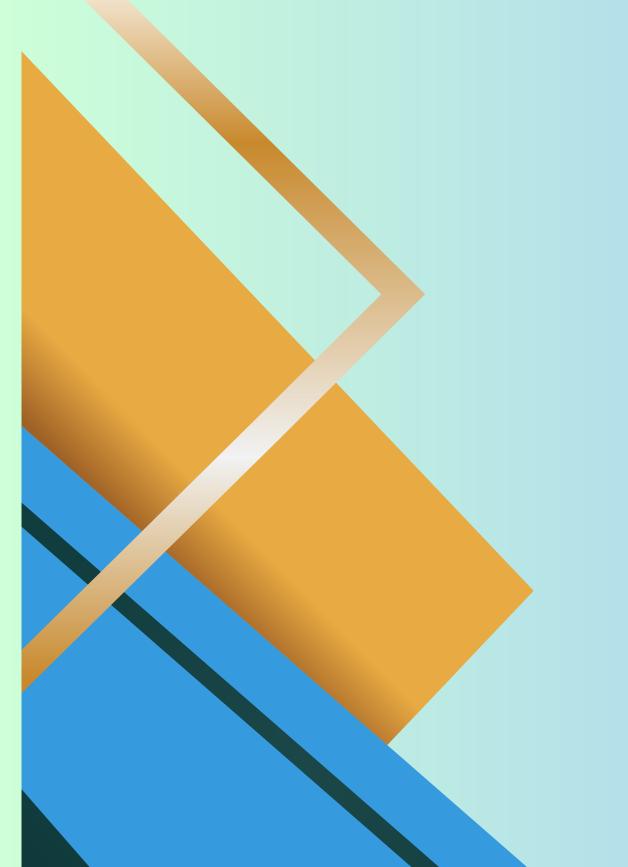
# Information Brochure Ph.D. -JDP Programme between IIT Mandi and SVNIT, Surat A Y - 2 0 2 5 - 2 0 2 6



# **Academic Section**

Indian Institute of Technology Mandi Kamand, Himachal Pradesh -175075



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# About IIT Mandi

The Indian Institute of Technology Mandi (IIT Mandi), one of the premier technical institutes in India. IIT Mandi was established in 2009 with the aim of providing world-class education and cutting-edge research in engineering, science, and technology. Since its inception, the institute has strived to achieve excellence in education, research, and innovation.

Located in the scenic town of Mandi in the Himalayan foothills, the institute offers a unique learning experience to its students. With state-of-the-art facilities and world-class faculty members, IIT Mandi provides a conducive environment for research and learning. The institute offers undergraduate, postgraduate, and doctoral programs in various disciplines of engineering, sciences, and humanities.

At IIT Mandi, we believe in fostering an environment of innovation and creativity. Our faculty members are renowned experts in their fields and are committed to providing their students with the best possible education. With our multidisciplinary approach to education, we aim to produce graduates who are well-rounded and equipped to solve real-world problems.

We take pride in our research culture and encourage our students to engage in cutting-edge research in various fields. Our research facilities are equipped with state-of-the-art equipment and resources, providing our students with ample opportunities to explore their interests and pursue their passions.

Institute Webpage: www.iitmandi.ac.in

# **About SVNIT Surat**

Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat is to be a leading technical Institute not only at national level but also at International level for imparting training to manpower as per the needs of technology. It is also envisaged to provide the necessary infrastructure to take up research work and to provide the mechanism to interact with industries effectively.

The Institute has been granted the status of 'Institute of National Importance' w.e.f. Aug. 15, 2007. At present, the Institute is offering Ten UG Programmes, Twenty Two PG Programmes and Four Five Years Integrated Programme including doctoral programme in various disciplines of Engineering, Sciences, English and Management.

Institute Webpage: www.svnit.ac.in

# **About PhD JDP**

The Joint Degree Program (JDP) offers PhD students enrolled in both institutions the chance to collaborate on a multidisciplinary research project with faculty members and research teams from IIT Mandi and SVNIT Surat, as well as to take advantage of the facilities and professional development opportunities offered by both institutions.

# **Important Guidelines for PhD Application**

- 1. Please read the instructions given in the brochure carefully before filling up the applications.
- Online Application form & Information brochure (Including the admission schedule along
  with the important dates) is available on the institute website at the following link:
  <a href="https://alliance.iitmandi.ac.in/svnit/">https://alliance.iitmandi.ac.in/svnit/</a>
- 3. You are required to submit the application form ONLINE. No Downloadable Forms will be available after filling the form, you are advised to take a print of your application for your records.
- 4. For each project, candidate should submit a separate application with the application fee.
- 5. The application fee is as follows:

Category	Amount in ₹
General/EWS/OBC/OBC(NCL)/Transgender/Foreign Nationals	200
Women/SC/ST/PD	100

- a. Mode of Payment: SBI Collect Portal.
- One application fee is valid for the single application. The application fee is NON-REFUNDABLE.
- 6. OBC candidates may note that the limit for annual income is Rs. 8 Lakhs for determining the creamy layer among Other Backward Classes (OBCs) candidates. The OBC (NCL) certificate issued for the financial year 2025-26 by the Competent Authority in the prescribed format must be uploaded in the ONLIINE application form.
- 7. Economically Weaker Sections (EWS) candidates may note that the limit for annual income is Rs. 8 Lakhs for determining the eligibility for benefit under Economically Weaker Sections (EWS) reservation. The EWS certificate issued by the Competent Authority in the prescribed format must be uploaded in the ONLINE application form and submitted at the time of admission.

- 8. Seats are reserved for Economically Weaker Sections (EWS)/Other Backward Class Non-Creamy Layer (OBC-NCL)/Schedules Caste (SC)/Scheduled Tribe (ST) and Person with Benchmark Disability (PwD) categories as per Government of India norms.
- 9. You should check Institute website for results/important announcements.
- 10. You should check emails sent to your email address provided in your application for all important communications and announcements if any.
- 11. Merely fulfilling eligibility criteria does not entitle a candidate to be called for the written test/interview. Decision of Institute authorities will be final. Admission is based on GATE/Written test/Interview performance in addition to general eligibility criterion, the applicants must also satisfy the eligibility criteria specified for the respective Departments / Centres / Schools / Interdisciplinary Groups.
- 12. Candidates, if called for written test/interview should show/ bring with them (i) Photo ID Card, (ii) Printed copy of the application submitted online, (iii) Thesis/dissertation/report/publications (iv) copy of certificates and mark-sheets.

# **Important Dates for Admission**

Starting date for filling Online Application	25 <sup>th</sup> April, 2025	
Last date for filling Online Application	16 <sup>th</sup> May, 2025	
Declaration of shortlisted candidates list	Will be Published on IIT Mandi and	
	SVNIT Surat website	
Shortlisted candidates will be informed by email		

# **Contact Details**

In case of any query related to the Ph.D. Programme admission process you may contact respective school/Centre, the contact details are:

### IIT Mandi

For Technical Problem Kindly contact:

Section	Contact No.
Academic Section	01905-267063 ,01905-267754

# For School/Centre details Kindly contact:

Name of School/Centre	Email ID	Contact No.
Centre Artificial Intelligence and Robotics (CAIR)	cairoffice@iitmandi.ac.in,	

School of Biosciences & Bioengineering	sbboffice@iitmandi.ac.in	01905-267061
School of Chemical Sciences	scsoffice@iitmandi.ac.in	01905-267277
School of Civil & Environmental Engineering	scene admissions@iitmandi.ac.in	01905-267180
School of Computing and Electrical Engineering	sceeoffice@iitmandi.ac.in	01905-267071
School of Humanities & Social Sciences	shssoffice@iitmandi.ac.in	01905-267719
Indian Knowledge System and Mental Health	iksmha@iitmandi.ac.in	01905-267786
Application (IKSMHA)		
School of Management	somoffice@iitmandi.ac.in	01905-267119
School of Mathematical & Statistical Sciences	smssoffice@iitmandi.ac.in	01905-267929
School of Mechanical and Materials Engineering	smmeadmissions@iitmandi.ac.in	01905-267138
School of Physical Sciences	spsoffice@iitmandi.ac.in	01905-267812
Centre for Quantum Science and Technologies (CQST)	arvindthapliyal@iitmandi.ac.in	01905-267899
Centre for Human Computer Interaction (CHCI)	chcioffice@iitmandi.ac.in	01905- 267187

# **SVNIT Surat**

# For Technical Problem Kindly contact:

Section	Email ID	Contact No.
Academic Section	acad_phd@svnit.ac.in	0261-220-1534

# For Department Kindly contact:

Name of Department	Email ID	Contact No.
Department of Artificial Intelligence	hod@aid.svnit.ac.in	0261-220-xxxx
Department of Chemical Engineering	hod@ched.svnit.ac.in	0261-220-1641
Department of Chemistry	hod@chem.svnit.ac.in	0261-220-1971
Department of Civil Engineering	hod@ced.svnit.ac.in	0261-220-1841
Department of Computer Science & Engineering	hod@coed.svnit.ac.in	0261-220-1611
Department of Electrical Engineering	hod@eed.svnit.ac.in	0261-220-1571
Department of Electronics Engineering	hod@eced.svnit.ac.in	0261-220-1681
Department of Humanities and Social Sciences	hod@dohss.svnit.ac.in	0261-220-1989
Department of Management Studies	kpd@med.svnit.ac.in	0261-220-1910
Department of Mathematics	hod@amhd.svnit.ac.in	0261-220-1981
Department of Mechanical Engineering	hod@med.svnit.ac.in	0261-220-1751
Department of Physics	hod@phy.svnit.ac.in	0261-220-1951

# **Academic Structure**

# Program management

A Doctoral Advisory Committee (DC) shall be set up for each JDP Scholar to support and monitor progress of the JDP Scholar throughout the candidature until the thesis has been submitted. The DC shall consist of the following members

Chair/Head of the School/Department of the Home Institute or his/her nominee	Chairperson
Supervisor from the Home institute	Member
Supervisor from the Host institute	Member
Co-supervisor (s), if any with justification	Member (s)
Subject Expert from the Home Institution	Member
Additional members may be appointed to meet the requirements	Members

# **Coursework Requirements**

The JDP Scholar shall satisfy the minimum academic coursework requirements of the Home Institution. Additional courses may be taken when recommended by the DC. If a JDP scholar credits a course in one institution, the credits will be automatically transferred to the other institution and will be counted towards the degree requirement.

# Joint Degree Program Structure

- Candidates have a "Home Institution" where they begin their studies and spend the majority of time. The expectation is that candidates will spend a minimum of 12 months at the other, "Host Institution" the timing and duration of this will depend on the program of research but in general will be in the second or third year of the degree. Travel to and study at the Host Institution will be subject to the usual requirements of the institute.
- As a condition of enrolment on the PhD JDP, candidates are required to:
  - Spend a minimum of one year\* (two semesters) enrolled at each institution.
     \*Candidates registered as part-time PhD or under External Registration program need to spend the minimum residential requirement criteria of both the institute as mentioned in their ordinances and regulations.
  - Undertake a program of progress monitoring and examination that meets the requirements of both institutions.
  - Comply with the rules, regulations, policies, codes and procedures of both institutions.
  - Write and submit a thesis for defence by oral examination at the home Institution
- Candidates for the PhD JDP will be enrolled in a PhD program in parallel at both institutions. The supervisory team will comprise academics from both institutions who will provide guidance and support throughout the doctoral program. Candidates will benefit from the research community, networking, and collaborations of the IIT

Mandi – SVNIT Surat. Through enrolment at both institutions, candidates will have access to services and support provided at IIT Mandi and SVNIT Surat, including a variety of professional and personal development opportunities for researchers.

- The primary supervisor shall be from the Home Institution. There must be a Joint supervisor from the Host Institution.
- The PhD JDP includes a tailored program of progress monitoring to fulfil the requirements of both institutions. On successful completion of the program requirements, candidates will be awarded a PhD degree jointly by both the Institutions.

# Admissions are currently open under the following research projects

# Project No:1

Assessing the Seismic Resilience of RC Buildings on Hill Slopes with Regional Ground Motion Variability: A Fragility and Deterministic Assessment

Due to a lack of open space and increasing demands from population growth, buildings are often constructed on hilly slopes using (i) poor materials, (ii) subpar design without code compliance, and/or (iii) self-made without consulting design engineers. Moreover, those buildings are often irregular in plan and elevation. Along the active Himalayan region, such construction methods may worsen vulnerability and lead to risk to property and lives of people. Hence, by identifying the critical factors affecting the vulnerability of irregular buildings on hill slopes, this study intends to propose updated typological fragility curves. This investigation will also include consideration of the regional ground motion variability and how it affects structural response. It is anticipated that the study's findings would formalize appropriate guidelines for disaster mitigation of buildings built in this region

Home Institute: Indian Institute of Technology

Mandi

**Supervisor:** Dr. Dhanya J.

**School/Dept.:**School of Civil and Environmental

Engineering

Host Institute: Sardar Vallabhbhai National

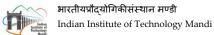
Institute of Technology, SVNIT **Supervisor:** Dr. Tamizharasi G. **School/Dept.:** Department of Civil

Engineering

# Project No:2

Impact of Limited Water Resources on Agricultural Productivity in the Himalayan Region: A Water-Soil-Plant-Nutrient System Analysis

Farmers in the Himalayan region have access to various water sources, but their quality is often limited. The primary and most easily accessible water sources for them may be contaminated, which can negatively impact plant health and consequently lead to risks to human health through





consumption. This research project critically addresses those issues of farmers, studying the impact of different irrigation water sources - river water (Uhl River near IIT Mandi campus), tank water, purified water, and farm pond water - on crop growth, biomass, and yield over two years. The study will assess water quality - chemical and biological parameters such as pH, electrical conductivity, dissolved oxygen, turbidity, nutrient content (N, P, K), heavy metals, and microbial count. Changes in soil physical (texture, bulk density), chemical (organic carbon, cation exchange capacity), and biological (microbial diversity) properties will be analyzed to assess how the irrigation water will change the soil quality in the long term. Therefore, this project will develop a complete relationship in the water-plant-nutrient system. Findings will identify water sources that enhance or restrict agricultural productivity, providing insights into sustainable water management and treatment strategies for improved crop-soil interactions.

Home Institute: Indian Institute of Technology

Mandi

**Supervisor:** Dr. Ranjeet Kumar Jha **School/Dept.:**SCENE, Indian Institute of

Technology (IIT) Mandi

Host Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT **Supervisor:** Dr. Sarita Kalla

School/Dept.: Department of Chemical

Engineering

# Project No:3

# Development of Mg Metal Matrix Composites through a novel hybrid additive manufacturing route

This project aims to develop Magnesium Metal Matrix Composites (Mg MMCs) using a novel hybrid additive manufacturing (AM) route. By combining traditional AM techniques with advanced reinforcement methods, the research seeks to enhance the mechanical properties and performance of Mg MMCs. The process involves incorporating ceramic and metallic reinforcements into the Mg matrix through a layer-by-layer fabrication approach, ensuring uniform distribution and strong interfacial bonding. Detailed microstructural analysis and mechanical testing are performed to evaluate properties such as strength, hardness, and thermal stability. The developed Mg MMCs are expected to find applications in lightweight structures for aerospace, automotive, and biomedical industries.

**Home Institute:** Indian Institute of Technology

Mandi

Supervisor: Dr. Sandeep Sahu

School/Dept.: School of Mechanical and Materials

Engineering

Host Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT

**Supervisor:** Dr. Biranchi Narayan Sahoo **School/Dept.:** Department of Mechanical

Engineering

# Project No:4

# **Advanced Materials for Energy Conversion**

Renewable Energy and Energy conversion devices have become the demand of the day and require proficient novel materials and techniques. Promising energy conversion devices are next-generation solar cells. Developing novel materials for efficient energy conversion/storage is essential nowadays. In addition, the development of novel materials for the enhancement of performance is highly needed. Energy conversion devices can be also coupled with energy storage devices to make them even more appreciated. Thus, we will prepare novel multifunctional hybrid

materials for such applications. These materials will be developed through rational designs for strategic applications.

Home Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT

**Supervisor:** Dr. Jignasa Gohel, NIT, Surat **School/Dept.:**Chemical Engineering

Host Institute: Indian Institute of Technology

Mandi

**Supervisor:** Dr. Ranbir Singh, IIT Mandi **School/Dept.:** Mechanical and Materials

Enggineering

# Project No :5

# Analysing the Approaches for Security and privacy using Machine Learning and Adversarial Machine Learning

The project involves analysing current state-of-the-art to investigate approaches for safeguarding Machine Learning (ML) systems from various security threats, including data breaches, model theft, and adversarial attacks, by implementing security measures at all stages of the ML lifecycle, finding out the research gaps therein and proposing new approaches for safeguarding the ML systems. The project may also involve investing probable approaches for security attacks on the ML systems and investigating newer approaches for such attacks, to eventually propose novel approaches for mitigating such attacks.

Home Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT

Supervisor: Dr. Devesh C Jinwala

**School/Dept.:**Department of Computer Science

and Engineering

Host Institute: Indian Institute of Technology

Mandi

Supervisor: Dr. Dinesh Singh

School/Dept.: School of Computing and

**Electrical Engineering** 

# **Project No:6**

# Developing Tailored UFG Structured Sheets Using the SPD Process for Biomedical Implants

The project, titled "Developing Tailored UFG Structured Sheets Using the SPD Process for Biomedical Implants," aims to create ultrafine-grain (UFG) titanium alloy sheets using the Severe Plastic Deformation (SPD) process. The key objectives include enhancing the biocompatibility of UFG sheets for biomedical applications, improving mechanical properties, and developing heterogeneous structures with tailored properties to meet specific implant requirements. The project seeks to advance the material's performance for implants, offering better integration with human tissues and ensuring long-term reliability and functionality in medical applications.

Home Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT

Supervisor: Dr. Sunil Kumar

School/Dept.:Department of Mechanical

Engineering

Host Institute: Indian Institute of Technology

Mandi

Supervisor: Dr. Rajesh Ghosh

School/Dept.: School of Mechanical and

Materials Engineering

# Project No:7

Development and high temperature deformation behavior of HEA reinforced Mg MMC.

The project focuses on developing and studying high-temperature deformation behavior of High-Entropy Alloy (HEA) reinforced Magnesium Metal Matrix Composites (Mg MMCs). HEAs are known for their exceptional mechanical properties, including high strength, thermal stability, and corrosion resistance. By reinforcing Mg MMCs with HEAs, this research aims to enhance composite's mechanical performance, especially under high-temperature conditions. The study involves fabricating Mg MMCs with varying HEA content, followed by detailed characterization of microstructure and mechanical properties. Deformation mechanisms are evaluated through compression and tensile tests at elevated temperatures, providing insights into improving high-temperature performance for aerospace and automotive applications.

Home Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT

Supervisor: Dr. B.N.Sahoo

**School/Dept.:**Department of Mechanical

Engineering

**Host Institute:** Indian Institute of Technology

Mandi

Supervisor: Dr. Sandeep Sahu

School/Dept.: Department of Mechanical

Engineering

# **Project No:8**

# Green synthesized bio-waste-derived membranes for environmental remediation

The project is related to a clean, green, and sustainable environment with adequate and drinkable clean water and air, which is one of the national priorities. The current project is related to the development of polymeric membranes from zero carbon footprint sources such as plastic waste. The developed membranes will be further modified by nano-particles to impart antifouling properties to the membrane surface and tested using membrane separation process. Solar energy is also used to maintain sustainability and to reduce overall process energy costs. The use of renewable energy sources makes the development process viable in rural areas where electrical energy may not be available or available for a limited time.

Home Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT **Supervisor:** Dr. Sarita Kalla

School/Dept.:Department of Chemical

Engineering

Host Institute: Indian Institute of Technology

Mandi

**Supervisor:** Dr. Ranjeet Kumar Jha **School/Dept.:** SCENE, IIT MANDI

# Project No:9

# Multi-Sensor integration, monitoring for Intelligent Defect Detection and Adaptive Control in Metal 3D Printing

This project involves the seamless integration of multiple advanced sensors, including thermal cameras, laser scanners, acoustic sensors, and force sensors, into a metal 3D printer to enable real-time monitoring and intelligent data processing. Al-driven multi-sensor data fusion techniques will be employed to detect and classify defects such as porosity, distortion, and thermal inconsistencies. A closed-loop, robotics-based adaptive control system will dynamically optimize key printing parameters, such as laser power and scan speed, in response to detected anomalies. The system's effectiveness will be validated through comparative analysis against conventional methods, ensuring superior defect detection, improved print quality, and process optimization.

Home Institute: Sardar Vallabhbhai National

Institute of Technology, SVNIT

**Supervisor:** Dr. Krishna Kishore Mugada **School/Dept.:**Dept of Mechanical Engineering

Host Institute: Indian Institute of Technology

Mandi

**Supervisor:** Dr. Amit Shukla **School/Dept.:** Center for Artificial Intelligence and Robotics (CAIR)

# Project No :10

# Optimization of forming factors with multistage Incremental hole flanging process

In the vast prospects for automation, incremental sheet forming (ISF) is a reliable sector on which the industry may focus in the future. Due to spring back, poor surface finish, and production time, ISF has yet to apply in broad prospects in mainstream high-value manufacturing sectors. ISF performance is affected by process factors such as vertical step depth, feed rate, spindle speed, forming angle, tool path, intermetallic friction, and bending forces. One of the variants of ISF processes is Single Point Incremental Forming (SPIF). The formability of the SPIF process increases by incorporating certain intermediary phases known as Multistage Incremental Sheet Forming (MSPIF). The strain-hardening effect that emerged in the distorted sheet alters its deformability. The integration of intermediate results into some new process parameters to address in this work includes the number of stages, angle interval between the stages, and tool diameter. Recently, the research interest of hole-flanging has turned from conventional press-working to single-point incremental forming (SPIF) as a viable process for small- and medium-sized batches. Both technologies have to study separately using different approaches and, therefore, most studies cannot be easily compared. The formability in SPIF is generally measured using the classical limiting forming ratio (LFR). The present research focuses on the influence of process parameters on section thickness, equivalent plastic strain, spring back and LFR. A simulation study of various process parameters of multistage forming and their effects on multistage incremental hole flanging performance were evaluated.

Home Institute: Sardar Vallabhbhai National
Institute of Technology, SVNIT
Supervisor: Dr. Amrut S. Mulay
School/Dept.:Department of Mechanical
Engineering

**Host Institute:** Indian Institute of Technology

Mandi

**Supervisor:** Dr. Vishal Singh Chauhan **School/Dept.:** Department of Mechanical

and Materials Engineering

# **General Qualifications**

In the present call, the students for the PhD JDP will be admitted only in the Regular category. An eligible student in this category works full-time and receives assistantship from the Institute.

The candidate should fulfil the minimum eligibility criteria of the Home institution of the respective projects as mentioned in the below link.

• IIT Mandi: https://cloud.iitmandi.ac.in/f/ebee554e7294407399ce/

# • <u>SVNITSurat</u>:

https://www.svnit.ac.in/Data/Notice/2023/October/Academic%20Regulation-2023-24.pdf

In addition to general eligibility criterion, the applicants must also satisfy the eligibility criteria specified for the respective Projects/Departments / Centres / Schools / Interdisciplinary Groups. Over and above the general eligibility criteria for admission, candidates need to satisfy additional criteria for financial support / fellowship, as specified under specific admission categories.

The final selection process to Ph.D. JDP programme for any project will be through written test and/or interview.

# **Application and Admissions**

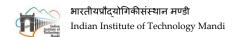
The admissions process will be managed by the IIT Mandi - SVNIT Surat Joint Admissions Sub-committee (JASC) constituted at the School/Department/Centre level and according to each Institution's admissions procedure. Candidates must meet the admissions requirements of both institutions. The eligibility criteria for enrolling in a joint PhD program will be same as that of a regular PhD program/ERP of the individual institute. The details of the same can be found in the PhD ordinance of the individual institute.

- IITMandi : https://www.iitmandi.ac.in/pdf/ordinances/Ordinances phd mtech.pdf
- <u>SVNIT Surat</u>: https://www.svnit.ac.in/Data/Notice/2023/October/Academic%20Regulation-2023-24.pdf

All applicants will be expected to apply through an online admissions portal.

# Fees, Scholarships and Funding

- The JDP Scholar shall pay tuition fees only to their Home Institution through out he duration of the JDP including the duration of study at the Partner Institution asper its fee structure.
- Unless otherwise indicated, candidates who wish to be admitted onto the PhD JDP are entitled to receive fellowship meeting the eligibility criteria. The cost of fellowship will be borne by the Home Institute even during the candidate's stay in the Host Institute. No tuition fee will be charged by the host institution. However, the student needs to bear the boarding and lodging charges. Scholarships are awarded based on merit, and the value and conditions of any scholarship awarded will be in accordance with the terms and conditions of the awarding institution.
- Regardless of the scholarship awarded, students on the joint PhD program will be personally responsible for the following expenses unless otherwise advised:
  - o Incidental fees and charges at either institution





- o Accommodation and living expenses at either institution
- All personal expenses and non-compulsory additional fees at the host institution
- All debts incurred by candidates during their stay at either institution
- o Any other debts incurred by candidates during the Joint PhD Program
- Further the grants in respect of attending conferences will be provided only by the home institute.

# Fees details:

The selected candidate needs to pay the fee only to the Home institution and the details about the fee structure can be found below:

IIT Mandi : https://iitmandi.ac.in/fees

SVNITSurat: https://www.svnit.ac.in/Data/fee%20structure/Ph.D.%20admitted%20in%20AY%202024-25.pdf