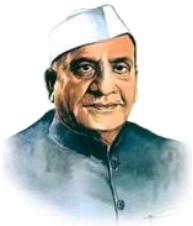
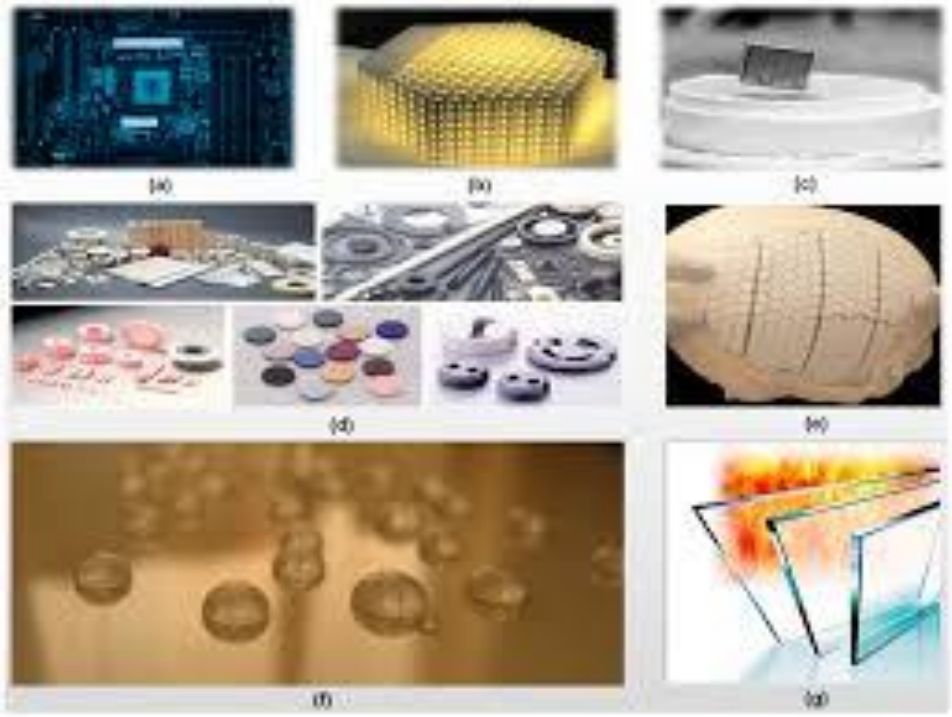


Shri Shivaji Education Society Amravati's

Science College, Nagpur

Department Of Physics

Certificate Course - Advanced Ceramics and Composites



Course Coordinator – Dr. Shahin K. Sayyad

Shri Shivaji Education Society Amravati's

Science College

Congress Nagar, Nagpur

Department Of Physics

Certificate Course Advanced Ceramics and Composites

- **Course Objectives:**

- To provide a deep understanding of the structure, properties, and applications of advanced ceramics and composites.
- To develop skills in the synthesis and processing of ceramic and composite materials.
- To enable students to analyze the mechanical, thermal, and electrical properties of these materials.
- To explore current trends and advancements in ceramics and composites.
- To prepare students for research and industrial roles in material science focusing on ceramics and composites.

- **Key Properties and Benefits of the Add-On Course on Advanced Ceramics and Composites**
- **Comprehensive Curriculum**
- **Fundamental Principles:** Gain a deep understanding of the basic science behind advanced ceramics and composites.
- **Material Properties:** Learn about the mechanical, thermal, electrical, and chemical properties of these materials.
- **Manufacturing Techniques:** Explore various fabrication and processing methods, including sintering, hot pressing, and additive manufacturing.
- **Hands-On Experience**
- **Laboratory Work:** Engage in practical experiments and projects to apply theoretical knowledge.
- **Real-World Applications:** Study case studies from industries such as aerospace, automotive, electronics, and biomedical engineering.
- **Expert Instruction**
- **Industry Professionals:** Learn from experienced instructors who are experts in the field of advanced ceramics and composites.
- **Guest Lectures:** Attend sessions with guest speakers from leading companies and research institutions.
- **Cutting-Edge Research**
- **Latest Innovations:** Stay updated on the latest advancements and trends in materials science.
- **Research Projects:** Participate in research projects and contribute to innovative developments.
- **Career Advancement**
- **Specialized Knowledge:** Enhance your expertise in a high-demand field with specialized knowledge that sets you apart.
- **Networking Opportunities:** Connect with professionals and peers in the industry through workshops, seminars, and conferences.
- **Certification:** Earn a certificate that validates your skills and knowledge, boosting your employability and career prospects.

Enroll Now

Dr. S. K. Sayyad (Co-ordinator)

Department of Physics SSES Amt's Science College Congress Nagar Nagpur

Phone: [9922901201]

Email: [shahinsayyed87@gmail.com]

Shri Shivaji Education Society Amaravati's

Science College Congress Nagar, Nagpur

Department of Physics

Report on Add-on Course
" Advanced Ceramics and Composites"
Course For Postgraduate Physics Students
Duration: 12/08/2022 to 15/10/2022

Total Students: 24

This 10-week add-on course provided postgraduate physics students with an in-depth understanding of advanced ceramics and composites. The course was conducted by Dr. S.K. Sayyad, Assistant Professor, Department of Physics SSES Amt's Science College Congress Nagar Nagpur. Total 18 Students of M.Sc. I and III Sem Physics were enrolled for the course.

The course combined theoretical knowledge with practical applications, focusing on the properties, processing techniques, and applications of these materials in various industries. The theory classes have been taken in room no. C4 from 4:00 p.m. to 5:00 p.m. every Friday and Saturday and 5:00 p.m. to 6:00 p.m. practical on Saturday in the laboratory for 10 weeks.

The students were evaluated through a combination of MCQ based written exam of 80 marks and practical lab work of 20 marks. All 24 students successfully completed the course. The overall performance was commendable, with several students showing exceptional understanding and innovative approaches in their projects.

The 10-week advanced ceramics and composites course was a significant addition to the postgraduate curriculum for physics students, providing them with critical skills and knowledge applicable in various high-tech industries. The successful completion of this course has prepared the students for further research and professional careers in materials science and engineering.

Action Taken: The feedback from the Advanced Ceramics and Composites certificate course has been instrumental in identifying areas for improvement. The actions taken reflect our commitment to providing a high-quality learning experience and ensuring that our course meets the professional and academic needs of our students. We will continue to monitor feedback and make necessary adjustments to maintain the highest standards of education.

Dr. S.K.Sayyad

Course Coordinator
Department of Physics

Shri Shivaji Education Society Amaravati's

Science College Congress Nagar, Nagpur

Department of Physics

" Advanced Ceramics and Composites"

Course For Postgraduate Physics Students

Duration: 12/08/2022 to 15/10/2022

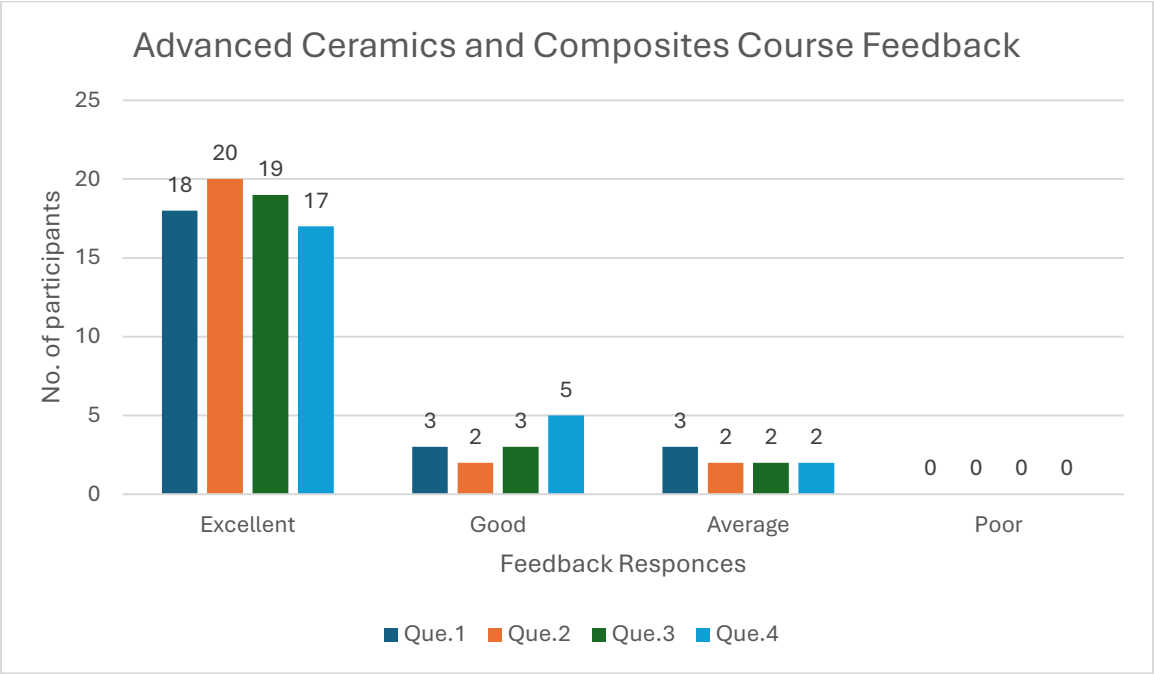
Course Coordinator: Dr. S. K. Sayyad

Feedback form

Advanced Ceramics and Composites Course Feedback Questionnaire

Name :

1) How would you rate the overall quality of the course content?
   - ☐ Excellent
   - ☐Good
   - ☐Average
   - ☐Poor
2) How relevant was the course content to your professional or academic goals?
   - ☐Excellent
   - ☐Good
   - ☐Average
   - ☐Poor
3) How would you rate the hands-on lab sessions and practical exercises?
   - ☐Excellent
   - ☐Good
   - ☐Average
   - ☐Poor
4) How would you rate the availability and quality of resources (e.g., textbooks, online materials)?
   - ☐Excellent
   - ☐Good
   - ☐Average
   - ☐Poor


Advanced Ceramics and Composites Course Feedback
No. of participants
25
20
15
10
5
0
18
20
19
17
3
2
3
5
3
2
2
2
0
0
0
0
Excellent
Good
Average
Poor
Feedback Responces
Que.1
Que.2
Que.3
Que.4

To,
The Principal
SSES Amt's Science College,
Congress Nagar, Nagpur-12

Subject: Permission to conduct the add on courses in the Physics department (2022-2023)

Respected Sir,

This is to request you that, we wish to conduct the add on courses in Physics department these are the certificate courses of thirty hours' time duration.

The details of the courses are submitted here with.

Hence please permit to run the same and oblige me.

Thanking you

Yours sincerely

2/07/2022

Dr. S. W. Anwane
Professor and Head
Department of Physics

Shri Shivaji Education Society Amravati's

Science College

Congress Nagar, Nagpur

Department of Physics

Add-on Certificate Course (2022-2023)

Certificate Course: Advanced Ceramics and Composites

Notice

Date: 08/08/2022

The Department of Physics is conducting Add-on **Certificate Course on Advanced Ceramics and Composites** for the session 2022-23. Interesting students of M.Sc. Semester I & Semester III should register themself in early and contact to the Course Coordinator Dr. S. K. Sayyad immediately.

Course	Admission Fees
Advanced Ceramics and Composites	Free

Dr. S.K. Sayyad

Course Coordinator

Shri Shivaji Education Society Amravati's

Science College, Nagpur

Department Of Physics

Course Module and Syllabus

Certificate Course: Advanced Ceramics and Composites

Course Coordinator – Dr. Shahin K. Sayyad

Course Duration: 30 hours (spread over 10 weeks, 3 hours per week)[12/08/22-15/10/2022]

Course Overview: This certificate course provides participants with a comprehensive understanding of advanced ceramics and composites, covering their properties, fabrication methods, applications, and future prospects. Through a combination of lectures, case studies, and interactive discussions, participants will gain valuable insights into the latest developments in these materials and their significance in various industries.

Course Objectives:

- To provide a deep understanding of the structure, properties, and applications of advanced ceramics and composites.
- To develop skills in the synthesis and processing of ceramic and composite materials.
- To enable students to analyze the mechanical, thermal, and electrical properties of these materials.
- To explore current trends and advancements in ceramics and composites.
- To prepare students for research and industrial roles in material science focusing on ceramics and composites.

Course Outcomes:

By the end of the course, students will be able to:

- Understand the fundamental concepts and properties of advanced ceramics and composites.
- Synthesize and process various ceramic and composite materials.
- Analyze and interpret the properties of these materials.
- Apply ceramics and composites in real-world applications.
- Present and document their experimental findings effectively.

Duration of course: Ten weeks (30 Hours)

The Structure of Syllabus and system of evaluation -

Course	Theory Paper	Marks	
Certificate Course in **Advanced Ceramics and Composites**	Theory paper- Advanced Ceramics and Composites ***Theory examination will be of MCQ pattern having 40 questions each with equal marks.***	**Theory**	**Practical**
		80	**20**
		Total Marks 100	

Internal Quality Assurance Cell
(IQAC)
S. S. E. S. A. Science College
Congress Nagar, Nagpur

Dr. S. K. Sayyad
Course Co-ordinator

Principal
S. S. E. S. Amravati's
Science College, Nagpur.

Course Coordinator IQAC Coordinator Principal

Syllabus

Course Content:

Unit 1: Introduction to Ceramics and Composites

- Overview and classification of ceramics and composites
- Applications in various industries
- Key properties and advantages
- Ceramic powder synthesis
- Forming techniques (slip casting, tape casting, pressing)
- Sintering and densification processes

Unit 2: Synthesis and Processing of Composites

- Types of composite materials (metal matrix, polymer matrix, ceramic matrix)
- Fabrication techniques (lay-up, pultrusion, resin transfer molding)
- Interface and bonding mechanisms
- Strength, toughness, and hardness of ceramics and composites
- Fracture mechanics
- Wear and abrasion resistance

Unit III: Thermal ,Electrical and Magnetic Properties

- Thermal conductivity and expansion
- Thermal shock resistance
- High-temperature behavior
- Electrical conductivity and insulation
- Dielectric properties
- Magnetic ceramics and composites

Unit IV : Characterization Techniques

- Microscopy (SEM, TEM)
- Spectroscopy (EDS, Raman)
- Mechanical testing (hardness, tensile, impact)

Practical Demonstration Sessions

1. Synthesis of Materials using Sol-gel method.
2. Synthesis of Materials using Hydrothermal method.
3. Synthesis of Materials using coprecipitation method.
4. Synthesis of Materials using soft combustion method.
5. Identification of functional groups and chemical bonds in materials through analysis of infrared absorption spectra.
6. Elemental analysis of materials to determine their chemical composition using EDX
7. Investigation of molecular vibrations and crystal structures of materials through analysis of Raman scattering spectra.

Distribution of marks:-

Synthesis Method	(05 Marks)
Characterization Techniques	(05 Marks)
Common issues and diagnostics	(05 Marks)
Preventive maintenance	(05 Marks)

Week-wise teaching plan

Week	HRS.	Syllabus
Week1	**1**	Overview and classification of ceramics and composites
	1	Applications in various industries
	1	Key properties and advantages
Week 2	**1**	Ceramic powder synthesis
	1	Forming techniques (sol gel , Hydrothermal , Co-precipitation, Pallet formation)
	1	Sintering and densification processes
Week 3	**1**	Types of composite materials (metal matrix, polymer matrix, ceramic matrix)
	2	Fabrication techniques (Solution Casting)
Week 4	**2**	Practical :Synthesis of Materials using Sol-gel method.
	1	Practical : Synthesis of Materials using Hydrothermal method
Week 5	**2**	Practical : Synthesis of Materials using coprecipitation method.
	1	Interface and bonding mechanisms
Week 6	**1**	Strength, toughness, and hardness of ceramics and composites
	1	Fracture mechanics
	1	Wear and abrasion resistance
Week 7	**1**	Thermal conductivity and expansion
	1	Thermal shock resistance
	1	High-temperature behavior
Week 8	**1**	Electrical conductivity and insulation
	1	Dielectric properties

	1	Magnetic ceramics and composites
Week 9	**1**	Microscopy (SEM, TEM)
	1	Spectroscopy (EDS, Raman)
	1	Mechanical testing (hardness, tensile, impact)
Week 10	**1**	Identification of functional groups and chemical bonds in materials through analysis of infrared absorption spectra.
	1	Elemental analysis of materials to determine their chemical composition using EDX
	1	Investigation of molecular vibrations and crystal structures of materials through analysis of Raman scattering spectra.

SSES Amravati's

Science College, Congress Nagar, Nagpur-12

Session 2022-23

Certificate course (10 weeks)

(Advanced Ceramics and Composites)

Timetable

Sr. No.	Day	Theory
1	Friday	SKS (C4) Theory 4.00 PM – 5.00 PM
2	Saturday	SKS (C4) Theory, 4.00 PM – 5:00 PM
3		(Physics Lab) practical, 5.00 PM – 6.00 PM

Course Coordinator
Dr. S.K.Sayyad

Shri Shivaji Education Society Amravati's
Science College, Congress Nagar Nagpur
Department of Physics
Add-on Certificate course

Title: "Certificate Course: Advanced Ceramics and Composites"
Registration List of Students
2022-2023

Sr. No.	Name Of Students
1	Ankita Subhash Fulzele
2	Anuj Chandrashekhar Ghatate
3	Bhakti Avinash Thakre
4	Bhumesh Madhukar Ukey
5	Bhushan Kishor Dange
6	Dhanashree Dhopte
7	Dipak Shiwpal Vaidya
8	Karishma Suresh Yelne
9	Keshao Kawadu Bhagat
10	Manasi Mahesh Sabne
11	Mayur Devendra Shivankar
12	Omeshwar Dyaneshwar Verma
13	Pallavi Krushna Khadse
14	Pallavi Pandurang Hinge
15	Pavan Rajendra Dongare
16	Pinkee Pralhad Khotele
17	Saniya Vadhid Turak
18	Satish Suklal Rahangdale
19	Shivani Sanjay Borade
20	Shraddha Sanjay Warbhe
21	Shweta Raghu Iyer

22	Surbhi Rajusingh Jaganwar
23	Vaishnavi Naresh Zalke
24	Viplov Gyaneshwar Dhoke

Course Coordinator
Dr. S.K.Sayyad

Shri Shivaji EducationSociety Amaravati's

Science College,Congress Nagar, Nagpur

Certificate course on Advanced Ceramic and Composites

Theory Class Attendance Sheet

2022-2023

Sr. No	Students Full Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
1	Ankita Subhash Fulzele	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
2	Anuj Chandrashekhar Ghatate	P	P	P	P	P	P	P	P	P	P	P		A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
3	Bhakti Avinash Thakre	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
4	Bhumesh Madhukar Ukey	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		29
5	Bhushan Kishor Dange	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
6	Dhanashree Dhopte	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	28
7	Dipak Shiwpal Vaidya	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
8	Karishma Suresh Yelne	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		A	P	P	P	P	P	P	P	P	29
9	Keshao Kawadu Bhagat	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	28
10	Manasi Mahesh Sabne	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30
11	Mayur Devendra Shivankar	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
12	Omeshwar Dyaneshwar Verma	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
13	Pallavi Krushna Khadse	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
14	Pallavi Pandurang Hinge	P	P		P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	28
15	Pavan Rajendra Dongare	P	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
16	Pinkee Pralhad Khotele	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30
17	Saniya Vadhid Turak	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
18	Satish Suklal Rahangdale	P	P	P	P	P	P	P	P	P	P	P	P		P	P		P	D	P	P	P	P	P	P	P	P	P	P	P	P	29
19	Shivani Sanjay Borade	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	29
20	Shraddha Sanjay Warbhe	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29
21	Shweta Raghu Iyer	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P	28
22	Surbhi Rajusingh Jaganwar	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	28
23	Vaishnavi Naresh Zalke	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	29
24	Viplov Gyaneshwar Dhoke	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P	29

Dr. S. K. Sayyad
Course Coordinator

Shri Shivaji Education Society Amravati's

Science College

Congress Nagar, Nagpur

Department of Physics

Add-on Certificate Course (2022-2023)

Certificate Course: Advanced Ceramics and Composites

NOTICE

Date:

All the registered students of add-on Course on **Advanced Ceramics and Composites** under Department of Physics for the session 2022-23 are hereby informed that the theory examination is to be scheduled on 29/10/2022 (Saturday) at 10:30 am to 11:30 am in Physics C4 room at our college centre. All Students should be present in the laboratory before 10 mins. of scheduled time of examination.

Dr. S.K.Sayyad
Course Coordinator
Department of Physics

Shri Shivaji Education Society Amravati's

Science College Congress Nagar Nagpur

Departrment Of Physics

Certificate course on Advanced Ceramic and Composites

Certificate Final Exam Attendance of Students

Date: 29/10/2022 **Time:** 10:30 a.m.

Sr. No.	Name Of Students	Signature Of Students
1	Ankita Subhash Fulzele	
2	Anuj Chandrashekhar Ghatate	
3	Bhakti Avinash Thakre	
4	Bhumesh Madhukar Ukey	
5	Bhushan Kishor Dange	
6	Dhanashree Dhopte	
7	Dipak Shiwpal Vaidya	
8	Karishma Suresh Yelne	
9	Keshao Kawadu Bhagat	
10	Manasi Mahesh Sabne	
11	Mayur Devendra Shivankar	
12	Omeshwar Dyaneshwar Verma	
13	Pallavi Krushna Khadse	
14	Pallavi Pandurang Hinge	
15	Pavan Rajendra Dongare	
16	Pinkee Pralhad Khotele	
17	Saniya Vadhid Turak	
18	Satish Suklal Rahangdale	
19	Shivani Sanjay Borade	
20	Shraddha Sanjay Warbhe	
21	Shweta Raghu Iyer	
22	Surbhi Rajusingh Jaganwar	
23	Vaishnavi Naresh Zalke	
24	Viplov Gyaneshwar Dhoke	

Course Coordinator
Dr. Shahin K. Sayyad
Assistant Professor
Dept. of Physics
SSESA'S Science College Nagpur

Shri Shivaji Education Society Amaravati's

Science College Congress Nagar, Nagpur

Department of Physics

Add-on Certificate Course on Advanced Ceramics and Composites

THEORY EXAM

Date: 29/10/2022 **Max. Time: 1 Hour**

Max. Marks: 80 **Marks Obtained:**

Student Name: ----------

Note: i) All questions are compulsory and carry equal marks
ii) Tick the correct option

Sign. Of Invigilator:

1. Which of the following is not a characteristic of advanced ceramics?

a) High melting point

b) Low hardness

c) Brittle

d) Chemically inert

2. What is the primary constituent of advanced ceramics?

a) Silica

b) Alumina

c) Titanium

d) Copper

3. What is the main advantage of using advanced ceramics over traditional materials?

a) Lower cost

b) Higher toughness

c) Corrosion resistance

d) High-temperature stability

4. Which of the following is not a method of producing advanced ceramics?

a) Sintering

b) Injection molding

c) Sol-gel processing

d) Extrusion

5. Which of the following is an example of a ceramic composite?

a) Silicon carbide

b) Zirconia

c) Glass-ceramics

d) Fiberglass

6. What is the primary reinforcement material in ceramic matrix composites (CMCs)?

a) Metal

b) Polymer

c) Ceramic fibers

d) Glass

7. Which of the following properties is typically improved in ceramic composites compared to monolithic ceramics?

a) Brittleness

b) Thermal conductivity

c) Strength

d) Transparency

8. What is the primary application of ceramic matrix composites (CMCs)?

a) Electronics

b) Aerospace

c) Construction

d) Automobile

9. What is the major advantage of using ceramic composites in aerospace applications?

a) Low cost

b) High ductility

c) Low weight

d) High electrical conductivity

10. Which of the following is not a type of ceramic composite?

a) Metal matrix composites

b) Polymer matrix composites

c) Ceramic matrix composites

d) Carbon matrix composites

11. What is the main limitation of using ceramic composites in high-temperature applications?

a) Low strength

b) High cost

c) Susceptibility to corrosion

d) Oxidation at high temperatures

12. Which of the following is a common fabrication method for ceramic matrix composites?

a) Powder metallurgy

b) Chemical vapor deposition

c) Polymer infusion

d) Rapid prototyping

13. What is the primary function of the matrix material in a ceramic composite?

a) Provide strength

b) Enhance ductility

c) Bind reinforcement

d) Increase thermal conductivity

14. Which of the following is not a type of ceramic matrix composite (CMC)?

    a) Carbon/carbon

    b) Oxide/oxide

    c) Silicon/silicon carbide

    d) Polymer/polymer

15. What is the primary reinforcement material in metal matrix composites (MMCs)?

    a) Ceramic fibers

    b) Metal fibers

    c) Polymer fibers

    d) Glass fibers

16. Which of the following is not a property of metal matrix composites (MMCs)?

    a) High strength

    b) Low density

    c) High thermal conductivity

    d) Corrosion resistance

17. Which of the following is not a common application of metal matrix composites (MMCs)?

    a) Automotive brake rotors

    b) Bicycle frames

    c) Aircraft fuselage

    d) Food packaging

18. What is the primary disadvantage of using metal matrix composites (MMCs) in aerospace applications?

    a) High cost

    b) High weight

    c) Low strength

    d) Poor machinability

19. What is the primary reinforcement material in polymer matrix composites (PMCs)?

a) Metal fibers

b) Ceramic fibers

c) Polymer fibers

d) Glass fibers

20. Which of the following is not a characteristic of polymer matrix composites (PMCs)?

a) High strength-to-weight ratio

b) Low electrical conductivity

c) High thermal conductivity

d) Corrosion resistance

21. What is the primary advantage of using polymer matrix composites (PMCs) in automotive applications?

a) Low cost

b) High strength

c) Corrosion resistance

d) Low weight

22. Which of the following is a common polymer matrix material used in composites?

a) Polyethylene

b) Aluminum

c) Steel

d) Copper

23. What is the primary reinforcement material in carbon matrix composites?

a) Metal fibers

b) Ceramic fibers

c) Polymer fibers

d) Carbon fibers

24. Which of the following is a common application of carbon matrix composites?

a) Aircraft engines

b) Food packaging

c) Bicycle frames

d) Clothing

25. What is the main advantage of using carbon matrix composites in high-temperature applications?

a) Low cost

b) High strength

c) Low weight

d) High thermal conductivity

26. Which of the following is not a limitation of ceramic matrix composites (CMCs)?

a) Susceptibility to oxidation

b) High cost

c) Low strength

d) Difficulty in fabrication

27. Which of the following is not a limitation of metal matrix composites (MMCs)?

a) High cost

b) High weight

c) Low strength

d) Poor machinability

28. Which of the following is not a limitation of polymer matrix composites (PMCs)?

a) Low strength

b) Low weight

c) Susceptibility to moisture

d) High thermal conductivity

29. Which of the following is not a limitation of carbon matrix composites?

a) High cost

b) Susceptibility to oxidation

c) Low strength

d) Low thermal conductivity

30. Which of the following is not a common reinforcement material used in composites?

a) Carbon fibers

b) Glass fibers

c) Steel fibers

d) Copper fibers

31. In which of the following applications, ceramic composites are typically used?

a) Thermal insulation

b) Structural components

c) Electrical wiring

d) Food packaging

32. Which of the following is not a method of fabricating ceramic composites?

a) Chemical vapor deposition

b) Injection molding

c) Powder metallurgy

d) Sol-gel processing

33. Which of the following is not a property of ceramic composites?

a) High strength

b) Low density

c) High electrical conductivity

d) High temperature stability

34. Which of the following is a limitation of using ceramic composites in aerospace applications?

a) High cost

b) Low strength

c) Low temperature stability

d) High density

35. Which of the following is not a type of ceramic matrix composite (CMC)?

a) Carbon/carbon

b) Oxide/oxide

c) Polymer/polymer

d) Silicon carbide/silicon carbide

36. Which of the following is not a common application of metal matrix composites (MMCs)?

a) Automotive brake rotors

b) Bicycle frames

c) Aircraft wings

d) Food packaging

37. Which of the following is not a property of polymer matrix composites (PMCs)?

a) High strength-to-weight ratio

b) Low electrical conductivity

c) High thermal conductivity

d) Corrosion resistance

38. Which of the following is a common reinforcement material used in polymer matrix composites (PMCs)?

a) Metal fibers

b) Ceramic fibers

c) Polymer fibers

d) Glass fibers

39. What is the main advantage of using carbon matrix composites in high-temperature applications?

a) Low cost

b) High strength

c) Low weight

d) High thermal conductivity

40. Which of the following is not a limitation of carbon matrix composites?

a) High cost

b) Susceptibility to oxidation

c) Low strength

d) Low thermal conductivity

Answer Key

1. Answer: b) Low hardness
2. Answer: b) Alumina
3. Answer: d) High-temperature stability
4. Answer: b) Injection molding
5. Answer: a) Silicon carbide
6. Answer: c) Ceramic fibers
7. Answer: c) Strength
8. Answer: b) Aerospace
9. Answer: c) Low weight
10. Answer: d) Carbon matrix composites
11. Answer: d) Oxidation at high temperatures
12. Answer: b) Chemical vapor deposition
13. Answer: c) Bind reinforcement
14. Answer: d) Polymer/polymer
15. Answer: a) Ceramic fibers
16. Answer: c) High thermal conductivity
17. Answer: d) Food packaging
18. Answer: b) High weight
19. Answer: d) Glass fibers
20. Answer: c) High thermal conductivity
21. Answer: d) Low weight
22. Answer: a) Polyethylene
23. Answer: d) Carbon fibers
24. Answer: a) Aircraft engines
25. Answer: b) High strength
26. Answer: c) Low strength
27. Answer: c) Low strength
28. Answer: d) High thermal conductivity
29. Answer: c) Low strength
30. Answer: d) Copper fibers
31. Answer: b) Structural components
32. Answer: b) Injection molding
33. Answer: c) High electrical conductivity
34. Answer: a) High cost
35. Answer: c) Polymer/polymer
36. Answer: d) Food packaging
37. Answer: c) High thermal conductivity
38. Answer: d) Glass fibers
39. Answer: b) High strength
40. Answer: d) Low thermal conductivity

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Add-on Course

Course Exam Name: "Certificate Course: Advanced Ceramics and composites"

Name of Student:

.....

Roll No.: | | | | **Session: 2022-23**

Test Date: 29/10/2022 | **Max. Marks: 80**

Invigilator Signature | **Obtained Marks:** | |

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WRONG METHODS ⊗ ◉ ◍ ✓ CORRECT METHOD ○ ○ ○ ●

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	○	11	○	○	○	○	21	○	○	○	○	31	○	○	○	○	41	○	○	○	○
2	○	○	○	○	12	○	○	○	○	22	○	○	○	○	32	○	○	○	○	42	○	○	○	○
3	○	○	○	○	13	○	○	○	○	23	○	○	○	○	33	○	○	○	○	43	○	○	○	○
4	○	○	○	○	14	○	○	○	○	24	○	○	○	○	34	○	○	○	○	44	○	○	○	○
5	○	○	○	○	15	○	○	○	○	25	○	○	○	○	35	○	○	○	○	45	○	○	○	○
6	○	○	○	○	16	○	○	○	○	26	○	○	○	○	36	○	○	○	○	46	○	○	○	○
7	○	○	○	○	17	○	○	○	○	27	○	○	○	○	37	○	○	○	○	47	○	○	○	○
8	○	○	○	○	18	○	○	○	○	28	○	○	○	○	38	○	○	○	○	48	○	○	○	○
9	○	○	○	○	19	○	○	○	○	29	○	○	○	○	39	○	○	○	○	49	○	○	○	○
10	○	○	○	○	20	○	○	○	○	30	○	○	○	○	40	○	○	○	○	50	○	○	○	○

Nagpur University, Nagpur

Shri Shivaji Education Society Amravati's

Science College, Congress Nagar Nagpur

Department of Physics

2022-2023

Add-on course Examination

Title: "Certificate Course: Advanced Ceramics and composites"

Course Coordinator: Dr. S. K. Sayyad

DATE: **Total Marks: 100**

STATEMENT OF MARKS

Sr. No.	Full Name of Student	Max. Marks: 80 (Theory)	Max Marks: 20 (Practical)	Total Marks 100	Grade obtained
1	Ankita Subhash Fulzele	60	20	80	A
2	Anuj Chandrashekhar Ghatate	64	20	84	A
3	Bhakti Avinash Thakre	70	20	90	A+
4	Bhumesh Madhukar Ukey	64	18	82	A
5	Bhushan Kishor Dange	66	20	86	A+
6	Dhanashree Dhopte	74	20	94	A+
7	Dipak Shiwpal Vaidya	58	20	78	A
8	Karishma Suresh Yelne	62	18	80	A
9	Keshao Kawadu Bhagat	64	20	84	A
10	Manasi Mahesh Sabne	74	20	94	A+
11	Mayur Devendra Shivankar	72	20	92	A+
12	Omeshwar Dyaneshwar Verma	76	18	94	A+
13	Pallavi Krushna Khadse	78	16	94	A+
14	Pallavi Pandurang Hinge	66	18	84	A
15	Pavan Rajendra Dongare	64	20	84	A
16	Pinkee Pralhad Khotele	58	20	78	A
17	Saniya Vadhid Turak	54	20	74	B+

18	Satish Suklal Rahangdale	74	18	92	A+
19	Shivani Sanjay Borade	64	16	80	A
20	Shraddha Sanjay Warbhe	72	18	90	A+
21	Shweta Raghu Iyer	78	16	94	A+
22	Surbhi Rajusingh Jaganwar	62	20	82	A
23	Vaishnavi Naresh Zalke	58	20	78	A
24	Viplov Gyaneshwar Dhoke	60	18	78	A

A+ Grade => Marks = 90 and above, A Grade =>Marks = 75 and <90
B Grade =>Marks = 60 and <75, C Grade =>Marks = 40 and <60, Fail Grade =>Marks<40

Dr. S.K.Sayyad

Course Coordinator

Department of Physics

ANSWER KEY

SAMPLE COPY

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Add-on Course

Course Exam Name: "Certificate Course: Advanced Ceramics and composites"

Name of Student: .....

Roll No.: | | | | **Session: 2022-23**

Test Date: 29/10/2022 **Max. Marks: 80**

Invigilator Signature **Obtained Marks:**

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WRONG METHODS CORRECT METHOD

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	●	○	○	11	○	○	○	●	21	○	○	○	●	31	○	●	○	○	41	○	○	○	○
2	○	○	●	○	12	○	●	○	○	22	●	○	○	○	32	○	●	○	○	42	○	○	○	○
3	○	○	○	●	13	○	○	●	○	23	○	○	○	●	33	○	○	●	○	43	○	○	○	○
4	○	●	○	○	14	○	○	○	●	24	●	○	○	○	34	●	○	○	○	44	○	○	○	○
5	●	○	○	○	15	●	○	○	○	25	○	●	○	○	35	○	○	●	○	45	○	○	○	○
6	○	○	●	○	16	○	○	●	○	26	○	○	●	○	36	○	○	○	●	46	○	○	○	○
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10	○	○	○	●	20	○	○	●	○	30	○	○	○	●	40	○	○	○	●	50	○	○	○	○

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Add-on Course

Course Exam Name: "Certificate Course: Advanced Ceramics and composites"

Name of Student: Dhanashree Dhopte

Roll No.: 0 0 6 **Session: 2022-23**

Test Date: 29/10/2022 **Max. Marks:** 80

Invigilator Signature **Obtained Marks:** 74

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WRONG METHODS CORRECT METHOD

	A	B	C	D
1	○	●	○	○
2	○	○	●	○
3	○	○	○	●
4	○	●	○	○
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9	○	○	●	○
10	○	○	○	●
11	○	○	○	●
12	○	●	○	○
13	○	○	○	○
14	○	○	○	●
15	●	○	○	○
16	○	○	●	○
17	○	○	○	●
18	○	○	○	○
19	○	○	●	○
20	○	○	●	○
21	○	○	○	●
22	●	○	○	○
23	○	○	○	●
24	●	○	○	○
25	○	○	○	○
26	○	○	●	○
27	○	○	●	○
28	○	○	○	●
29	○	○	●	○
30	○	○	○	●
31	○	●	○	○
32	○	●	○	○
33	○	○	●	○
34	●	○	○	○
35	○	○	●	○
36	○	○	○	●
37	○	○	●	○
38	○	○	○	●
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Add-on Course

Course Exam Name: "Certificate Course: Advanced Ceramics and composites"

Name of Student: Ankita Fulzele

Roll No.: 0 0 1 **Session: 2022-23**

Test Date: 29/10/2022 **Max. Marks: 80**

Invigilator Signature **Obtained Marks:** 60

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WRONG METHODS CORRECT METHOD

	A	B	C	D
1	○	●	○	○
2	○	○	●	○
3	○	○	○	●
4	○	●	○	○
5	●	○	○	○
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8	○	○	○	○
9	○	○	●	○
10	○	○	○	●
11	○	○	○	●
12	○	●	○	○
13	○	○	○	○
14	○	○	○	●
15	●	○	○	○
16	○	○	●	○
17	○	○	○	○
18	○	○	○	○
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22	○	○	○	○
23	○	○	○	●
24	●	○	○	○
25	○	●	○	○
26	○	○	○	○
27	○	○	●	○
28	○	○	○	○
29	○	○	●	○
30	○	○	○	●
31	○	●	○	○
32	○	●	○	○
33	○	○	●	○
34	○	○	○	○
35	○	○	●	○
36	○	○	○	●
37	○	○	○	○
38	○	○	○	●
39	○	●	○	○
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Session 2022-23 under Add-on course conducted for 30 hours from 12/08/2022 to 15/10/2022 by Department of Physics, SSESA's, Science College, congress Nagar, Nagpur 440012.

He/She has passed the Examination with '--------' Grade.

Dr. Shahin K. Sayyad
Coordinator, Department of

Prof. M. P. Dhore
Principal, Science Colleg

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