

Major Facilities at RGUKT Basar

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1. Field Emission Scanning Electron Microscopy (FESEM)



Model: Merlin compact

Manufacturer: Carl Zeiss, United Kingdom

Unique features: Suitable for generating topographical and elemental information of the samples.

Applications: High resolution secondary electron imaging and information generation, Secondary electron imaging, Topographic information generation, Compositional and oriental contrast imaging, Electron transmitted imaging, High resolution scanning or transmission electron microscopy (SEM or TEM), Energy dispersive X-ray spectroscopic (EDS) imaging

Specifications:

Resolution: 0.8 nm at 30 kV and 2.0 nm at 1 kV.
GEMINI column with 4 pA – 100 nA probe current.

Acceleration voltage: 0.02 V – 30 kV

Magnification: 12 – 1,00,000x using secondary electrons (SE) and 100 – 2,00,000x using back scattered electrons (BSE)

Detectors:

Column mounted detector: In-lens SE detector

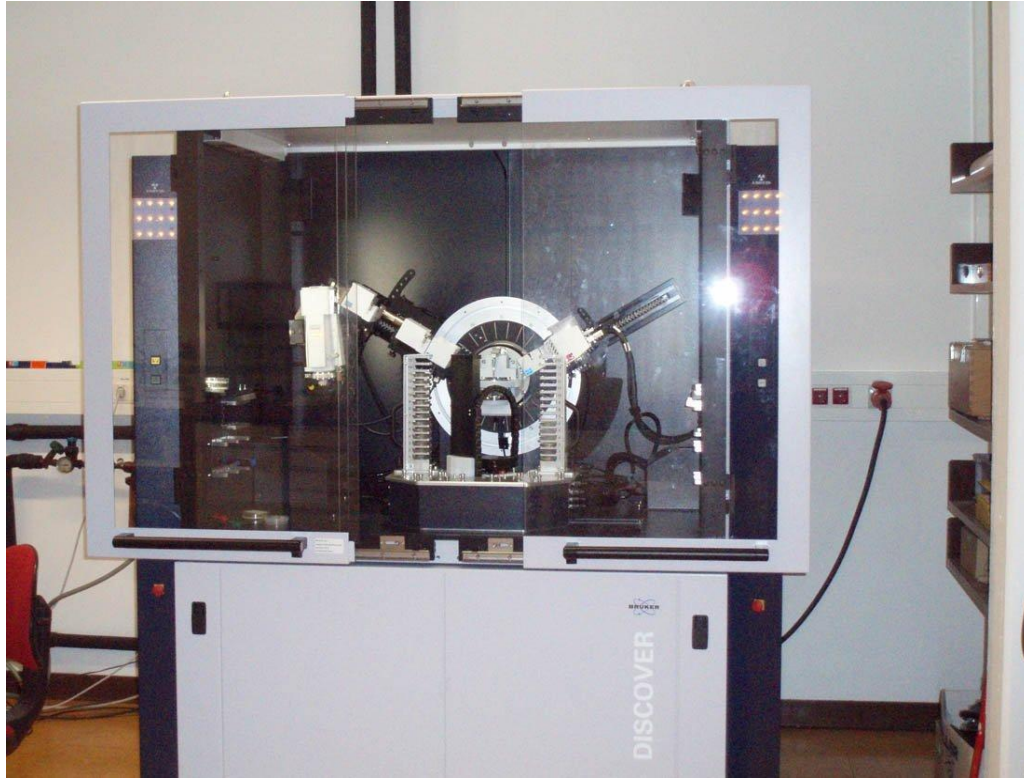
Chamber detectors: Everhart-Thornley (SE2) detector

Angular selective backscatterd detector (AsB)

Scanning transmitted electron microscopy (STEM)

EDS detector

2. X-Ray Diffraction (XRD) Machine



Model: D8 Discover

Manufacturer: Bruker, Germany

Unique features: DAVINCI design, plug-and-play functionality and fully integrated 2-D XRD capabilities

Applications: X-ray reflectivity (XRR), High resolution XRD (HRXRD), residual stress mapping (RSM), in-plane grazing incidence diffraction (GID), grazing incidence small-angle X-ray scattering (GISAXS), phase identification and texture investigations.

Specifications:

X-ray source: Turbo x-ray source with twist tube in ceramic sealed tube. [Cu and Cr-target)

X-ray optics: Goebel mirrors

X-ray detectors: LYNXEYE detectors

DIFFRAC.SUITE Software modules:

EVA – Phase identification and quantitative phase analysis

LEPTOS – Thin film analysis/Residual stress investigation

MULTEX – Texture analysis of 1- and 2-dimensional datasets

Licensing with ICDD data base of PDF-2 release 2013 (more than 2.5 lakh database entries)

3. 3D Printer



Physical specifications

Height	762 mm
Width	660 mm
Depth	660 mm
Weight	59 kg
Material bay height	153 mm
Material bay width	660 mm
Material bay depth	660 mm
Material bay weight	17 g

4. Friction Stir Welding (FSW)

Model: 3-Axis friction stir machine

Manufacturer: BISS, India

Unique features: Capable of welding the samples in 3 axes (X, Y and Z)

Type of joint possible: T-joint and butt joint.

Applications: Friction Stir Welding, Friction Stir Processing and Friction Surfacing.



Specifications:

S.no	Specification	X-axis	Y-axis	Z-axis	
1.	Load	15 kN	25 kN	25 kN	
2.	Stroke length	500 mm	500 mm	300 mm	
3.	Rate of movement	1-3000 mm/min	1-3000 mm/min	1-100 mm/min	
4.	Servo motors	Speed	2000 RPM	3000 RPM	3000 RPM
		Torque	4.78 Nm	2.39 Nm	1.27 Nm
		Power	1 kw	0.75 kw	0.4 kw

5.	Gear box	Ratio	6	20	60
		Backlash	5 Arcmin	5 Arcmin	5 Arcmin
6.	Tool tilt		-	$\pm 5^\circ$	-
7.	Spindle servo motor	Spindle speed	3000 RPM		
		Spindle torque	100 Nm		
8.	Control system		UACE 2020		

5. Wirecut Electrical Discharge Machining (Wire EDM)



Specifications:

TRAVEL RANGE

Travel range	Axis	
Longitudinal	Y	400 mm
	V	+/- 40 mm
Lateral	X	300 mm
	U	+/- 40 mm
Vertical	Z	225 mm

WORKPIECE SIZE

Work Piece Size	
Table Size	650 mm X 440 mm
Max. work piece size	600 X 780 X 200 mm
Max. work piece weight	400

FEED

Main table feed rate	900 mm/min
Resolution	0.0005 mm
Wire feed rate	0 – 15 m/min
Wire tension	2.5 kgf

WIRE GUIDE TYPE

Wire Guide Type	Diamond closed
Wire electrode diameter	0.25 mm standard
	0.15, 0.2, 0.3 mm are optional

TAPER CUTTING ANGLE

Max. Taper angle	$\pm 30^{\circ}/ 50 \text{ mm}$
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6. High Temperature Universal Testing Machine (UTM)

Model: Zwick/Roell Z100

Manufacturer: Zwick, Germany

Unique features: Suitable for testing at a wide range of temperatures (RT-1200°C) with sufficient ease with possibility for thermal cycling. Samples of various dimensions (sheets, plates, rounds etc.,) can be employed.



Applications: Tension and compression tests at room temperature and high temperatures as well as bending (3 point) at room temperature.

Specifications:

Capacity: 100 kN

Furnace: HTO-15 round-furnace

Maximum operating temperature: 1200°C

Extensometers: Room temperature and high temperature.

Sample dimensions: As per ASTM E8 standards.

7. Creep Machine

Model: STS-03

Manufacturer: Star testing systems, India

Applications: Creep and stress rupture tests can be carried out for a wide range of temperatures (RT-1000 °C).

Specifications:

Capacity: 50 kN

Lever arm ratio: 20:1

Furnace: 3 zone furnace with maximum operative temperature of 1000 °C

Thermocouple sensitivity: 1 °C

Extensometer: LVDT type with sensitivity of 1μ

Maximum extension that can be measured: 25 mm

Sample dimensions: As per available standards of material testing.



8. Advanced Environmental Hydrology System



Model: S12-MKII (Arm Field)

Application: This floor-standing unit is the only Hydrology System that includes features making it suitable for studying fluvial geomorphology. It combines the capabilities of the S10 Rainfall Hydrographs and S11 Ground Water Flow Unit into a single comprehensive facility. The system is fully instrumented for investigation of rainfall/run-off hydrographs, ground water abstraction studies and unique to this apparatus, fluvial mechanics. This apparatus sets out to demonstrate, on a small scale, some of the physical processes found in hydrology.

9. Digital Ultrasonic Concrete Tester



Model: MT 03A (HEICO)

Application: The DIGITAL ULTRASONIC CONCRETE TESTER (DUCT) is a rugged, light and easy to operate instrument and uses a non-destructive technique for concrete testing. The technique involves determination of velocity of ultrasonic pulses through solid material. The velocity of these pulses depends upon the density and elastic properties of the material. The quality of some materials is sometimes related to their elastic stiffness so that measurement of ultrasonic pulse velocity in such materials can often be used to indicate their quality as well as to determine their elastic properties. Materials that can be accessed in this way include, in particular, concrete and timber, but excludes metals.

Specifications:

- **Display** : Four digit seven segment display with LED over-range indication.
- **Time measurement** : 0.1 to 999.9 micro seconds in single range.
- **Accuracy** : +/- 0.1 micro seconds for entire range.
- **Measurement range** : approx. 1.5 mtrs in concrete.
- **Input sensitivity** : 150 microvolt between 50 khz to 500khz.
- **Standard probe resonant frequency:** 150 khz approx.
- **Dimensions** : 230x 130x280mm
- **Weight** : 3kgs
- **Ambient temp.range** : 0⁰C to 45⁰c

10. GDS Resonant Column

Model : GDSRCA (GDS Instruments)

Application : The GDS Resonant Column Apparatus (GDSRCA) is used to excite one end of a confined solid or hollow cylindrical soil specimen. From the resonant frequency, small strain stiffness can be found. The GDSRCA is used by advanced commercial laboratories and Universities for performing research.



Specifications: **Frequency Range (Hz)** : 300

Data Acquisition : 16 Bit
Pressure Range (MPa) : 1 standard, 2, 3 and 25 as options
Sample Sizes (mm) : 50, 70, optionally 100

11. Glass Sided Tilting Flume

Model: S6-MK11 (Arm Field)



Application: The flow channel or flume is one of the most important tools available to the hydraulics engineer or civil engineer whether engaged in teaching researching solutions to practical problems. Many applications in fluid mechanics are associated the flow of water through an open channel where the water has a free surface that is exposed to the air at atmospheric pressure.

Specifications:

Flow rate - 30 litres/second

Flow regulation valve - Handwheel operated butterfly valve

+Ve slope 1:40 max (1.432 degrees) for all lengths

-Ve slope 1:200 max (0.286 degree) for all lengths

Flow Meter - Electromagnetic with digital display

12. Rebar Detection System

Model: Profometer 5+ (Proceq)

Application: The Profometer 5+rebar locator is a lightweight, compact device for the non-destructive location of rebars and for the measurement of concrete cover and bar diameters. The measuring method is based on the eddy-current principle with pulse-induction.



Specifications:

- Non-volatile data memory for 40 000 measured values, can be divided into 60 objects
- Graphics LCD, 128 x 128 pixels with backlight
- Interface RS 232
- ProVista software for data transfer to PC and editing Power supply with 6 batteries, 1,5 V, LR6 for an operating time of approx. 45 h, or 30h with switched on backlight. We suggest touse alkaline batteries.
- Permissible ambient temperature for the whole device: -10 °C to +60 °C

“Consultation works would be carried out as per the university norms”

Job requisition form and the charges applicable per sample are available in the website.

For further details, log on to: www.rgukt.ac.in

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