VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN
(An Autonomous Institution)
[Sponsored by Lavu Educational Society, Affiliated to JNTUH & Approved by AICTE, New Delhi]
Kondapur (V), Ghatkesar (M), Medchal - Malkajgiri (D) - 501 301. Phone: 96529 10002/3

Department of Physics

2nd BoS Meeting on 26th August 2025

AGENDA

Item No.	Agenda Item
1.0	**Review and Confirmation of Items**
1.1	Review and conformation of the Minutes of Meeting of the 1st BOS Meeting held on 19th December 2024.
1.2	Review of the VR 25 regulations.
1.3	Review and conformation of I B.Tech I & II Semester Course Structure.
2.0	**Approval Items**
2.1	Approval of Syllabus for I B.Tech I & II Semester.
3.0	**Any other items with permission of Chair**

Chairman - BOS
(Dr. R.Sridhar)

Department of Physics

2nd BoS Meeting on 26th August 2025

Members present:

S. No	Name of the Member	Designation	Organization	Role	Sign
1	Dr. R. Sridhar	Associate Professor & HOD-BSH	VMTW, Hyderabad.	BOS Chairman	
2	Dr. Suresh Sripada	Assistant Professor & CRC Chairman	JNTUH UCES, Hyderabad	Member (JNTUH Nominee)	
3	Dr. B. Sreenivas Reddy	Professor & Head	CBIT, Hyd.	Member (Academician)	
4	Dr. M. Sreenath Reddy	Associate Professor	OU, Hyd.	Member (Academician)	
5	Dr.M.Mahesh	Scientist	DRDO-DMRL	Member (Industry)	ABSENT
6	Dr.V.Raju	Assistant Professor	VMTW, Hyderabad.	Member	
7	Mr. K. Bal Reddy	Assistant Professor	VMTW, Hyderabad.	Member	
8	Mr. K.Venu Gopal	Assistant Professor	VMTW, Hyderabad.	Member	
9	Mr. E. Ravi	Assistant Professor	VMTW, Hyderabad.	Member	
10	Mrs. D.Kavitha	Assistant Professor	VMTW, Hyderabad.	Member	

Vignan's Institute of Management & Technology for Women
(An Autonomous Institution & Accredited by NBA & NAAC)

Minutes of the 2nd Board of Studies (BoS) meeting held on 26th August 2025, 9:30 AM at HOD'S Chamber, VMTW

The Quorum (minimum 40%) was satisfied.

The following members were present:

1. Dr. R. Sridhar
2. Dr. Suresh Sripada
3. Dr. B. Sreenivas Reddy
4. Dr. M. Sreenath Reddy
5. Dr.V.Raju
6. Mr. K. Bal Reddy
7. Mr. K.Venu Gopal
8. Mr. E. Ravi
9. Mrs. D.Kavitha

The Chairman welcomed all the members to the meeting of the Board of Studies.

Proceedings of the meeting of the Board of Studies

1.0 Review and Confirmation of Items.

1.1 Review and confirmation of the Minutes of Meeting of the 1st BOS meeting held on 19th December 2024.

The Chairman-BOS present the Minutes of Meeting of the 1st BOS Meeting held on 19th December 2024.

The Board reviewed and confirmed the Minutes of the Meeting of the 1st BOS Meeting held on 19th December 2024.

1.2 Review of the VR 25 regulations.

The Chairman-BOS present the VR 25 regulations.

The Board reviewed and noted.

1.3 Review and conformation of I B.Tech I & II Semester Course Structure.

The Chairman-BOS present the proposed Course Structure (Annexure -1) to the members.

The Board has reviewed and confirmed the Course Structure.

2.0 Approval Items

2.1 Approval of Syllabus for I B.Tech I & II Semester.

The Chairman-BOS presented the Syllabus (Annexure – II, III, IV & V) to the members..

Theory Subject-**Advanced Engineering Physics** – I. B.Tech – I Semester – Common to CSE (AIML), CSE (DS), IT & ECE.

Laboratory - **Advanced Engineering Physics Lab** – I. B.Tech – I Semester – Common to CSE (AIML), CSE (DS), IT & ECE

Theory Subject- **Advanced Engineering Physics** – I. B.Tech – II Semester – CSE.

Laboratory - **Advanced Engineering Physics Lab** – I. B.Tech – II Semester – CSE.

The Board has approved the above syllabi (Annexure – II, III, IV & V).

3.0 Any other item with the permission of the Chair

Board members suggested the changes as the following.

1. **UNIT -1 (Crystallography & Materials Characterization)** replace with few changes as **UNIT –II (Quantum Mechanics)** with the following changes.

Removed topics: Introduction: Unit cell, space lattice, basis, lattice parameters; crystal structures, Bravais lattices, packing factor: SC, BCC, FCC; Miller indices, inter-planar distance; defects in crystals (Qualitative): point defects, line defects, surface defects and volume defects.

Added topics from UNIT-II: Introduction, de-Broglie hypothesis, Heisenberg uncertainty principle, physical significance of wave function, postulates of quantum mechanics: operators in quantum mechanics, eigenvalues and eigenfunctions, expectation value; Schrödinger's time independent wave equation, particle in a 1D box.

Bloch's theorem (qualitative), Kronig-Penney model (Qualitative): E-k diagram, formation of energy bands, origin of band gap classification of solids.

2. **UNIT – II (Quantum Mechanics)** replace with few changes as **UNIT –II (Semiconductor Physics & Nanotechnology)** with the following changes.

Added new topics: Intrinsic and extrinsic semiconductors – Dependence of Fermi level on carrier-concentration and temperature (Qualitative) - Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode - LED and Solar cells, their structure, materials, working principle and characteristics.

Added topic from UNIT –I :Nanoscale, concept of discrete energy levels and quantum confinement in nanomaterials, surface to volume ratio, bottom-up fabrication: sol-gel method, top-down fabrication: ball milling method, characterization techniques - X -ray diffraction (XRD): Bragg's law, powder method, calculation of average crystallite size using Debye Scherrer's formula, Scanning electron microscopy(SEM): block diagram, working principle, applications of nanomaterials.

3. **UNIT- III (Quantum Computing)**

Removed topics: challenges and advantages of quantum computing over classical computation, quantum algorithms: Deutsch-Jozsa, Shor, Grover.

Added topics: Quantum logic gates: Single Qubit (Pauli's Hadamard) gates, Multiple Qubit gates (CNOT), Applications.

4. **UNIT – IV (Magnetic and Dielectric Materials)**

Removed and added in UNIT-II Syllabus: synthesis of ferrimagnetic materials using sol-gel method.

5. **UNIT –V (Laser and Fiber Optics)**

Removed topic: CO_2 Laser

6. **In Advanced Engineering Physics Lab**

   Removed experiments are

   i. Synthesis of magnetite (Fe_3O_4) powder using sol-gel method.

   ii. Study of P-E loop of a given ferroelectric crystal.

   Added experiments are

   i. To Study of V-I Characteristics of a given P-N Junction diode.

   ii. A) To Study the V-I Characteristics of Light Emitting Diode.

   B) To Study the V-I Characteristics & Fill factor of Solar Cell.

   iii. Determination of magnetic moment of a bar magnet and horizontal earth magnetic field replace with Determination of Magnetic field along the axis of current carrying coil – Stewart and Gee's method.

The Board suggested the Chairperson, maintain the Academic Quality, Update the syllabus to maintain the Standards of Institution.

Chairman - BOS
(Dr. R. Sridhar)

Department of Physics

Minutes of the 2nd Board of Studies (BoS) meeting held on 26th August 2025, 9:30 AM at HOD'S Chamber, VMTW

S.No.	Name	Designation	Organization	Position in BoS	Signature
1	Dr. R. Sridhar	Associate Professor & HOD-BSH	VMTW, Hyderabad.	BOS Chairman	
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5	Dr.M.Mahesh	Scientist	DRDO-DMRL	Member (Industry)	-ABSENT-
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9	Mr. E. Ravi	Assistant Professor	VMTW, Hyderabad.	Member	
10	Mrs. D.Kavitha	Assistant Professor	VMTW, Hyderabad.	Member	

25PH102BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

	L	T	P	C
B.Tech.	L	T	P	C
I Year - I Semester	3	0	0	3

ADVANCED ENGINEERING PHYSICS
(Common to CSE(AIML) ECE, IT & CSE(DS))

Course Objectives: The objectives of this course for the student are to:

1. To understand fundamental concepts of quantum mechanics and their applications in solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices & Nanomaterials.
3. To introduce Quantum computing principles and quantum gates.
4. To learn the properties and applications of magnetic and dielectric materials.
5. To explore the working and applications of lasers and fiber optics in modern technology.

Course Outcomes: At the end of the course the student will be able to:

1. CO1: Apply quantum mechanical principles to explain particle behavior and energy band formation in solids.
2. CO2: Identify the role of semiconductor devices in science and engineering applications & understand Nanomaterials.
3. CO3: Understand concepts of quantum computing use quantum gates.
4. CO4: Classify magnetic and dielectric materials and explain their properties, synthesis and applications.
5. CO5: Explain the principles of lasers and fiber optics and their applications in communication and sensing.

UNIT - I: QUANTUM MECHANICS

Introduction, de-Broglie hypothesis, Heisenberg uncertainty principle, physical significance of wave function, postulates of quantum mechanics: operators in quantum mechanics, eigen values and eigen functions, expectation value; Schrödinger's time independent wave equation, particle in a 1D box.

Bloch's theorem (qualitative), Kronig-Penney model (Qualitative): E-k diagram, formation of energy bands, origin of band gap classification of solids.

UNIT - II: Semiconductor physics & Nanotechnology

Intrinsic and extrinsic semiconductors – Dependence of Fermi level on carrier-concentration and temperature (Qualitative) - Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode - LED and Solar cells, their structure, materials, working principle and characteristics.

Nanoscale, concept of discrete energy levels and quantum confinement in nanomaterials, surface to volume ratio, bottom-up fabrication: sol-gel method, top-down fabrication: ball milling method, characterization techniques - X -ray diffraction (XRD): Bragg's law, powder method, calculation of average crystallite size using Debye Scherrer's formula, Scanning electron microscopy(SEM): block diagram, working principle, applications of nanomaterials.

UNIT - III: Quantum Computing

Introduction, linear algebra for quantum computation, Dirac's Bra and Ket notation and their properties, Hilbert space, Bloch's sphere, concept of quantum computer, classical bits, Qubits, multiple Qubit system, quantum computing system for information processing, evolution of quantum systems (Qualitative), Quantum measurements, entanglement, Quantum logic gates: Single Qubit (Pauli's Hadamard) gates, Multiple Qubit gates (CNOT), Applications.

1) 2) 3) 4) 5) –

6) 7) 8) 9) 10)

UNIT – IV Magnetic and Dielectric Materials

Introduction to magnetic materials, origin of magnetic moment-classification of magnetic materials, hysteresis, Weiss domain theory of ferromagnetism, soft and hard magnetic materials, applications: magnetic hyperthermia for cancer treatment, magnets for EV, Giant Magneto Resistance (GMR) device.

Introduction to dielectric materials, types of polarization (qualitative): electronics, ionic & orientation; ferroelectric, piezoelectric, pyroelectric materials and their applications: Ferroelectric Random-Access Memory (Fe-RAM) and fire sensor.

UNIT - V: LASER AND FIBER OPTICS

Introduction to laser, characteristics of laser, Einstein coefficients and their relations, metastable state, population inversion, pumping, lasing action, Ruby laser, He-Ne laser, semiconductor diode laser, applications: Bar code scanner, LIDAR for autonomous vehicle.

Introduction to fibre optics, total internal reflection, construction of optical fibre, acceptance angle, numerical aperture, classification of optical fibres, losses in optical fibre, applications: optical fibre for communication system, sensor for structural health monitoring (Temperature and Pressure sensor).

TEXT BOOKS:

1. Charles Kittel, *Introduction to Solid State Physics*, John Wiley & Sons, Inc.
2. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Tata Mc Graw Hill, 4th Edition, 2021.
3. Thomas G. Wong, *Introduction to Classical and Quantum Computing*, Rooted Grove

REFERENCE BOOKS:

1. Jozef Gruska, Quantum Computing, McGraw Hill
2. Michael A. Nielsen & Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge Univesity Press.
3. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
4. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons, 11th Edition, 2018.
5. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
6. Elementary Solid-State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
7. A.K. Bandyopadhyay - Nano Materials, New Age International, 1st Edition, 2007.
8. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4th Edition,2021.

Useful Links

- https://shijuinpallotti.wordpress.com/wp-content/uploads/2019/07/optical-fiber-communications-principles-and-pr.pdf
- https://dpbck.ac.in/wp-content/uploads/2022/10/Introduction-to-Solid-State-PhysicsCharles-Kittel.pdf
- https://www.thomaswong.net/introduction-to-classical-and-quantum-computing-1e4p.pdf
- https://www.fi.muni.cz/usr/gruska/qbook1.pdf
- https://profmcruz.wordpress.com/wp-content/uploads/2017/08/quantum-computation-and-quantum-information-nielsen-chuang.pdf

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6) 7) 8) 9) 10)

25PH202BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - II Semester	**3**	**0**	**0**	**3**

ADVANCED ENGINEERING PHYSICS
(CSE)

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2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices & Nanomaterials.
3. To introduce Quantum computing principles and quantum gates.
4. To learn the properties and applications of magnetic and dielectric materials.
5. To explore the working and applications of lasers and fiber optics in modern technology.

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1) [illegible] 2) [illegible] 3) [illegible] 4) [illegible] 5) —

6) [illegible] 7) [illegible] 8) [illegible] 9) [illegible] 10) [illegible]

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- https://dpbck.ac.in/wp-content/uploads/2022/10/Introduction-to-Solid-State-PhysicsCharles-Kittel.pdf
- https://www.thomaswong.net/introduction-to-classical-and-quantum-computing-1e4p.pdf
- https://www.fi.muni.cz/usr/gruska/qbook1.pdf
- https://profmcruz.wordpress.com/wp-content/uploads/2017/08/quantum-computation-and-quantum-information-nielsen-chuang.pdf

25PH106BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

	L	T	P	C
B.Tech.				
I Year - I Semester	0	0	2	1

ADVANCED ENGINEERING

~~APPLIED~~ PHYSICS LABORATORY

(Common to CSE(AIML), ECE, IT &DS)

Course Objectives: The objectives of this course for the student to

1. To provide practical exposure to advanced concepts in solid-state and modern physics.
2. To synthesize and study the physical properties of materials like semiconductors, ferromagnetic and ferroelectric substances.
3. To perform semiconductor characterization using Hall effect and band gap experiments.
4. To explore the working principles of LED, Lasers and Optical Fibers through hands-on experiments.
5. To develop skills in data analysis, interpretation, and scientific reporting.

Course Outcomes: The students will be able to:

1. **CO1:** Appreciate Quantum physics in semiconductor devices and optoelectronics.
2. **CO2:** Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials.
3. **CO3:** Characterize semiconductors using Hall effect and energy gap measurement techniques.
4. **CO4:** Demonstrate working knowledge of laser systems and optical fiber parameters through experimental study.
5. **CO5:** Apply scientific methods for accurate data collection, analysis, and technical report writing.

LIST OF EXPERIMENTS:

1. To Study of V-I characteristics of a given P-N Junction diode.
2. Determination of energy gap of a semiconductor.
3. Determination of Hall coefficient and carrier concertation of a given semiconductor.
4. Determination of Magnetic field along the axis of current carrying coil – Stewart and Gee's method.
5. Study of B-H curve of a ferro magnetic material.
6. A) To study the V-I Characteristics of Light emitting diode.
   B) To study the V-I Characteristics & Fill factor of Solar cell.
7. Determination of dielectric constant of a given material.
8. Determination of Curie's temperature of a given ferroelectric material.
9. A) Determination of wavelength of a laser using diffraction grating.
   B) Study of V-I & L-I characteristics of a given laser diode.
10. A) Determination of numerical aperture of a given optical fiber.
    B) Determination of bending losses of a given optical fiber.

Note: Any 8 experiments are to be performed.

1) 2) 3) 4) 5) —

6) 7) 8) 9) 10)

25PH206BS **Vignan's Institute of Management and Technology for Women** VR25

An Autonomous Institution

B.Tech.	**L**	**T**	**P**	**C**
I Year - II Semester	**0**	**0**	**2**	**1**

ADVANCED ENGINEERING ~~APPLIED~~ PHYSICS LABORATORY

(CSE)

Course Objectives: The objectives of this course for the student to

1. To provide practical exposure to advanced concepts in solid-state and modern physics.
2. To synthesize and study the physical properties of materials like semiconductors, ferromagnetic and ferroelectric substances.
3. To perform semiconductor characterization using Hall effect and band gap experiments.
4. To explore the working principles of LED, Lasers and Optical Fibers through hands-on experiments.
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Note: Any 8 experiments are to be performed.

1) 2) 3) 4) 5) —

6) 7) 8) 9) 10)