SCHOOL OF
ARCHITECTURE

Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed-to-be University under section 3 of UGC Act 1956)

25.04.2018

## CIRCULAR

The School of Architecture, Bharath Institute of Higher Education and Research is planned to conduct a certification value added course on ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES for the benefit of II, III and IV year students. This course is scheduled from 07.05.2018 for 30hours which includes theory and practical. The timings are 4:00 PM to 5:30 PM from Monday to Friday and 9:00 AM to 10:30 AM on Saturday.

For registrations, students can contact the following faculty members who are assigned to handle the course.

| S.NO | Name of the Faculty | Designation |
|---|---|---|
| 1 | Shehnaz Mubeen R | Assistant Professor |
| 2 | Sachin Kumar | Assistant Professor |

All Registered Students must attend all the classes without fail. Students who are completed the course successfully can only get the course certificate.

Ar.Mohamed Farook Ali M., M.Arch(Landscape),
Head of the Department, School of Architecture,
Bharath Institute of Higher Education & Research

Head of the Department

Copy: Vice chancellor

Registrar

Dean(Engg) /Dean Arts/Dean Science/Dean law/Dean Agri/All Deans/AO

All HoDs/FM/Website/Office File/Notice Boards

## ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES

### COURSE OBJECTIVES

- To understand various steels with their composition, advantages, limitations and application.
- Select and compare different steel for a given metallurgical application.
  To know about different alloy cast irons.
- To perceive the use of different types of light metal and their alloys with metallurgical aspects.
- To comprehend different Super Alloys with their strengthening mechanism, composition properties and applications.
- To understand the technique to producing metallic glass.
- To interpret properties and applications of Nano materials.
- To grasp different smart material with their application.
- To perceive requirements of biomaterials and suggest a biomaterial for a given application.

# BARVAC 005 – ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES

## UNIT-I Special steels

Metallurgical aspects, Composition, Properties and applications of: different types of Stainless steels, Dual phase steels, TRIP steels, Maraging steels, High speed steels, Hadfield steels, Free cutting steels, Ausformed steels, Tool Steels, manganese steels, chrome steels, electrical steels, bearing steels, spring steels, heat resistant steels, creep steels, HSLA steels etc.

## UNIT-II Rapid Solidification

Metallic glasses, Atomic arrangement, Comparison with crystalline alloys, properties & applications, Glass transition temperature, Glass forming ability, Techniques for Production of metallic glasses.

## UNIT-III Biomaterials

Property requirement, biocompatibility, bio functionality, Important bio metallic alloys like: Ni-Ti alloy and Co-Cr-Mo alloys. Applications.

## UNIT-IV Smart materials

Shape memory alloys, Piezoelectric materials, Electro-rheological fluid, Magneto- rheological fluids

## UNIT-V Miscellaneous Advanced Materials

Magnetic materials, ceramics, composites and polymers, surface metal matrix composites, aerospace materials, and cryogenic materials, semi conducting and superconducting materials.

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# ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES

LESSON PLAN

TOTAL HOURS-30

FACULTY NAME - SHEHNAZ MUBEEN

| DATE | DAY | HOURS | T/P | COURSE TITLE |
|---|---|---|---|---|
| 07.05.2018 | MONDAY | 1.5 | THEORY | **UNIT 1**-Metallurgical aspects, Composition, Properties and applications of: different types of Stainless steels, |
| 08.05.2018 | TUESDAY | 1.5 | THEORY | Dual phase steels, TRIP steels, Maraging steels, High speed steels, |
| 09.05.2018 | WEDNESDAY | 1.5 | THEORY | Hadfield steels, Free cutting steels, Ausformed steels, |
| 10.05.2018 | THURSDAY | 1.5 | THEORY | Tool Steels, manganese steels, chrome steels, electrical steels, |
| 11.05.2018 | FRIDAY | 1.5 | THEORY | bearing steels, spring steels, heat resistant steels,creep steels, HSLA steels etc. |
| 12.05.2018 | SATURDAY | 1.5 | THEORY | **UNIT-II** Rapid Solidification of Metallic glasses, Atomic arrangement |
| 14.05.2018 | MONDAY | 1.5 | THEORY | Comparison with crystalline alloys, |
| 15.05.2018 | TUESDAY | 1.5 | THEORY | Glass forming ability, Techniques for Production of metallic glasses. |
| 16.05.2018 | WEDNESDAY | 1.5 | THEORY | Techniques for Production of metallic glasses. |
| 17.05.2018 | THURSDAY | 1.5 | THEORY | **UNIT-III** Biomaterials Property requirement |
| 18.05.2018 | FRIDAY | 1.5 | THEORY | Biocompatibility, bio functionality |
| 19.05.2018 | SATURDAY | 1.5 | THEORY | Important bio metallic alloys like: Ni-Ti alloy and Co-Cr-Mo alloys. |
| 21.05.2018 | MONDAY | 1.5 | THEORY | Applications of Biomaterials |
| 22.05.2018 | TUESDAY | 1.5 | THEORY | **UNIT-IV** Smart materials |
| 23.05.2018 | WEDNESDAY | 1.5 | THEORY | Shape memory alloys, Piezoelectric materials, |
| 24.05.2018 | THURSDAY | 1.5 | THEORY | Electro-rheological fluid, |
| 25.05.2018 | FRIDAY | 1.5 | THEORY | Magneto- rheological fluids |
| 26.05.2018 | SATURDAY | 1.5 | THEORY | **UNIT-V** Magnetic materials, ceramics, |
| 28.05.2018 | MONDAY | 1.5 | THEORY | composites and polymers |
| 29.05.2018 | TUESDAY | 1.5 | THEORY | surface metal matrix composites, aerospace materials |
| 30.05.2018 | WEDNESDAY | 1.5 | THEORY | cryogenic materials, |
| 01.06.2020 | THURSDAY | 1.5 | THEORY | semi conducting and superconducting materials. |

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PRACTICAL-0/THEORY-30

Total hours-33

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**LIST OF STUDENTS - VALUE ADDED COURSE -** ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES

| S.NO | REGISTER NUMBER | NAME OF THE STUDENT |
|---|---|---|
| 1 | U15AR01 | A ANNI MONICA |
| 2 | U15AR02 | ABDUL KHADER |
| 3 | U15AR03 | ADITHYAN E |
| 4 | U15AR04 | AHAMATH HUSSAIN |
| 5 | U15AR06 | ARUN PRASANTH |
| 6 | U15AR07 | A HARSHITH REDDY |
| 7 | U15AR08 | DHANUSH RAM ADITHYAN |
| 8 | U15AR11 | JENIFER HEPZIBAH |
| 9 | U15AR12 | K NAVEEN RAJESWAR |
| 10 | U15AR13 | KARTHIK S |
| 11 | U15AR15 | LOKESH S |
| 12 | U15AR16 | MAKEEF RAHMAN M |
| 13 | U15AR17 | MD A MAQSOOD KHAN |
| 14 | U15AR19 | MERVIN WILLIAM |
| 15 | U15AR20 | MUTHU ARVINTH G |
| 16 | U15AR21 | NITHYANANDA GIRIJA |
| 17 | U15AR22 | PAVITHRA S |
| 18 | U15AR23 | PRASANTH N |
| 19 | U15AR24 | PRAVEEN KUMAR |
| 20 | U15AR25 | PREETHIKA M |
| 21 | U15AR26 | SADANA SRIDHAR |
| 22 | U15AR27 | SAI GAYATHRI N |
| 23 | U15AR28 | SANGEETH M |
| 24 | U15AR29 | SANTOSH R A |
| 25 | U15AR30 | SELVASUTHAN R |
| 26 | U15AR31 | SRUTHI S |
| 27 | U15AR32 | SURYA S |
| 28 | U15AR34 | TITUS J |
| 29 | U15AR37 | VIJAYALAKSHMI |
| 30 | U15AR38 | VIMAL E AKASH |
| 31 | U15AR40 | ZAKKALLAH BARDER |
| 32 | U15AR42 | KAMALA KANNAN M |
| 33 | U15AR43 | AJITH KUMAR N |
| 34 | U15AR44 | HAKASHWAR K |
| 35 | U15AR45 | JEEVITHA T |
| 36 | U15AR46 | DHANUSH KUMAR P |
| 37 | U16AR001 | KISHAN I |
| 38 | U16AR002 | SOWMIYA K |
| 39 | U16AR003 | THANUJA SHARON M |
| 40 | U16AR004 | RUFEENA B |
| 41 | U16AR007 | GONUGUNIKA AJAY KUMAR |
| 42 | U16AR008 | DAMALACHERUVU BHANU TEJA REDDY |
| 43 | U16AR009 | ANU R |
| 44 | U16AR011 | SETHUPATHY D |
| 45 | U16AR012 | ABDUL KALAM M H |

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## ATTENDANCE % - VALUE ADDED COURSE - ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES

| S.NO | REGISTER NUMBER | NAME OF THE STUDENT | ATTENDANCE % |
|---|---|---|---|
| 1 | U15AR01 | A ANNI MONICA | 94 |
| 2 | U15AR02 | ABDUL KHADER | 82 |
| 3 | U15AR03 | ADITHYAN E | 76 |
| 4 | U15AR04 | AHAMATH HUSSAIN | 75 |
| 5 | U15AR06 | ARUN PRASANTH | 77 |
| 6 | U15AR07 | A HARSHITH REDDY | 95 |
| 7 | U15AR08 | DHANUSH RAM ADITHYAN | 79 |
| 8 | U15AR11 | JENIFER HEPZIBAH | 76 |
| 9 | U15AR12 | K NAVEEN RAJESWAR | 86 |
| 10 | U15AR13 | KARTHIK S | 88 |
| 11 | U15AR15 | LOKESH S | 91 |
| 12 | U15AR16 | MAKEEF RAHMAN M | 83 |
| 13 | U15AR17 | MD A MAQSOOD KHAN | 75 |
| 14 | U15AR19 | MERVIN WILLIAM | 88 |
| 15 | U15AR20 | MUTHU ARVINTH G | 92 |
| 16 | U15AR21 | NITHYANANDA GIRIJA | 82 |
| 17 | U15AR22 | PAVITHRA S | 95 |
| 18 | U15AR23 | PRASANTH N | 78 |
| 19 | U15AR24 | PRAVEEN KUMAR | 92 |
| 20 | U15AR25 | PREETHIKA M | 88 |
| 21 | U15AR26 | SADANA SRIDHAR | 96 |
| 22 | U15AR27 | SAI GAYATHRI N | 95 |
| 23 | U15AR28 | SANGEETH M | 79 |
| 24 | U15AR29 | SANTOSH R A | 85 |
| 25 | U15AR30 | SELVASUTHAN R | 82 |
| 26 | U15AR31 | SRUTHI S | 75 |
| 27 | U15AR32 | SURYA S | 82 |
| 28 | U15AR34 | TITUS J | 88 |
| 29 | U15AR37 | VIJAYALAKSHMI | 78 |
| 30 | U15AR38 | VIMAL E AKASH | 79 |
| 31 | U15AR40 | ZAKKALLAH BARDER | 85 |
| 32 | U15AR42 | KAMALA KANNAN M | 84 |
| 33 | U15AR43 | AJITH KUMAR N | 82 |
| 34 | U15AR44 | HAKASHWAR K | 89 |
| 35 | U15AR45 | JEEVITHA T | 91 |
| 36 | U15AR46 | DHANUSH KUMAR P | 75 |
| 37 | U16AR001 | KISHAN I | 82 |
| 38 | U16AR002 | SOWMIYA K | 86 |
| 39 | U16AR003 | THANUJA SHARON M | 91 |
| 40 | U16AR004 | RUFEENA B | 83 |
| 41 | U16AR007 | GONUGUNIKA AJAY KUMAR | 87 |
| 42 | U16AR008 | DAMALACHERUVU BHANU TEJA REDDY | 82 |
| 43 | U16AR009 | ANU R | 95 |
| 44 | U16AR011 | SETHUPATHY D | 87 |
| 45 | U16AR012 | ABDUL KALAM M H | 81 |

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| TIMETABLE- VALUE ADDED COURSE - ADVANCED MATERIALS CHARACTERIZATION TECHNIQUES | | |
|---|---|---|
| **DAY** | **9.00 - 10.30** | **4.00 - 5.30** |
| MONDAY | | ADVANCED MATERIALS CHAR TECHNIQUES |
| TUESDAY | | ADVANCED MATERIALS CHAR TECHNIQUES |
| WEDNESDAY | | ADVANCED MATERIALS CHAR TECHNIQUES |
| THURSDAY | | ADVANCED MATERIALS CHAR TECHNIQUES |
| FRIDAY | | ADVANCED MATERIALS CHAR TECHNIQUES |
| SATURDAY | ADVANCED MATERIALS | |

**COURSE COORDINATORS**
SHEHNAZ MUBEEN
SACHIN KUMAR

**HEAD OF THE DEPARTMENT**

BHARATH UNIVERSITY CHENNAI-73 INDIA SCHOOL OF ARCHITECTURE

# COURSE FEEDBACK FORM

| | |
|---|---|
| Academic Year | 2017-2018 |
| Course Code | ARVAC 005 |
| Course Title | Adv. Material Charac. techniques |
| Number of Credits | |

**I. Information on the Respondent: (Tick (√) Appropriately)**

1. **Percentage of classes attended**

| 0-20 | | 20-40 | | 40-60 | ✓ | 60-80 | ✓ | 80-100 | |
|---|---|---|---|---|---|---|---|---|---|

2. **Number of hours per week spent on the course (Other than lecture hours)**

| 0-2 | | 2-4 | | 4-6 | ✓ | 6-8 | | 8-10 | |
|---|---|---|---|---|---|---|---|---|---|

3. **Preparation for the course by the student:**

| | |
|---|---|
| (i) | Have done part of this course earlier |
| (ii) | Has adequate prior exposure to the prerequisites |
| (iii) | Had to pickup relevant additional topics through concurrent study |
| (iv) ✓ | Have no exposure to the background material |

4. **The expectations for taking the course by the student are:**

| | |
|---|---|
| (a) | Enhance by skill base in the area of specializations |
| (b) ✓ | Get exposed to a relevant subject |
| (c) | Curiosity |
| (d) | Better Employment Opportunity |
| (e) | Complete Course requirements |
| (f) | To Improve CGPA |

| II. | About the Course Information on the Respondent: (Tick (√) Appropriately) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Depth of Coverage** | | | | | | | | | | |
| **UG level** | ✓ | **Graduate level** | | **Advance level** | | | | | | |
| **Standard of test and assignments** | | | | | | | | | | |
| **High** | | **Normal** | ✓ | **Easy** | | | | | | |

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Coverage of the syllabus | | ✓ | | | |
| Organization of the Course | | ✓ | | | |
| Emphasis on fundamentals | ✓ | | | | |
| Emphasis of fundamentals | ✓ | | | | |
| Coverage of modern/advanced topics | ✓ | | | | |
| Availability of text books/study materials | | ✓ | | | |
| Usefulness of tests and assignments | ✓ | | | | |
| Overall rating of the Course | ✓ | | | | |
| What benefit you derived from the course? | ✓ | | | | |

**About the Instructor: Information on the Respondent: (Tick (√) Appropriately)**

| | | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1. | Pace of the Teaching/lecture | | ✓ | | | |
| 2. | Comment of the Subject | | ✓ | | | |
| 3. | Clarity of expression | | ✓ | | | |
| 4. | Level of preparation | ✓ | | | | |
| 5. | Level of interaction | ✓ | | | | |
| 6. | Accessibility outside the class | ✓ | | | | |
| 7. | Others (please specify | ✓ | | | | |

| **A: Excellent** | | **B: Very Good** | | **C: Good** | | **D: Satisfactory** | | **E: Poor** | |
|---|---|---|---|---|---|---|---|---|---|

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# CERTIFICATE OF PARTICIPATION

**This certificate is presented to**

A. ANNI MONICA

For actively participating in the value added course **" ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES"** Conducted by School of Architecture, BIHER from 07.05.2018 to 29.05.2018.

COURSE COORDINATORS

HEAD OF THE DEPARTMENT

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# ADVANCED MATERIAL CHARACTERIZATION TECHNIQUES


VALUE ADDED COURSE ON ADVANCED MATERIAL TECHNIQUES ON 23.05.2018