BIT Mesra – Interdisciplinary Research Clusters (BIRCs)

Vision

To position **Birla Institute of Technology (BIT) Mesra** as a nationally and internationally competitive research university by fostering theme-based, interdisciplinary research clusters that accelerate **high-impact research, translational outcomes, industry engagement, and societal solutions**.

Objectives

The BIRCs initiative aims to:

- Promote **cross-departmental and cross-disciplinary collaboration** around national and global priority areas
- Enable efficient **sharing of advanced research facilities, laboratories, and technical expertise**
- Enhance institutional **success rate in competitive external funding** (DST, DBT, SERB, MeitY, DRDO, ISRO, BIRAC, ICMR, industry, international agencies)
- Translate research into **patents, prototypes, startups, licensed technologies, and policy inputs**
- Build long-term **industry, government, and strategic partnerships**
- Strengthen BIT Mesra's position in **global rankings and research visibility**

Structure of Each Research Cluster (BIRC)

Each BIRC will function with the following structure:

- **Theme Leader** (Faculty with demonstrated leadership and funding track record)
- **Core Faculty Group**
  - Minimum **6 interdisciplinary faculty members**
  - From **different academic departments / centers**
- **Shared Facilities & Laboratories**
  - Pooled access to major equipment and infrastructure
- **Annual Action Plan & Deliverables**
  - Projects, publications, patents, funding proposals, outreach and training
- **Cluster Review & Governance**
  - Annual performance review by Institute-level Research Committee

---

Funding for Each Research Cluster

- **Funding per BIRC:** ₹50 lakhs to ₹1 crore
- **Tenure:** Maximum **2 years**
- **Manpower:**
  - ❌ No regular manpower support
  - Students to be supported through **IRS**
- **Permissible Expenditure:**
  - Equipment and facility augmentation
  - Consumables and prototyping
  - Testing and characterization
  - Software licenses and databases
  - Travel for project development, industry engagement, and consortium building

---

Thematic Research Clusters (Indicative, Not Limited To)

Research Cluster	Key Focus Areas	Key Outputs / Deliverables
Advanced Manufacturing & AI/ML-Driven Generative Materials Design	3D/4D printing, smart materials, composites, lightweight alloys, AI-guided materials discovery	Aerospace & automotive solutions, industry collaboration, technology transfer
AI, Data Science & High-Performance Computing (HPC)	Simulation, modeling, digital twins, AI for medical imaging, signal processing, machine learning	AI-enabled diagnostics, software IP, analytics platforms
Energy & Sustainability	Renewables, batteries, supercapacitors, hydrogen, fuel cells	Green technologies, pilot plants, technology demonstrators
Water, Environment & Climate Resilience	Water purification, wastewater treatment, climate adaptation	Rural & urban solutions, policy inputs, scalable technologies
BIODESIGN, BIOPROCESS, Computational Biology, MedTech & 3D Bioprinting	Imaging, NDT, biomaterials, spectroscopy, theranostics, image-guided therapy	Indigenous devices, patents, translational MedTech, preclinical validation
Smart Infrastructure & IoT	Smart cities, structural health monitoring (SHM), sensors, embedded systems	City-scale deployments, consultancy projects

Research Cluster	Key Focus Areas	Key Outputs / Deliverables
Robotics, Automation & Control	Autonomous systems, industrial automation, control algorithms	Industry-ready prototypes, skill development
Defence, Space, Remote Sensing & Strategic Technologies	Sensors, RF, photonics, defence materials, space instrumentation	Strategic & classified research, national partnerships
Cybersecurity, Blockchain & Trusted Systems	Secure communication, blockchain, privacy-preserving systems	Secure platforms, defence & policy relevance
Management, Innovation & Entrepreneurship	Technology management, innovation ecosystems, incubation	Spin-offs, commercialization models, policy frameworks
Humanities, Policy & Technology Studies	Ethics of AI, science & technology policy, technology–society studies	Policy briefs, interdisciplinary grants
High-Speed Digital Data Communication & Antenna Systems	5G/6G, RF systems, antenna design, optical communication	Industry-funded projects, testbeds, standards contributions
AI-Guided Design of APIs (Active Pharmaceutical Ingredients)	De novo drug design, QSAR, ADMET, computational chemistry, CMC-aware API optimization	Novel drug candidates, IP, pharma collaborations, translational drug discovery

---

Expected Institutional Impact

- Creation of **flagship interdisciplinary research centers of excellence**
- Increased **large-ticket grants** and consortium projects
- Enhanced **patent filing, licensing, and startup creation**
- Stronger **industry & strategic sector engagement**
- Improved **national and global research reputation**