

Rayat Shikhan Sanstha's
D. P. Bhosale College, Koregaon
Department of Physics
Add on Course -2021-2022
Nanotechnology
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Rayat Shikhan Sanstha's
D. P. Bhosale College, Koregaon
Department of Physics
Add on Course -2021-2022
Nanotechnology

Date :- 7/12/2021

To,
The principal,
D.P. Bhosale college, Koregaon

Subject: - About Add on Course

Respected Sir,

The department of Physics is going to run carrier oriented course on
"Add on Course in Nanotechnology" in academic year 2021-2022.

The course will be implemented according to university norms.

Thanking you.

Yours faithfully,


Head
Department of Physics.



Rayat Shikhan Sanstha's
D. P. Bhosale College, Koregaon
Department of Physics

Add on Course -2021-2022

Autonomous (Self Financed) Add on course.
Nanotechnology

Objectives of the course –

- To foster scientific attitude, provide in-depth knowledge of scientific and technological concepts of Nanoscience and Nanotechnology.
- To enrich knowledge through problem solving, minor/major projects, seminars, tutorials, review of research articles/papers, participation in scientific events, study visits, etc.
- To familiarize with recent scientific and technological developments.
- To create foundation for research and development in Nanoscience and Nanotechnology.
- To help students to learn various experimental and computational tools thereby developing analytical abilities to address real world problems.
- To train students in skills related to research, education, industry, and market.
- To help students to build-up a progressive and successful career in Nanoscience and Nanotechnology.

Reference Books:-

1. Solid States Physics - S.O. Pillai (latest edition)
2. Nanobiotechnology, C.M.Niemeyer, C.A. Mirkin, Wiley VCH, 2004
3. Carbon materials and nanotechnology – Anke Krueger, Wiley- VCH publication
4. Carbon-based Nanomaterials and Hybrids, Hans J. Fecht, Kai Brühne, CRC Press
5. Polymer photovoltaics, a practical approach by Fredrik C. Krebs, Spie Press, Bellingham, Washington USA.

6. Solar cells- Dye Sensitized Devices by Leonid A. Kosyachenko, Published by Intech.
Janeza Trdine 9, 51000 Rijeka Croatia

Board of Studies-

1. Nimat R. K (Balasaheb Desai College, Patan)
2. Mujawar S.H (Yashwantrao Chavan institute of Science, Satara)
3. Dr. Jamadade. V.S.
4. Shri.Jadhav. S.L.
5. Mr. Kadam. P. K
6. Miss. Khandare. A. B




Head
Department of Physics
P. Bhosale College, Koregaon

Rayat Shikhan Sanstha's
D. P. Bhosale College, Koregaon
Department of Physics
Add on Course -2021-2022

Autonomous (Self Financed) Add on certificate course.
Nanotechnology

1. **Eligibility** : XII std. pass.
2. **Duration of Course** : 3 Month.
3. **No. of Students** : 12
4. **Admission fee** : Rs.- 500 /-(Five hundred)
5. **Examination** : Theory (50 marks),
: Practical (40 marks)
For Practical- Journal – 10 marks.
: Total 100 marks.
6. **Faculty** : Dr. V.S. Jamadade
: Shri. Jadhav. S.L
: Mr. Kadam. P. S.
: Miss. Khandare A.B.
: Miss. Mahamuni K. S.
7. **Coordinator** : Mr. Kadam. P. S.
8. **Co-Coordinator** : Miss. Khandare A.B.
9. **Head of the Department** : Dr. V. S. Jamadade
10. **Director** : Principal, D. P. Bhosale College, Koregaon.




Head
Department of Physics
D. P. Bhosale College, Koregaon

Rayat Shikhan Sanstha's
D. P. Bhosale College, Koregaon
Department of Physics
Add on Course -2021-2022
Nanotechnology
Admission List

Sr.No.	Class	Full Name	Mobile
1	B.Sc-III	Dhole Aniket Sanjay	9529193838
2	B.Sc-III	Jadhav Pranita Duryodhan	7499196983
3	B.Sc-III	Jagadale Mayuri Tatyaba	9422023342
4	B.Sc-III	Kadam Rushikesh Saudagar	7038809705
5	B.Sc-III	Kadam Sanket Ashok	7776838805
6	B.Sc-III	Katkar Omkar Jotiram	9137756199
7	B.Sc-III	Kodulkar Swati Shrikrushna	9773714714
8	B.Sc-III	Mane Mayuri Jaysing	7559129622
9	B.Sc-III	Pawar Kshitija Vikas	7499577411
10	B.Sc-III	Shinde Dhiraj Dashrath	8999006360

11	B.Sc-III	Shinde Poonam Vikas	8975007565
12	B.Sc-III	Ubale Ashish Bajirao	7058151060



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Department of Physics
Add on Course -2021-2022

Nanotechnology

1. Solid State Physics:

Revision of band theory, band structure, intrinsic and extrinsic semiconductors, Fermi level, band gap in metals, semiconductors and insulators, band gap for bulk, atoms and nanoclusters, density of states, Bohr exciton radius, quantum size effect, nanostructures, quantum well and quantum dots.

2. Advanced spectroscopy:

Revision of electron probe microscopy, Dynamic Light scattering (DLS), NMR spectroscopy, ESR and FMR spectroscopy, optical absorption and emission spectroscopy, Thermoluminescence

3. Nanomaterial in biotechnology :

definition classification of nanomaterial

(i) carbon based materials (ii) metal based materials (iii) dendrimers (iv) composites, Graphene, Nanotubes, Nanowires, Nanocones, Quantum dots.

4. Applications of carbon based nanomaterials:

Catalysis applications of nanoforms of carbon, supercapacitor, battery applications, water purification, solar cell applications, sensor and FET, Biological applications

5. Polymer Solar Cells:

Introduction, history of the polymer solar cells, planar heterojunction solar cells, bulk heterojunction solar cells, excitons in polymers, donor and acceptors polymers, mechanism of photon absorption and power generation, evolution of polymer solar cell designs, hybrid polymer solar cells.

6. Perovskite solar cells:

Introduction, history of perovskite solar cells, operation, design and working principle of perovskite solar cells, advantage and disadvantages of perovskite solar cells, comparison of photon conversion efficiency of perovskite solar cells with other solar cells.

Syllabus (Practical)

Sr. No.	Title of Experiments
1	Synthesis of ZnO nano-particles by wet chemical method.
2	Synthesis of NiO nano-particles by wet chemical method.
3	Synthesis of NiO Nanoparticles by using Hydrothermal method.
4	Preparation of TiO ₂ thick film by screen printing technique and measurement of thickness using weight difference method
5	Characteristic of solar cell (calculation of fill factor, maximum power point and efficiency)
6	Synthesis of ZnO Nanoparticles by using Hydrothermal method.
7	Preparation of thin film by spray pyrolysis technique and measurement of thickness using weight difference method.

Rayat Shikhan Sanstha's
D. P. Bhosale College, Koregaon
Department of Physics
Add on Course -2021-2022
Nanotechnology
Schedule of the course

Sr. No.	Day & Date	Time	Title of Theory/Experiment	Faculty Name
1	Thursday 16/12/2021	10:00 to 12:00 a:m	Solid State Physics	Dr. V.S. Jamadade
2	Friday 17/12/2021	10:00 to 12:00 a:m	Synthesis of ZnO nano-particles by wet chemical method.	Miss. Khandare A.B.
3	Thursday 23/12/2021	10:00 to 12:00 a:m	Solid State Physics	Dr. V.S. Jamadade
4	Friday 24/12/2021	10:00 to 12:00 a:m	Synthesis of NiO nano-particles by wet chemical method	Mr. Kadam. P. S.
5	Thursday 30/12/2021	10:00 to 12:00 a:m	Advanced spectroscopy	Shri. Jadhav. S.L
6	Friday 31/12/2021	10:00 to 12:00 a:m	Synthesis of NiO Nanoparticles by using Hydrothermal method.	Miss. Khandare A.B.
7	Thursday 06/01/2022	10:00 to 12:00 a:m	Nanomaterial in biotechnology	Mr. Kadam. P. S.
8	Friday 07/01/2022	10:00 to 12:00 a:m	Preparation of TiO ₂ thick film by screen printing technique and measurement of thickness using	Miss. Mahamuni K. S.

			weight difference method	
9	Thursday 13/01/2022	10:00 to 12:00 a:m	Applications of carbon based nanomaterials	Miss. Khandare A.B.
10	Friday 20/01/2022	10:00 to 12:00 a:m	Characteristic of solar cell (calculation of fill factor, maximum power point and efficiency)	Shri. Jadhav. S.L
11	Thursday 21/01/2022	10:00 to 12:00 a:m	Polymer Solar Cells	Miss. Mahamuni K. S.
12	Friday 27/01/2022	10:00 to 12:00 a:m	Synthesis of ZnO Nanoparticles by using Hydrothermal method.	Mr. Kadam. P. S.
13	Thursday 28/01/2022	10:00 to 12:00 a:m	Polymer Solar Cells	Miss. Mahamuni K. S.
14	Friday 10/02/2022	10:00 to 12:00 a:m	Preparation of thin film by spray pyrolysis technique and measurement of thickness using weight difference method.	Miss. Khandare A.B.
15	Thursday 11/02/2022	10:00 to 12:00 a:m	Perovskite solar cells	Shri. Jadhav. S.L
16	Friday 17/02/2022	10:00 to 12:00 a:m	Perovskite solar cells	Mr. Kadam. P. S.
17	Thursday 10/03/2022	11:00 to 12:00 a:m	Offline Examinations	



Rayat Shikshan Sanstha's
D P Bhosale College, Koregaon
SHORT TERM COURSE

Dept. of Physics
Question Paper- Theory
Name of Course:- Nanotechnology

Marks -50

Theory Exam-2021-22

Date:- 10/03/20221

Time:- 11:00 to 12:00 a:m

Que.No.1 Select the Correct Alternative from the following: (20)

1. Nanomaterials are the materials with at least one dimension measuring less than _____
 - a) 1 nm
 - b) 10 nm
 - c) 100 nm
 - d) 1000 nm
2. A material with one dimension in Nano range and the other two dimensions are large is called _____
 - a) Micro-material
 - b) Quantum wire
 - c) Quantum well
 - d) Quantum dot
3. The colour of the nano gold particles is _____
 - a) Yellow
 - b) Orange
 - c) Red
 - d) Variable
4. The melting point of particles in nano form _____
 - a) Increases
 - b) Decreases
 - c) Remains same
 - d) Increases then decreases
5. The first talk about nano-technology was given by _____
 - a) Albert Einstein
 - b) Newton
 - c) Gordon E. Moore
 - d) Richard Feynman

6. The size of atoms is nearly _____
- a) 0.01 nm
 - b) 0.1 nm
 - c) 1 nm
 - d) 10 nm
7. The major difference between the nano materials compared to the bulk form is the big fraction of the total number of atoms on the surface.
- a) True
 - b) False
8. When semiconductors are reduced to nanometres they become pure conductors.
- a) True
 - b) False
9. Which of the processes of materials was not described as Nanotechnology?
- a) Separation
 - b) Creation
 - c) Processing
 - d) Consolidation
10. The initial tools used to help launch the nanoscience revolution were _____
- a) Binoculars
 - b) Microscope
 - c) Scanning probe instruments
 - d) Interferometer

Que.No.2 Write in Brief. (Any three)

(30)

1. Define Nanotechnology.
2. Write different modes of classification of Nanomaterials.
3. List out challenges faced by Nanotechnology.
4. Explain X-Ray Diffraction (XRD)
5. Write short note on (i) Carbon fullerenes (ii) Carbon Nanotubes

Rayat Shikshan Sanstha's

D P Bhosale College, Koregaon

ADD ON COURSE

Nanotechnology

Examination MARKLIST -2021-22

Sr.No	Name of Student	Result	Grade
1	Dhole Aniket Sanjay	PASS	B
2	Jadhav Pranita Duryodhan	PASS	A
3	Jagdale Mayuri Tatyaba	PASS	A
4	Kadam Rushikesh Saudagar	PASS	A
5	Kadam Sanket Ashok	PASS	A
6	Katkar Omkar Jotiram	PASS	A
7	Kodulkar Swati Shrikrushna	PASS	B
8	Mane Mayuri Jaysing	PASS	A
9	Pawar Kshitija Vikas	PASS	A
10	Shinde Dhiraj Dashrath	PASS	A
11	Shinde Poonam Vikas	PASS	A
12	Ubale Ashish Bajirao	PASS	B




Head
Department of Physics
D. P. Bhosale College, Koregaon



Rayat Shikshan Sanstha's

D. P. BHOSALE COLLEGE, KOREGAON



ADD ON COURSE

Certificate

This is to certify that Mr./Miss. Jagdale... Mayuri. Tatyaba.....

CLASS : B.Sc. III..... SUBJECT Physics.....

has successfully completed three months "Add on Course" in.....

..... Nanotechnology.....

From ..2021..... to2022..... and obtainedA..... Grade.

21/1/21

Chairman



Principal

Course Co-ordinator

Principal



Rayat Shikshan Sanstha's

D. P. BHOSALE COLLEGE, KOREGAON



ADD ON COURSE

Certificate

This is to certify that Mr./Miss...Katkar..Omkar..Johiram.....

CLASS : ...B.Sc. - III.....SUBJECT....Physics.....

has successfully completed three months "Add on Course" in.....

....Nanotechnology.....

From ...2021..... to2022..... and obtainedA..... Grade.


Chairman




Course Co-ordinator


Principal

Rayat Shikshan Sasntha's

D.P.Bhosale College, Koregaon

B.Sc. III (Physics) 2021-22 Add on Course on Nanotechnology

Attendance Sheet

Sr. No.	Roll No.	Student Name	16/12/21	17/12/21	23/12/21	24/12/21	30/12/21	31/12/21	6/1/22	7/1/22	13/1/22	20/1/22	21/1/22	27/1/22	28/1/22	10/2/22
1	B.Sc-III	Dhole Aniket Sanjay	P	P	P	A	P	P	P	P	P	A	A	P	A	A
2	B.Sc-III	Jadhav Pranita Duryodhan	P	P	P	P	P	P	P	P	P	P	P	P	P	P
3	B.Sc-III	Jagadale Mayuri Tatyaba	P	P	P	P	P	P	P	P	P	P	P	P	P	P
4	B.Sc-III	Kadam Rushikesh Saudagar	A	P	P	A	A	A	P	P	A		A	P	A	P
5	B.Sc-III	Kadam Sanket Ashok	A	A	P	A	P	P	A	A	A	A	A	P	A	A
6	B.Sc-III	Katkar Omkar Jotiram	P	P	P	P	A	A	A	A	P	P	A	P	P	P
7	B.Sc-III	Kodulkar Swati Shrikrushna	P	P	P	P	P	P	P	P	P	P	A	P	A	P
8	B.Sc-III	Mane Mayuri Jaysing	P	P	P	P	P	P	P	P	P	P	P	P	P	P
9	B.Sc-III	Pawar Kshitija Vikas	P	P	P	P	P	P	P	P	P	P	P	P	P	P
10	B.Sc-III	Shinde Dhiraj Dashrath	P	A	A	P	P	A	P	P	A	P	A	P	A	A
11	B.Sc-III	Shinde Poonam Vikas	P	P	P	P	P	P	P	P	P	P	P	P	P	P
12	B.Sc-III	Ubale Ashish Bajirao	A	A	P	P	A	A	A	A	P	P	P	P	P	A



Head
Department of Physics
D.P. Bhosale College, Koregaon

Rayat Shikshan Sasntha's

D.P.Bhosale College, Koregaon

B.Sc. III (Physics) 2021-22 Add on Course on Nanotechnology

Attendance Sheet

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Head
Department of Physics
O. P. Bhoosale College, Koregaon