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**

    o Minimum **6 interdisciplinary faculty members**

    o From **different academic departments / centers**

- **Shared Facilities & Laboratories**

    o Pooled access to major equipment and infrastructure

- **Annual Action Plan & Deliverables**

    o Projects, publications, patents, funding proposals, outreach and training

- **Cluster Review & Governance**

    o Annual performance review by Institute-level Research Committee

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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

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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**

BIT Mesra – Interdisciplinary Research Clusters (BIRCs)

Project / Cluster Proposal Submission Form
(To be submitted to: Office of Research / DRIE, BIT Mesra)

Section A: General Information
1. **Title of the Research Cluster (BIRC):**

2. **Thematic Area:**
   ☐ **Advanced Manufacturing & AI/ML Generative Materials Design**
   ☐ **AI, Data Science & HPC**
   ☐ **Energy & Sustainability**
   ☐ **Water, Environment & Climate Resilience**
   ☐ **Biodesign, Bioprocess, Computational Biology, MedTech & 3D Bioprinting**
   ☐ **Smart Infrastructure & IoT**
   ☐ **Robotics, Automation & Control**
   ☐ **Defence, Space, Remote Sensing & Strategic Technologies**
   ☐ **Cybersecurity, Blockchain & Trusted Systems**
   ☐ **Management, Innovation & Entrepreneurship**
   ☐ **Humanities, Policy & Technology Studies**
   ☐ **High-Speed Digital Data Communication & Antenna Systems**
   ☐ **AI-Guided Design of APIs (Active Pharmaceutical Ingredients)**
   ☐ **Other (please specify):** _____

3. **Broad Area:** _____
   Sub-Area / Theme: _____
   (Example: Life Sciences → AI-guided Drug Discovery & API Design)

4. **Proposed Cluster Duration:**
   ☐ **1 Year**
   ☐ **2 Years (Maximum)**

5. **Total Budget Requested (₹):**
   ☐ **₹50 Lakhs**
   ☐ **₹75 Lakhs**

☐ ₹1 Crore
☐ Other (specify): ₹_____

Section B: Theme Leader (Cluster Head)
- **Name:** _____
- **Designation:** _____
- **Department/Centre:** _____
- **Email:** _____
- **Mobile:** _____
- **ORCID/Scopus ID (if any):** _____

Major External Grants in Last 5 Years (brief):
_____

_____

Section C: Core Faculty Members (Minimum 6, Interdisciplinary)

Sl. No.	Name	Department	Role in Cluster	Email
1				
2				
3				
4				
5				
6				
Additional (if any)				

Section D: Background & Rationale (Max 1 Page)
- **Scientific/technical background of the cluster theme**
- **National and global relevance**
- **Alignment with BIT Mesra strategic priorities**

(Attach as Annexure if required)

Section E: Objectives & Key Research Questions
List 3–6 specific, measurable objectives:
1. _____
2. _____
3. _____
4. _____
5. _____

Section F: Work Packages & Milestones
Provide major work packages and timelines:

 Work Package Description Lead Faculty Timeline Key Deliverables

 WP1

 WP2

 WP3

 WP4

Section G: Expected Outputs & Deliverables
(Provide quantitative targets)

Section H: Translational & Societal Impact
- **Industry relevance / commercialization potential**
- **Startup / IP creation potential**
- **Societal / policy impact**
- **Alignment with national missions**

Section I: External Funding & Sustainability Plan
- **Target funding agencies (DST, DBT, SERB, DRDO, ICMR, BIRAC, MeitY, Industry, etc.):**

- **Plan to sustain the cluster beyond BIRC funding:**

Section J: Facilities & Infrastructure
- **Existing facilities to be used**
- **New equipment proposed (if any)**
- **Shared facility plan**

Section K: Budget Summary (Indicative)

Head	Amount (₹)	Justification
Equipment		
Consumables		
Software/Databases		
Testing/Characterization		
Travel (Project/Industry)		
Contingency		
Total		

Section L: Compliance & Declarations
- **No manpower support is requested under BIRC funding. ☐ Yes**
- **The project is interdisciplinary in nature. ☐ Yes**
- **The team agrees to annual review and performance reporting. ☐ Yes**

Signatures
Theme Leader:
Name & Signature: _____ Date: _____
All Core Faculty Members:
(Attach signed consent sheet)

For Office Use Only
- **Proposal ID: _____**
- **Date of Receipt: _____**
- **Review Committee Remarks: _____**
- **Approved Budget: _____**
- **Approval Authority: _____**