Who can attend?

- Students pursuing B.Tech./M.Tech./MS/M.Sc./Ph.D. degrees in any discipline or members of Faculty of any department from academic and technical institutions.
- Researchers in Sciences, Engineering, Computer Science and IoT disciplines who need to process complex and large data sets.
- Executives working with manufacturing, IT, service or any other organization, including research laboratories.

Important Dates

- Last Date of Online Registration: April 18, 2022
- Course Dates: May 02-13, 2022

How to Register?

- Register online at: **https://gian.iitkgp.ac.in/GREGN/index**
- The registration fee can be paid through a Demand Draft drawn in favour of "PDPM IIITDM JABALPUR" payable at JABALPUR OR through NEFT/RTGS:

Account Name : PDPM IIITDM JABALPUR
Account No.: 50210022387
Bank MICR Code: 482019014
Bank IFS Code: IDIB000M694
Bank Name: Indian Bank
Branch Name:
Mehgawan, IIITDM, Campus
Branch, Jabalpur

- Please email transaction details and registration copy (from GIAN) to the mail ID provided.
  Email: **cps.gian2022@iiitdmj.ac.in**

Registration Fee

Industry/ Research Organizations:	INR 2500
Academic Institutions (Faculty):	INR 1000
Research Scholars/Students:	INR 500
Students from SAARC Countries:	INR 1000
Participants from abroad:	USD 100

The registration fee includes instructional materials, tutorials and assignments, computer and Internet access. For accomodation in institute hostels, candidate has to pay charges as per institute norms available in the Institute's website (**www.iiitdmj.ac.in**).

Course Coordinators

Prof. Puneet Tandon is a joint Professor of Mechanical Engineering and Design at PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India. Presently, he is serving as the Head of Smart Manufacturing Discipline. His primary research interests include CAx technologies, including CAD/CAM/CAE, BioCAD, and Human Factors in CAD; and Advanced Manufacturing Technologies, including Hybrid, Dieless, Additive,and Smart Manufacturing. He has been awarded the 2020 DUO-India Fellowship Award with Padova University, Italy. He has also been awarded First Prize in IMTEX Forming 2016 on Dieless Manufacturing, and Second Prize in IMTEX 2018. He has more than 290 publications, besides being the author of 2 books and more than 18 patents to his credit. He has been editor/guest editor of a few journals.

Prof.Vijay Kumar Gupta is Professor of Mechanical Engineering at PDPM IndianInstitute of Information Technology, Design, and Manufacturing, Jabalpur (PDPMIIITDM Jabalpur). Prof. Gupta has an interest in the area of Smart Structures, Vibrations, FEM, Mechatronics, and Robotics. He was the recipient of the ISAMPE K. Suryanarayan Rao Memorial Senior student award for R&D in smart technology for Year 2003 for his Ph.D. work. He is also the recipient of JSPS Short Term Invitation Fellowship. He has published more than 50 research articles and edited three books. He was chair of three international conferences and supervised a number of students in the areas of Mechanical Design, Condition Monitoring, Mechatronics, and Robotics.

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MHRD Scheme on
Global Initiative on Academic Network (GIAN)

Designing Cyber-Physical Systems for General Societal & Personal Utilization

Smart Manufacturing Discipline
PDPM Indian Institute of Information Technology,
Design and Manufacturing, Jabalpur
Madhya Pradesh, India - 482005.
www.iiitdmj.ac.in

May 02 - 13, 2022

Course Coordinators

The Government of India approved a new program titled Global Initiative of Academic Networks (GIAN) in Higher Education aimed at tapping the talent pool of scientists and entrepreneurs, internationally to encourage their engagement with the institutes of Higher Education in India so as to augment the country's academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence.

Under the GIAN program lectures by internationally and nationally renowned experts are being arranged to garner the best international experience into our systems of education, enable interaction of students and faculty with the best academic and industry experts from all over the world and share their experiences and expertise to motivate people to work on Indian problems.

Course Instructor

Professor Imre Horváth, an Emeritus Professor at Delft University of Technology (TU Delft) studied Mechanical Engineering and Engineering Education at the Technical University of Budapest, Hungary. He served at various faculty positions at the Technical University of Budapest. He earned dr.univ. title in Computer Aided Design in 1987, C.D.Sc. title from the Hungarian Academy of Sciences in Applied Information Technology in 1993, and Ph.D. from the Technical University of Budapest in 1994. He was nominated to a Chair Professor position at the Section of Computer Aided Design Engineering, Department of Design Engineering, Faculty of Industrial Design Engineering, Delft University of Technology, in 1996. His research group is currently focusing on research and education of Cyber Physical System Design. He was the promotor of more than 20 Ph.D. students. From 2006 until 2008 he was Chair and past chair of the Executive Committee of the CIE Division of ASME. From 1999 until today he has been member of the Royal Dutch Institute of Engineers. He received the Pitney-Bowes Award of the American Society of Mechanical Engineers, and the Honorary Scholarship award from the Committee of Promotion of Science of Japan in 1995. He received honorary doctor title from the Budapest University of Technology and Economics in 2009, and Honorary Professor title from the Miskolc University of Technology, Hungary, in 2010. He received the Pahl-Beitz ICONNN award for internationally outstanding contribution to design science and education in 2019. Recently, he was distinguished by the ASME CIE Division 2019 lifetime achievement award. He is the author of more than 390 publications. He edited 16 conference proceedings and compiled 29 special issues of various journals as guest editor. He acted as co-editor in chief of Journal Computer Aided Design in the period of 2004-2014 and is emeritus editor now.

Course Overview

Smart-Cyber Physical Systems (S-CPSs) are claimed to be the main enablers of the digital transformation that is currently happening all around the world, in particular in the framework of Industry 4.0. However, this kind of system has enormous potential and possible capabilities to be applied on domains other than intelligent manufacturing and production, or as platforms for the implementation of digital twins. These other domains of applications are collectively referred to as societal and personal applications. Typical examples of these are traffic management, stroke rehabilitation, greenhouse operation, foreign language education, sports enhancement, indoor fire evacuation, airport passenger monitoring, etc. While traditionally humans have been considered to be involved in the operation loop of systems, the above applications enforce the system-in-the-social/human loop concept. The developments are rather fast with regards to both understanding the theoretical and methodological fundamentals of designing S-CPSs for context-dependent smart operation and to the implementation practices of the key components. Some of the examples can be such as awareness building, situation analysis, dynamic context management, system-level reasoning, operation adaptation, adaptation planning, status supervision, etc. There are even many more open issues and research/development questions

This course intends to inform the learners about the important family of engineered systems of high future impacts, which is represented by various generations of cyber-physical systems. The significance comes from the fact that they are multi-actor systems and deeply penetrating into real-life processes, as opposed to purely industrial systems that target a very high level of self-autonomy and efficiency in production. This course is designed for a fascinating and competitive future role as a smart system designer and developer. Dealing with CPSs is not only exciting and fun, but it also strengthens the position of graduate students in the international job market. To optimize the competencies of the students, the course tries to achieve a good balance between the necessary foundational theories and practical learning by doing.

About IIITDM Jabalpur

PDPM IIITDM Jabalpur was established by the Ministry of Education (Formerly MHRD), the Government of India in 2005 with a focus on education and research in IT enabled Design and Manufacturing. Since its inception, IIITDM Jabalpur has been playing a vital role in producing quality human resources to contribute to India's mission of inclusive and sustainable growth. The Institute offers undergraduate, postgraduate and Ph.D. programs in Computer Science and Engineering, Electronics and Communication Engineering, Mechanical Engineering, Smart Manufacturing, and Design, along with Ph.D. in Mathematics, Physics and English. Under the IIIT act, the Institute has been declared an Institute of National Importance.

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- Lecture 02: Characteristics of cyber-physical systems
- Practicum 01: Cyber-physical systems exemplified

- Lecture 03: Typical functionality and smartness of CPSs
- Lecture 04: Generations of cyber-physical systems
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- Lecture 05: Cognitive engineering of cyber-physical systems
- Lecture 06: Examples for experimental S-CPSs
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- Lecture 07: Context engineering for S-CPSs
- Lecture 08: Artificial intelligence and system-level reasoning
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- Lecture 19: Designing for interaction with S-CPSs
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