



Madanapalle Institute of Technology & Science

*Affiliated to JNTUA, Anantapur & Approved by AICTE, New Delhi
(AUTONOMOUS)*
Recognised Research Center

Recognised by UGC under the sections 2(f) and 12(B) of the UGC act 1956



Board of Studies Meeting

22-05-2015

Department of Physics

OPEN ELECTIVES

Sl.No.	Course Code	Course Name
1	14HSSOE01	Professional Ethics
2	14HSSOE02	Human Resource Development
3	14MATOE01	Numerical Analysis
4	14MATOE02	Engineering Optimization
5	14CEOE01	Project Planning Management
6	14CHEOE01	Introduction to Nano Science and Technology
7	14CHEOE02	Green Chemistry and Catalysis
8	14PHYOE01	Physics of Laser and Applications
9	14PHYOE02	Optical Physics and Applications

DEPARTMENT OF PHYSICS
MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(An UGC-Autonomous Institution)

B.Tech. – Open Elective

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PHYSICS OF LASER AND LASER APPLICATIONS
(14PHYOE01)

Course Description:

This course covers the introduction to the theory and mechanism of laser action, various types of lasers and their applications and future use.

Scope and Objectives of the Course:

The Objective of the course is to make the student to understand the principles of laser, to explain the properties of laser light and to understand the operations of different types of lasers, to explain how material processing is accomplished with lasers. Introduce basic fiber optic communication systems using laser.

UNIT-I INTRODUCTION

Laser characteristics, Spontaneous and Stimulated emission of radiation, Einstein's Coefficients, Population inversion, Methods of Population Inversion Gaussian beam and its properties, Stable two minor optical resonators, Longitudinal and transverse modes of laser cavity, Mode selection, Gain in the regenerative laser cavity.

UNIT-II TYPES OF LASERS AND THEIR CONSTRUCTION

Basic principles of lasers, Solid-state lasers, Gas lasers, Ruby laser, Nd-YAG Laser, He-Ne laser, Carbon dioxide laser, Nitrogen laser,

UNIT-III TYPES OF LASERS – II

Semiconductor lasers, free electron lasers, Liquid, Dye and Chemical lasers. High power laser systems. Laser spectroscopic techniques and other applications.

UNIT-IV LASER OPTICS

Laser fluorescence and Raman scattering and their use in pollution studies, non-linear interaction of light with matter, Laser induced multi-photon processes and their applications.

UNIT-V LASER SPECTROSCOPY AND OPTICAL FIBERS

Ultra high resolution spectroscopy with lasers and its applications, Propagation of light in a medium with variable refractive index, optical fibers, light wave communication, qualitative of medical and engineering applications of lasers.

TEXT BOOKS

1. Laser Theory and Applications: A.K. Ghatak and K. Thyagarajan
2. Optics: Ghatak, 4th Edition, Tata McGraw Hill

REFERENCE BOOKS

1. Principles of Laser: O. Svelto
2. Laser spectroscopy: Demtroder
3. Laser Applications: Monte Ross

Course Outcomes

Upon completion of this course the students shall be able to:

1. Identify the four elements of different lasers
2. Estimate stability requirements in producing laser light
3. Recognize different laser modes of oscillation
4. Recognize components of optical fiber communication system

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B.Tech. – Open Elective

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OPTICAL PHYSICS AND APPLICATIONS
(14PHYOE02)

Course Description:

The course will cover Geometrical optics, Aberrations, Physical Optics, and Diffraction

Scope and objective of the course:

The objective of the course is to give an introduction to basic phenomena in optics and the techniques used to deal with them. Course will assume a basic knowledge of optics at the level of the core Physics courses. The course will also provide theoretical background for the optical experiments done in the lab courses.

UNIT 1: INTRODUCTION

Corpuscular and wave theory, Fermat's principle, Matrices for translation, refraction and reflection, Unit and nodal planes, Eigenvalues and Eigenvectors.

UNIT II: ABERRATIONS

Types of aberrations, Chromatic and monochromatic aberrations. Different types of monochromatic aberrations.

UNIT III: WAVE OPTICS & INTERFERENCE

Huygens' principle, Superposition of waves, Fourier transforms, representation of slits and apertures, Two beam interference by Division of wave front.

UNIT IV: DIFFRACTION & POLARISATION

Fraunhofer diffraction, Diffraction from single slit, double slit & multiple slits, Fresnel half-period zones, Zone plate, Polarisation, Malus' law, double refraction.



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Department of Physics

Board of Studies Meeting on 22-05-2015

Minutes of the meeting

The meeting of Board of Studies is held today on 22-05-2015 from 11.00 am to 2.00 pm for the approval and evaluation of the syllabus of the two open electives offered by the department of Physics.

The following members attended the meeting.

1. Dr. S. Victor Vedanayakam
2. Dr. R. Padma Suvarna
3. Mr. M. Sankaran
4. Prof. P. S. Brahmanandam
5. Dr. M. Chandra Sekhar
6. Dr. N. Nanda Kumar Reddy
7. Dr. Virendra Kumar Verma
8. Dr. G. Gopikrishna
9. Dr. Sumit Kumar
10. Ms. K. Surekha

And the following members are expected to be taking part in the meeting, due to some unavoidable reasons they could not attend.

1. Prof. J. Nagaraju
2. Prof. P. Sreedhar Reddy
3. Mrs. G. Soujanya

Principal Dr. C Yuvraj addressed the gathering, extended warm welcome to the dignitaries and gave opening remarks.

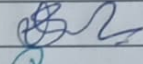

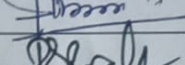
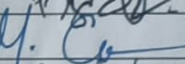
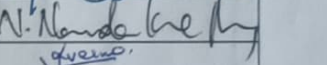
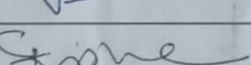
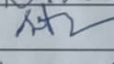
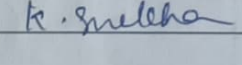


HOD Department of Physics Dr. Victor Vedanayakam explained in detail regarding the syllabus of the two open electives planned to be offered from the academic year 2014-15.

Board members reviewed the syllabus for the open elective courses **1. PHYSICS OF LASER AND APPLICATIONS** and **2. OPTICAL PHYSICS AND APPLICATIONS** for B. Tech students.

Resolutions:

- 1) The board has suggested to exclude the topic Non linear interaction of light with matter in unit -IV of open elective - I.
- 2) More stress has to be given in the physics aspects of Engineering applications of LASER.
- 3) The board recommended reshuffling unit- V in open elective - II to deal completely with optical fibers, excluding the aspects of LASER. They suggested to introduce construction, principle of optical fiber, attenuation, losses of optical fibers, analogue and digital communication system, and applications of optical fibers.
- 4) The board suggested to include Non-linear interaction of light with matter in unit-III of open elective - II as self study topic.
- 5) They suggested to introduce the open electives such as Thermo electrics and energy harvesting, Micro and Nano sensors, Microelectronic devices and Plasma physics.

Signature of the BoS members

S. NO	NAME	DESIGNATION	SIGNATURE
1	Dr. S. Victor Vedanayakam	Chairman	
2	Dr. R. Padma Suvarna	Subject Expert nominated by V.C	
3	Mr. M. Sankaran	Industry Expert	
4	Prof. P. S. Brahmanandam	Member	
5	Dr. M. Chandra Sekhar	Member	
6	Dr. N. Nanda Kumar Reddy	Member	
7	Dr. Virendra Kumar Verma	Member	
8	Dr. G. Gopikrishna	Member	
9	Dr. Sumit Kumar	Member	
10	Ms. K. Surekha	Member	

Guidelines for Open Electives

I. Open Electives:

The Open Electives (OEs) will commence from III Year I Semester and ends in IV year II Semester. In total, students need to complete 4 OEs, one in each semester. Students can opt for any 4 courses of their choice from the list under "Open Electives". Students need to register their names through online for OE course, one semester before. If the number of students enrolled for a particular OE is less than 40, that course cannot be run for that semester. Similarly, the maximum number is restricted to 60, on first come first basis.

In total, 69 open electives are offered for all UG courses, in which, 9 courses are offered by general departments and 60 are from engineering departments (12 courses each department). These are drawn from discipline electives of each department. The discipline electives of one department would be open electives for other departments.

The general OEs (offered by departments of Humanities, Physics, Chemistry, Mathematics and Civil) are open to all. A student, belongs to a particular branch shall not be allowed to opt for OE that is offered by his/her parent department.

List of Open Electives:

Sl.No.	Open Electives	Department
1	Professional Ethics	HSS
2	Human Resource Development	HSS
3	Numerical Analysis	Mathematics
4	Engineering Optimization	Mathematics
5	Project Planning and Management	Civil
6	Introduction to Nano Science and Technology	Chemistry
7	Green Chemistry and Catalysis	Chemistry
8	Lasers and Applications	Physics
9	Optical Physics & Applications	Physics
1	Pavement Design, Maintenance and Management	Civil Engg
2	Computer Applications in Civil Engineering	
3	Environmental Impact Assessment	
4	Design of Pre-stressed Concrete Structure	
5	Design Advanced Concrete Structures	
6	Introduction to Bridge Engineering	
7	Airport, Railways and Waterways	
8	Geosynthetics and reinforced Soil Structure	
9	Irrigation Engineering	
10	Green Buildings and Energy Conversion	
11	Principles of Geographical Information Systems	
12	Introduction to Finite Element Methods	
1	Optical communication	