Babu, Scitech Publication.
2. Power Electronics, P.C.Sen, TMH.
3. Power Electronics & Controls, S.K. Dutta.
4. Power Electronics, M.D.Singh&K.B. Khanchandani, TMH.
5. Power Electronics Circuits, Devices and Applications, 3rd Edition, .H.Rashid, Pearson Education.
6. Power Electronics, Applications and Design, Ned Mohan,Tore.
7. Power Electronics, P.C.Sen, TMH.

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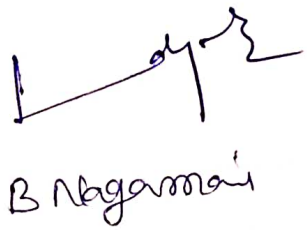
8. Power Electronics, M.S.Jamil Asghar,PHI.
9. A Textbook of Electrical Technology-Vol-II,B.L.Thareja,A.K.Thareja, S.Chand.

POWER ELECTRONICS Lab

LAB LIST:

Any Six Experiments

1. Study of I-V characteristics of DIAC
2. Study of I-V characteristics of a TRIAC
3. Study of I-V characteristics of a SCR
4. SCR as a half wave and full wave rectifier switch R and RL loads
5. DC motor control using SCR.
6. DC motor control using TRIAC.
7. AC voltage controller using TRIAC with UJT triggering.
8. Study of parallel and bridge inverter.
9. Design of snubber circuit
10. VI Characteristic of IGBT
11. Study of chopper circuits



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B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VIII-A3 - CONSUMER ELECTRONICS (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

UNIT-I

MICROWAVE OVENS - Microwaves (Range used in Microwave Ovens) - Microwave oven block diagram -LCD timer with alarm - Single-Chip Controllers - Types of Microwave oven - Wiring and Safety instructions -Care and Cleaning.

UNIT-II

WASHING MACHINES - Electronic controller for washing machines - Washing machine hardware and software- Types of washing machines - Fuzzy logic washing machines Features of washing machines.

UNIT-III

AIR CONDITIONERS AND REFRIGERATORS - Air Conditioning - Components of air conditioning systems -All water air conditioning systems - All air conditioning systems - Unitary and central air conditioning systems -Split air conditioners ,Domestic Refrigerator-Block diagram –Working.

UNIT-IV

HOME/OFFICE DIGITAL DEVICES - Facsimile machine - Xerographic copier - Calculators - Structure of a calculator - Internal Organization of a calculator - Servicing electronic calculators

UNIT-V

DIGITAL ACCESS DEVICES - Online ticket reservation - Functions and networks - Barcode Scanner and decoder - Electronic Fund Transfer - Automated Teller Machines (ATMs) - Set-Top boxes - Digital cable TV - Video on demand.

TEXT BOOKS

1. S.P. Bali, Consumer Electronics - Pearson Education, New Delhi, 2005.
2. R. G. Gupta Audio and Video systems Tata McGraw Hill (2004)

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ELECTRONICS LAB –VIII A3

PROJECT WORK LAB

Work load: 45 hrs per semester **3 hrs/week**

(At least One Project should be done)

NOTE: At least One Project should be done from any of the four papers

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B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VIII-B1 - COMPUTER NETWORKS (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

UNIT-I :
INTRODUCTION to OSI,TCP/IP and other Network models, Examples of Networks, Novel Networks, Arpanet, Internet, Network topologies, WAN, LAN, MAN. PHYSICAL LAYER: Transmitted media copper, Twisted pair wireless, switching and Encoding synchronous communications.

UNIT-II :
DATA LINK LAYER: Design issues, framing, error detection &correction, CRC, elementary protocol-Stop and wait, slip, data link layer in HDLC, Internet, ATM.

UNIT-III :
MEDIUM ACCESS SUB LAYER: ALOHA, MAC, Address, Carrier sense multiple access, IEEE 802.X standard Ethernet, Wireless LAN.

UNIT-IV :
NETWORK LAYER: Virtual circuits and data gram sub nets-routing algorithm, shortest path routing, flooding, Hierarchical routing, broadcast, multicast.

UNIT-V :
TRANSPORT LAYER : Transport services, Connection management ,TCP & UDP protocols, ATM AAL layers protocol, APPLICATION LAYER- Network security, domain name system, SNMP, Electronic mail, The world web, multimedia.

TEXT BOOKS:
Computer Networks – by Andrew S. Tanenbaum, 4th Edition, Pearson Education.
Data Communications and Networking – by Behrouz a. Forouzan. 3rd edition TMH.

RFERENCE BOOKS:
An engineering approach to Computer networks – by S.Kesav 2nd edition, Pearson education.

COMPUTER NETWORKS LAB
LAB LIST:

1.Study of different types of network cables and practically implement the cross wired cable and straight through cable using clamping tool
2.study of network Devices in detail.
3.Study of network IP
4.connect the computers in local area network
5.study of basic network command and network configuration command.
6.confiqure a network topology using packet tracer software
7.confiqure a network using link state vector routing protocol

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SRR &CVR GOVT.DEGREE COLLEGE (AUTONOMOUS), VIJAYAWADA
B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI
PAPER VIII-B2 - MATHEMATICAL METHODS AND ANALYSIS USING MATLAB
(45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

UNIT- I

Introduction to MATLAB and Graphics

Preliminary, workspace, variables, simple arithmetic problems, symbolic calculations. Matrices, Vectors operations, Operators .Introduction to graphics: 2-D and 3-D plots, types & features, overlays, scripts and functions, M-files, special function variable loops, branch, control, flow statements, structures and cells. File handling, input and output.

UNIT - II

Laplace Transforms

Signals and systems: continuous time and discrete time signals.

Laplace Transform: definition, Laplace transform of simple function, properties of

L T (linearity, shifting, change of scale), Inverse LT, partial fraction technique to find Inv of L T transfer functions.

UNIT- III

Laplace Transforms Applications.

1. Series RC circuit, RL circuit, RLC circuit,
1. Poles and Zeros stability criteria, Low pass and High pass filters.

MATLAB Exercises

1. CT and DT signals plotting
2. To find Laplace Transform and I LT of any given function.
3. RC / RL/RLC (series) circuit analysis for DC input
4. Transfer Function, Pole and Zero stability criteria and filters

UNIT - IV

Fourier series and Transform

Fourier Series Definition, Evaluation of Fourier Co-efficient, Fourier series for Square, Triangular waves, Half Wave, Full wave rectifiers, Fourier Transform: Definition and examples.

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MA TLAB Exercises:

I. To evaluate Fourier Co-efficient for given waveform function.

2. To find Fourier Transform for given function.

UNIT- V

Mathematical Application

Solution of differential equation using separation of variable method (Laplace, Poisson and Schrodinger equations in Cartesian co-ordinate system),

Curve fitting (Straight line, Exponential & Cubic Spy .line) and its application to

1. Diode characteristics
2. Ohm's Law
3. Filters, Phasors as per AC circuits

MATLAB Exercises

1. Real root of algebraic equation, curve fitting
2. Diode/BJT characteristics. Ohm's law filters performance.

TEXTBOOKS

1. Rudra Pratap Getting Started with MA TLAB ,7th Edition Oxford University Press N Delhi
2. MATLAB and Simulink for engineers by Agam kumar tyagi-Oxford University press.
3. Amos Gilat MATLAB : An introduction with applications, Wiley India
4. Stephen 1. Chapman MATLAB Programming for Engineers. Thomas Learning

REFERENCE BOOKS

1.G K Mittal Network Analysis KhannaPubtishers, NewDelhi

2.Van Valkenberg Network Analysis, 3rd Edition DorlingKindersley(Jndia) PVl Ltd.,

3.Umesh Sinha etwork Analysis and Synthesis Satya Prakashan. Delhi.

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MA TLAB Exercises:

I. To evaluate Fourier Co-efficient for given waveform function.

2. To find Fourier Transform for given function.

UNIT- V

Mathematical Application

Solution of differential equation using separation of variable method (Laplace, Poisson and Schrodinger equations in Cartesian co-ordinate system),

Curve fitting (Straight line, Exponential & Cubic Spy .line) and its application to

1. Diode characteristics
2. Ohm's Law
3. Filters, Phasors as per AC circuits

MATLAB Exercises

1. Real root of algebraic equation, curve fitting
2. Diode/BJT characteristics. Ohm's law filters performance.

TEXTBOOKS

1. Rudra Pratap Getting Started with MA TLAB ,7th Edition Oxford University Press N Delhi
2. MATLAB and Simulink for engineers by Agam kumar tyagi-Oxford University press.
3. Amos Gilat MATLAB : An introduction with applications, Wiley India
4. Stephen 1. Chapman MATLAB Programming for Engineers. Thomas Learning

REFERENCE BOOKS

1.G K Mittal Network Analysis KhannaPubtishers, NewDelhi

2.Van Valkenberg Network Analysis, 3rd Edition DorlingKindersley(Jndia) PVl Ltd.,

3.Umesh Sinha etwork Analysis and Synthesis Satya Prakashan. Delhi.

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ELECTRONICS LAB -VII-C (MATLAB)

Work load: 45 hrs per semester **3 hrs/week**

(Any six experiments should be done)

1. CT and DT signals plotting
2. To find Laplace Transform and IL T of any given function.
3. RC / RL/RLC (series) circuit analysis for DC input
4. Transfer Function, Pole and Zero stability criteria and filters
5. To evaluate Fourier Co-efficient for given waveform Function.
6. To find Fourier Transform for given function.
7. Real root of algebraic equation, curve fitting
8. Diode/BJT characteristics. Ohm's law, filters performance.

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SRR &CVR GOVT.DEGREE COLLEGE (AUTONOMOUS), VIJAYAWADA
B.Sc ELECTRONICS SYLLABUS
SEMESTER: VI

PAPER VIII-B3 - MICROWAVES,RADARS AND SATELLITE COMMUNICATIONS (45 HOURS)

(w. e. f. 2019-20)

Work load:45hrs per semester **3 hrs/week**

Unit -1. Microwave Devices:
Klystrons, Magnetrons and traveling wave tubes. Velocity modulation basic principles of two cavity klystron and reflex klystron, principles of operation of magnetron. Wave modes. Effect, principles of operation, modes of operation. Read diode, Gunn diode.

Unit -2. Microwave Diodes & Measurements:

Mixers – non-linear – linear – Balanced Mixer – Detector square law characteristic, parametric Amplifiers –Up converter – down converter. Microwave measurement – Guide wavelength, standing wave ratio, measurement of impedance, Q and attenuation.

Unit -3. Microwave communications:
Introduction, advantages and disadvantages of Microwave Radio - FM Microwave Radio systems –
Repeaters – Repeater station.

Unit -4. Radar Systems:
Basic principle – Fundamentals. Radar performance factors, pulsed systems – Basic pulsed Radar systems, antennas and scanning, display methods, pulsed radar systems, moving target indications (MTI), Radar Beacons. Other Radar Systems – C.W Doppler Radar, Frequency – Modulated CW Radar, phased array Radars, Planer array Radars.

Unit -5. Satellite communications:
Introduction Kepler's Laws satellite orbits, Geosynchronous satellites. Satellite classification, spacing and frequency allocation. Satellite link equations and link Budget.

TEXT BOOKS:

1. S.Y.LIAO Microwave Devices and circuits (PHI)
2. KENNEDY ' Electronic Communication Systems'.
3. W.TOMASI 'Advanced Electronic Communication Systems.

REFERENCE BOOKS:

1. R.E.COLLIN 'Foundation of Microwave Eng. (Mc.Grew Hill)
2. SKOLNIC: Introduction to Radar Systems.

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ELECTRONICS LAB –VIII B3
PROJECT WORK LAB

Work load: 45 hrs per semester **3 hrs/week**

(At least One Project should be done)

NOTE: At least One Project should be done from any of the four papers

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MODEL PATTERN FOR SYLLABUS: ELECTRICAL APPLIANCES (SKILL) (SEM- 1)

S.NO	Title of Unit	Title of Topic /Sub Topic, etc
Unit-1	**Electric elements & Electric meters**	Voltage, Current, Resistance, Capacitance, Inductance, Electrical conductors and Insulators, Ohm's law, Series and parallel combinations of resistors, Galvanometer, Ammeter, Voltmeter, Multimeter, Transformers, Electrical energy, Power, Kilowatt hour (kWh), consumption of electrical power
Unit-2	**House wiring and safety instruments**	Direct current and alternating current, RMS and peak values, Power factor, Single phase and three phase connections , Basics of House wiring , Star and delta connection , Electric shock, First aid for electric shock, Overloading , Earthing and its necessity, Short circuiting , Fuses , MCB , ELCB, Insulation, Inverter, UPS
Unit-3	**Electrical appliances**	Principles of working, parts and servicing of Electric fan, Electric Iron box, Water heater; Induction heater, Microwave oven; Refrigerator, Concept of illumination, Electric bulbs, CFL, LED lights, Energy efficiency in electrical appliances, IS codes & IE codes. LCD projectors

Biobliography

1 . A Text book on Electrical Technology, B.L.Theraja, S.Chand& Co.,

2. A Text book on Electrical Technology, A.K.Theraja.

3. Performance and design of AC machines, M.G.Say, ELBSEdn.,

4. Handbook of Repair & Maintenance of domestic electronics appliances; BPB Publications

5. Consumer Electronics, S.P.Bali, Pearson

6. Domestic Appliances Servicing, K.P.Anwer, Scholar Institute Publications

Learning Outcomes :

Hours: 2 hours /week

Marks : 50 marks

By successful completion of the course, students will be able to:

1. Acquire necessary skills/hand on experience/ working knowledge on multimeters, galvanometers, ammeters, voltmeters, ac/dc generators, motors, transformers, single phase and three phase connections, basics of electrical wiring with electrical protection devices.

2. Understand the working principles of different household domestic appliances.

3. Check the electrical connections at house-hold but will also learn the skill to repair the electrical appliances for the general troubleshoots and wiring faults.

Co-curricular Activities (Hands on Exercises): (04 hrs)

[Any four of the following may be taken up]

1. Studying the electrical performance and power consumption of a given number of bulbs connected in series and parallel circuits.

2. Measuring parameters in combinational DC circuits by applying Ohm's Law for different resistor values and voltage sources

3. Awareness of electrical safety tools and rescue of person in contact with live wire.

4. Checking the specific gravity of lead acid batteries in home UPS and topping-up with distilled water.

5. Identifying Phase, Neutral and Earth on power sockets.

6. Identifying primary and secondary windings and measuring primary and secondary voltages in various types of transformers.

7. Observing the working of transformer under no-load and full load conditions.

8. Observing the response of inductor and capacitor with DC and AC sources.

9. Observing the connections of elements and identify current flow and voltage drops.

10. Studying electrical circuit protection using MCBs, ELCBs

11. Assignments, Model exam etc.

ADDITIONS:

1. LCD projectors

Syllabus of
SOLAR ENERGY
(SKILL COURSE)(SEM -2)

S.NO	Title of Unit	Title of Topic /Sub Topic, etc
Unit-1	**Solar radiation(6hrs)**	Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation-Pyre heliometers, Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond. **solar energy as a renewable energy.**
Unit-2	**Solar Thermal Systems:(10hrs)**	Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses.
Unit-3	**Solar Photovoltaic Systems:(10hrs)**	Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping. **power sectors of Andhra Pradesh**

Additions : 1.solar energy as a renewable energy
2. power sectors of Andhra Pradesh

Reference Books &area :

1. Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
2. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhumi, Tata Mc-Grew Hill Publishers, 1999.
3. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
4. Science and Technology of Photovoltaic's, P. Jayarama Reddy, BS Publications, 2004.
5. . Solar Energy Utilization, G. D. Rai, Khanna Publishers
6. Solar energy - Wikipedia

Revised CBCS w.e.f. 2020-21

SKILL DEVELOPMENT COURSES

Science Stream

Total 30 hrs (02h/wk), *02 Credits & Max Marks: 50*

Course Outcomes:

After completion of the course, the students will be able to:

1. *Get basic knowledge of solar energy .*
2. *Acquire knowledge on solar radiation principles with respect to solar energy .*
3. *Get knowledge with various techniques of solar energy and its storage*
4. *Understand the solar technology principles and different types of solar cells for energy conversion and different photovoltaic applications.*
5. *Understand the working principles of several solar appliances like Solar cookers,Solar dryers, Solar greenhouses etc.*
6. *To develop basic skills on utilization of solar energy appliances.*
7. *To apply knowledge of solar energy as renewable energy.*

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Department of Physics & Electronics

Syllabus Modified and approved in BOS

2020-21

S.No.	Course Code	Course Name	Content Modifications	Justification
1	ELE N-1303	sem-1 paper -1 Network theorem and electronics devices and circuits	Additions—CB,CC configurations, BJT biasing ,FET biasing and SCR Deletions—power supplies and photo electric devices.	Deleted topics were replaced with additional topics to give clear knowledge of working of electronic devices.
2	ELE N-2303	Sem-2,paper -2 Digital Electronics	Additions—Shift left and Right registers ,Down counters	Will develop deep understanding of working of registers
3	PHY N-1302	Paper I: Mechanics , waves and Oscillations	Deletion:Gyroscope, precession of atom and nucleus in magnetic field. melde's stringAddition: Rutherford scattering (concept only),logarithm decreament,Relaxation time and Quality factor (concept only)fourier therem and evolution of the fourier coefficients, analysis of periodic wave functions, Einestie's mass energy relation, principles behind covid protection equipment(unit)	Already covered in intermediate Will be useful in wave analysis
4	PHY N-2303	paper IIp: Wave Optics	Deletion:Laurent's half shade Polarimeter Addition:circularly polarised light(concept only), Basics of LCDs, Principles of fiber communication (concept only), Einstien coefficients(concepts only)	Deleted topic was replaced with added topic to give glimpse of new age technologies.

Percentage of Overall Revision in the Syllabus: 20%

P. Silaja

Signature of the In-charge

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