



# YOGI VEMANA UNIVERSITY

## DEPARTMENT OF

# MATERIALS SCIENCE AND NANOTECHNOLOGY

### About the Department

The department of Materials Science and Nanotechnology was established in the year 2009 with a vision to promote education and research in the emerging areas of functional nanomaterials for energy, healthcare, environmental and biological applications. The department offers both M. Sc and Ph. D programmes in Material Science and Nanotechnology with well-designed curriculum and standards. With rich research expertise in India and abroad, the faculty members significantly contributing to the research growth of the University by publishing more than 200 articles in high impact journals. The department received research grants from funding agencies such as MNRE, DST, CSIR, UGC, DRDO-NRB etc. The department is always strives in establishing inter-departmental as well cross-institutional collaboration both at national and international level. Faculty members received several prestigious awards like UGC-Raman postdoctoral fellow, DST Young Scientist, Fellow of Royal Society of Chemistry, Andhra Pradesh government's Scientist and Best Teacher award, Fellow of Indian Chemical Society and Academy of Sciences Chennai, etc. To promote research in cross-disciplinary areas, adjunct faculty members from institute of national importance were appointed in the year 2021. To promote sharing of knowledge and facilities, department has entered into MOUs with various higher educational institutions. In addition, department is equipped with infrastructure facilities like ICT-enabled classrooms, laboratories with modern amenities. The department hosts DST-Inspire fellows, CSIR-SRF, and project fellows for doctoral research. Students are encouraged to take internships with neighbouring Universities, institutions. As a part of curriculum students undertake project working during the 4<sup>th</sup> semester. The department's proud alumni were working in national and international institutions in various capacities in teaching and research domains.

**Student intake: Regular – 15 (EWS), Self finance –15 (EWS), TOTAL – 30**

Student on rolls: 2020 – 2022 Batch (IV SEM): 12

2021 – 2023 Batch (I SEM) : 6

#### Programmes Offered

M. Sc. Materials science and Nanotechnology, Ph.D

#### Infrastructural facilities

Student-specific:

Class Rooms: 02

ICT enabled: 01

Total number of Labs : 0 2

#### Eligibility:

The admission into M. Sc (Materials Science and Nanotechnology) is based on a state level common entrance examination (APPGCET) conducted by Andhra Pradesh State Council of Higher Education (APSCHE). The candidate should possess U. G with Physics and Mathematics. The question paper consists of 100 multiple choice questions covering prescribed syllabus in Physics at undergraduate level. For the admission into Ph. D programme also is based on a state level common entrance exam (APRCET) conducted by APSCHE. The applicant for Ph. D programme must studied M. Sc (Materials Science and Nanotechnology/ Materials.Science/ Nanotechnology/ Chemistry/ Physics).





| Semester                        | Components of Study | Course Code                                    | Title of the Course  | No. of credits       | No. of hours per week | Practical/Project | Internal Assessment | Semester End Exams | Total       |     |
|---------------------------------|---------------------|--|--|----------------------|-----------------------|-------------------|---------------------|--------------------|-------------|-----|
| SEMESTER-I                      | Core                | MSNT 101                                       | Concepts in Materials Science  | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 102                                       | Chemistry of Materials   | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 103                                       | Fundamentals of Polymers   | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 | Internal Elective   | MSNT 104                                       | (A) Classical and Statistical Mechanics  | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     |  | (B) Polymer Processing and Testing Methods                                     |                      | 04                    |                   |                     |                    |             |     |
|                                 |                     |  | (C) Enhancing Soft Skills and Personality                                      |                      | 04                    |                   |                     |                    |             |     |
|                                 |                     |  |  | Tutorial and Seminar | 00                    | 04                |                     | 00                 | 00          | 000 |
| Practical                       | MSNT 105            | Practical-I Polymeric Materials Lab            |  | 04                   |                       | 16                |                     | 100                | 100         |     |
| Practical                       | MSNT 106            | Practical-II Materials Synthesis Lab           |  | 04                   |                       | 16                |                     | 100                | 100         |     |
| <b>Sub-total</b>                |                     |  |  | <b>24</b>            | <b>28</b>             | <b>32</b>         | <b>100</b>          | <b>500</b>         | <b>600</b>  |     |
| SEMESTER-II                     | Core                | MSNT 201                                       | Quantum Mechanics  | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 202                                       | Properties of Bulk and Nanomaterials   | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 203                                       | Nanoscience and Nanocatalysis for Sustainable Future                           | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 | Open Elective       | MSNT 204                                       | (A) Introduction to Nanoscience and Technology                                 | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     |  | (B) Fundamentals in Materials Science  |                      | 04                    |                   |                     |                    |             |     |
|                                 |                     |  | (C) SWAYAM /MOOCs/ NPTEL   |                      | 04                    |                   |                     |                    |             |     |
|                                 |                     |  |  | Tutorial and Seminar | 00                    | 04                | 00                  | 00                 | 00          | 000 |
| Practical                       | MSNT 205            | Practical-III Study of Properties of Materials |  | 04                   |                       | 16                |                     | 100                | 100         |     |
| Practical                       | MSNT 206            | Practical-IV Nanocatalysis Lab                 |  | 04                   |                       | 16                |                     | 100                | 100         |     |
| <b>Sub-total</b>                |                     |  |  | <b>24</b>            | <b>28</b>             | <b>32</b>         | <b>100</b>          | <b>500</b>         | <b>600</b>  |     |
| SEMESTER-III                    | Core                | MSNT 301                                       | Characterization Techniques  | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 302                                       | Semiconductor Physics  | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 303                                       | Alloys and Composites  | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 | Open Electives      | MSNT 304                                       | (A) Intellectual Property Rights   | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     |  | (B) Scientific writing in English  |                      | 04                    |                   |                     |                    |             |     |
|                                 |                     |  | (C) SWAYAM /MOOCs/ NPTEL   |                      | 04                    |                   |                     |                    |             |     |
|                                 | Practical           | MSNT 305                                       | Practical-V Semiconductors Lab   |                      | 04                    |                   | 16                  |                    | 100         | 100 |
| Skill Oriented Course Practical | MSNT 306            | Characterization of Materials                  |  | 04                   | 04                    | 08                | 10                  | 40                 | 50          | 100 |
|                                 |                     |  | Tutorial and Seminar   | 00                   | 04                    | 00                | 00                  | 00                 | 000         |     |
| <b>Sub-total</b>                |                     |  |  | <b>24</b>            | <b>28</b>             | <b>32</b>         | <b>100</b>          | <b>500</b>         | <b>600</b>  |     |
| SEMESTER-IV                     | Core                | MSNT 401                                       | Optical, Electrical, Diffusive and Superconductivity of Bulk and Nanomaterials | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 402                                       | Industrial Applications of Nanomaterials                                       | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     | MSNT 403                                       | Nanomaterials and Food and Agriculture   | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 | Internal Elective   | MSNT 404                                       | (A) Scientific Writing Skills in English & Intellectual Property Rights        | 04                   | 04                    |                   | 25                  | 75                 | 100         |     |
|                                 |                     |  | (B) Energy Conversion Technologies   |                      | 04                    |                   |                     |                    |             |     |
|                                 |                     |  | (C) Advanced Characterization Techniques                                       |                      | 04                    |                   |                     |                    |             |     |
|                                 | Practical           | MSNT 405                                       | Practical-VI Applications of Nanomaterials Lab                                 |                      | 04                    |                   | 16                  |                    | 100         | 100 |
| Multi-Disciplinary/Project      | MSNT 406            | Project Work                                   |  | 04                   |                       | 16                |                     | 100                | 100         |     |
| <b>Sub-total</b>                |                     |  |  | <b>24</b>            | <b>28</b>             | <b>32</b>         | <b>100</b>          | <b>500</b>         | <b>600</b>  |     |
| <b>Grand Total</b>              |                     |  |  | <b>96</b>            | <b>116</b>            | <b>120</b>        | <b>400</b>          | <b>2000</b>        | <b>2400</b> |     |

## SOPHISTICATED INSTRUMENTS



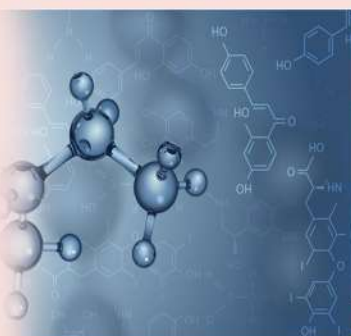
Gas chromatograph



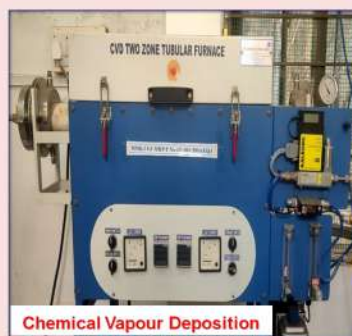
Solar Simulator



Micro Milling



M.Sc Laboratories Materials Science & Nano technology



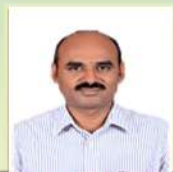
Chemical Vapour Deposition



Particle Size Analyzer



## Faculty Details



Prof. M. V. Shankar  
Professor

**Research Area**  
Photocatalysis for Hydrogen fuel production and multi-functional application of nano-materials.



Dr. B. Vijay Kumar Naidu  
Associate Professor

**Research Area**  
Polymeric materials for membrane applications materials.



Dr. N. Ramamanohar Reddy  
Associate Professor

**Research Area**  
Magnetic materials for supercapacitor applications



Dr. S. Adinarayana Reddy  
Associate Professor

**Research Area**  
Design and synthesis of nano-materials for energy and fuel cells applications.



Dr. M. Mamatha Kumari  
Assistant Professor

**Research Area**  
Carbonaceous nanomaterials /hybrids/Composites for energy and environmental applications

## Faculty Achievements



Department of Materials Science and Nanotechnology faculty have received several prestigious awards, few of which were listed below.

- Meritorious Teacher Award from APSCHE, Amaravathi, A.P
- Top 2% Most influential scientist in the world (Stanford University, USA and Elsevier)
- Ranked in Top 10,000 scientists in India by AD Scientific Index 2022
- Fellow of Royal Society of Chemistry
- Raman postdoctoral fellow
- AP Scientist Award
- Fellow of Indian Chemical Society
- Fellow of academy of sciences Chennai
- DST Young scientist Award
- AP Academy of Sciences Associate Fellow
- Institute of Scholars Young Researcher Award

## Student's Achievements



No of Ph. Ds Awarded: 12

Working as post-docs: South Korea (7)

Asst. Professor (1)

Hetero drugs (1)

Microlabs (1)

**Students progressed to higher education:**

IICT Hyderabad, Alagappa university Chennai, Yonsei University South Korea

International Advanced Research Centre for Powder Metallurgy and New Materials ,Hyderabad

Prathibha awards – Government of Andhra Pradesh – 11.

Total Ph Ds awarded so far: 16 (Among them 10 members are working as Post Doctoral Fellows in countries like France, Czech Republic, Poland, South Korea, Qatar, China).

DST – National Post Doctoral Fellows worked : 03.

DST – INSPIRE Fellows received Ph. D : 01.

DST – INSPIRE Fellows working for Ph. D : 03).



# Department Activities

## Student Projects

Students need to take-up projects in the final semester under the supervision of faculty.

## Student Internships

INSA Summer fellowships – CECRI, JNTU (HYD) , S.V University

## Student Seminars

In all the semesters student will give seminars Preparatory classes to students for national level exams like CSIR/GATE

Student Extension Activities



# Research achievements



# Our recruiters



# Research Collaborations



## Contact Information

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