Detailed Project Report (DPR) for The Grant of Deemed to be University under De-Novo Category

Submitted to
University Grants Commission (UGC)
New Delhi

MADHAV INSTITUTE
OF TECHNOLOGY &
SCIENCE
GWALIOR – 474 005,
M.P. (INDIA)

Index

Introduction

- **Madhav Institute of Technology & Science (MITS), Gwalior was established in** 1957 **by His Highness Sir Jiwaji Rao Scindia, Maharaja, of the erstwhile state of Gwalior under open door policy of Govt. of India.**
- **The Foundation Stone of the Institute building was laid by the then** President Dr. Rajendra Prasad**, on 20th October, 1956 and subsequently, established in** 1957**.**
- **The building of Institute was inaugurated by the then** President of India Dr. S. Radhakrishnan**, on 11th December, 1964.**
- **On the occasion of Golden Jubilee Celebrations, the then president of India,** Dr. Pratibha Devi Singh Patil **graced the occasion as Chief Guest on 30th June, 2008. A commemorative Postal Stamp with first day cover of the institute was also released by department of Posts, India on this occasion.**
- **Madhav Institute of Technology & Science (MITS), Gwalior run by** the Scindia Engineering College Society**, is a** UGC Autonomous**,** NAAC Accredited**,** state government grant-in-aid institute**, affiliated to RGPV, Bhopal. It is situated in the northern part of Madhya Pradesh.**
- **The institute has a lush green, campus spread in** 44.6 acres**.**
- **The Institute started with 3 disciplines; Civil, Mechanical and Electrical Engineering with a total intake of 120. Now, there are17 under graduate and 10 post graduate Programmes in Engineering & Technology, Architecture & Planning, Computer Application and Management with a total strength of approximately 5000 students. There are about 100 Ph.D. scholars in different disciplines.**
- **As per the vision of the institute," To create world class quality Engineers and Technocrats capable of providing leadership in all spheres of life and society ", the institute is committed to achieve and maintain quality through several different initiatives and endeavors. The mission is to maintain a dynamic approach and constantly upgrade & update efforts to fulfil stakeholder expectations in the ever changing global technological scenario.**
- **The** NPTEL local Chapter **of the institute ranked 2nd across the nation during January-April 2022 session. with AAA rating.**
- **The institute is listed in 251-300 band of NIRF -2021, promising band of ARIIA-2021 and is ISO 9001:2015 compliant. Many of the programmes are accredited by NBA.**
- **It is a recognized Centre of the Quality Improvement Programme (QIP) of**

AICTE for Ph.D. Programmes.

- **The Institute has implemented TEQIP-II & TEQIP-III successfully and was declared as the best performer in the final performance audit.**
- **Offering** 27 UG & PG degree courses **along with Ph.D. in various disciplines.**
- **Institute is a** QIP center of AICTE **for Ph.D. programme under QIP & NDF schemes.**
- **DST established** Entrepreneurship Development Cell**, since 1988.**
- Academic autonomy **is granted by Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, since 2002.**
- UGC **has granted** academic autonomy **to the institute for a period of six years w.e.f. July 2017.**
- **Institute is** NAAC Accredited **and few programmes are** NBA Accredited**.**
- **Institute has successfully completed** TEQIP Phase-II & Phase-III project of MHRD**, Govt. of India.**
- **Institute houses on-campus** training Center of SKF India Pvt. Ltd & IBM India Pvt. Ltd..
- **Institute is also an** A-VIEW Resource Center of IIT-Bombay **and IIT Kharagpur under MHRDs National Mission on Education through ICT.**
- **Established** first Drone School of Madhya Pradesh **in collaboration with Indira Gandhi** Rashtriya Uran Akademi (IGRUA), Amethi.
- MoUs and Collaborations **with Industries & Research Organizations (Annex-II).**
- **Promoting** Research in core & emerging areas **(Annex-III).**
- **Institute is** Corporate Partner of International Civil Aviation Organization (ICAO), **Montreal, Canada for TRAINAIR PLUS Programme.**
- **Completed various** Research & Development projects **supported by AICTE, DST and other funding agencies.**
- **The institute has implemented** National Educational Policy (NEP-2020) **for holistic & multidisciplinary education.**
- **MoU with Foundation for Innovation & Research in Science & Technology** (FIRST), IIT Kanpur **to enable, promote and incubate new technology/knowledge/innovation based start-ups, building a vibrant start-up ecosystem.**

Vision, Mission & Branding Statement

Vision

"To create world class quality Engineers and Technocrats capable of providing leadership in all spheres of life and society "

Mission

- To provide quality education in technical and allied disciplines.
- To organize and arrange innovative courses in Engineering and Technology.
- To arrange vocational courses in the upcoming fields and innovative subjects to meet global advancement.
- To promote research in the fields of Technology and Science

Branding Statement

"Mission to Innovate Technology for Society"

Values Framework

To promote the following core values among the HEIs of the country:

- Contributing to National Development
- Fostering Global Competencies among Students
- Inculcating a Value System among Students
- Promoting the Use of Innovative Technologies in Teaching Learning

The Society

Institute is managed by The Scindia Engineering College Society (SECS) which is registered under the Societies Registration Act No. 53 of 1950 (no. 337 of 1956). The Promoter of the society was His Highness Lt. Gen. Maharaja Sir Jiwaji Rao M. Scindia, Maharaja of Erstwhile State of Gwalior in 1956.

The society is established to provide first class engineering college at Gwalior and to run, manage and administer the same. The registered office of the office is situated at Gwalior, Madhya Pradesh.

The constitution of sponsoring Body

Shri Jyotiraditya M. Scindia, **Chairman**

Minister of Civil Aviation & Minister of Steel, Government of India

Shri A.K. Bajoria, **President & Director,** **J.K. Tyres & Industries Ltd.,**	Vice Chairman
Prof. K.K. Aggarwal, Ex- Chairman, NBA, **Former Vice Chancellor** **Guru Gobind Singh Indraprastha University,**	Member
Shri Prashant Mehta, I.A.S., **Former Director General,** **Academy of Administration, Bhopal**	Member
Prof. D.P. Agrawal, **Ex-Chairman, UPSC of India,**	Member
Shri Mahanaaryaman J. Scindia, **Associate at Boston Consulting Group**	Member
Shri V. Bapna **CA, V. Bapna & Company,**	Member
Smt. Ujjawala Phalke, **Gwalior**	Member
Er. Ramesh Agrawal, **Former MLA**	Member Secretary

Governing Body

The Institute functions under the chairmanship and guidance of the Shri Jyotiraditya M. Scindia, Educationalist and other BoG Members.

Shri Jyotiraditya M. Scindia, **Minister of Civil Aviation & Minister of Steel, Government of India**	**Chairman**
Shri A.K. Bajoria **President & Director** **J.K. Tyres & Industries Ltd.,**	Member

Prof. K.K. Aggarwal **Ex Vice Chancellor** **Guru Gobind Singh Indraprastha University,New Delhi.**	Member
Prof. D.P. Agrawal **Ex-Chairman, UPSC of India, New Delhi.**	Member
Shri Prashant Mehta, I.A.S **Former Director General,** **Academy of Administration, Bhopal.**	Member
Shri Pashupathy Gopalan, **President Asia Pacific & GCC, SunEdison Inc,** **Mumbai (Maharashtra)**	Member
Shri Yuvraj Mahanaaryaman J. Scindia, **Associate at Boston Consulting Group**	Member
Er.Ramesh Agrawal **Ex MLA, Gwalior.**	Member
Er. Lokesh Saxena **MD, DISA India Ltd** **Kushal Garden Arcade, Bangalore.**	Member
Prof. Sunil Gupta **Vice Chancellor** **Rajiv Gandhi Proudgiki Vishwavidyalaya, Bhopal**	Member
Director **Directorate of Technical Education, M.P. Govt. Bhopal**	Member
Member Secretary **All India Council for Technical Education, New Delhi.**	Member

Principal Secretary **Department of Manpower Planning & Technical Education,** **M.P. Government, Vallab Bhawan, Bhopal.**	Member
Principal Secretary **Department of Finance, M.P. Government,** **Vallab Bhawan, Bhopal.**	Member
Joint Secretary, **University Grant Commission,**	Member
Faculty representative nominated by the Director	Member
Dr.R.K. Pandit, **Director,** **MITS, Gwalior.**	Member Secretary

Sub Committees of the Board

- **Executive Committee**
- **Finance Committee**
- **IT & IR Committee**
- **H.R. Committee**
- **Alumni Interaction Committee**

Strength, Weakness, Opportunity and Challenges (SWOC)

SWOT analysis was carried out with the involvement of various stakeholders participation. All the important points related to SWOT were considered. Some of the important parameters taken into consideration for analysis were, teaching learning process, human resources, services, physical Resources, Finance and organization pattern along with its formalization procedures etc. The brain storming sessions in different groups were conducted to discuss the various parameters involving in the analysis of SWOT.

For the purpose of analysis, various comments received during discussions were analyzed and reported. In these various sessions, 72% students, 98% Faculty members and 80% supporting staff of various departments of the Institute participated. The outcome of the discussion during free flow of information is diagnosed and analyzed are reported below:

Strength
➢ UGC autonomy and NAAC accreditation since 2017 ➢ Autonomous under affiliated university since 2000 ➢ A blend of eminent persons from society, administration, academia and industry, constitute the BoG who are closely associated with the development of the institute ➢ The vast alumni base of the institute ➢ The institute has effectively implemented the Flexible Curriculum for 2017-2021 batch onwards and integrated NEP-2020 parameters and provisions from 2020-2021 batch onwards. ➢ The examination reforms have been implemented and are in practice. ➢ The institute NPTEL Local Chapter ranked 2nd among 4500 Institutions in India in 2022 ➢ The faculty is experienced, well qualified and the retention is good. ➢ The institute has a state-of-the-art digital studio to facilitate development of MOOCs by the faculty. ➢ A beautiful building, green & environmentally conscious campus and excellent academic/other infrastructure
Weakness
➢ Financial constraints for removal of obsolescence & commencement of new demand based programmes/facilities. ➢ There is a need for strengthening industry collaboration for faculty training, conduction of corporate training programmes and industry sponsored research

projects.

- Requirement of an auditorium, indoor sports facilities, & accommodation for students/staff
- Up-gradation of Networking of Campus

Opportunity

- The path has been paved for acquiring the status of a 'degree granting autonomous institute'.
- Multiple mode teaching-learning-evaluation system is developed by the institute enabling attainment of higher order thinking skills (HOTs)
- Effective tapping of the huge alumni potential of the institute as off campus-resource persons for the institute internship programme and for strengthening the start-up activities
- The faculty is developing their own MOOCs. About 10 courses are ready to be launched
- Active participation in community development programme for regional needs
- Strengthening collaboration with local industry for student projects and learning
- Very good air & train connectivity with other parts of the country, particularly to the national capital

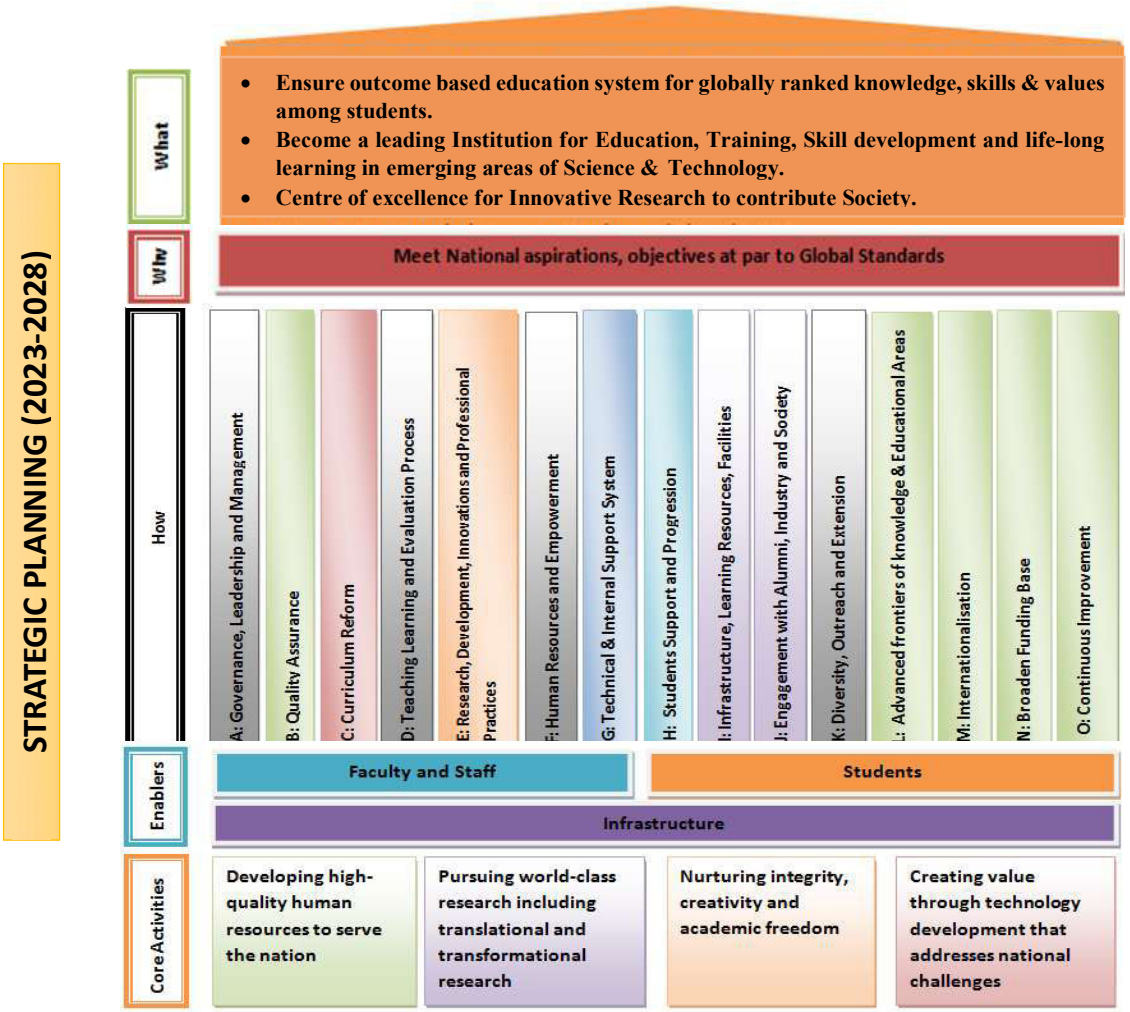
Challenge

- To constantly update and upgrade curriculum, faculty skills and laboratory infrastructure to fulfil stakeholder/market needs
- The lack of exposure to new technology/facilities can become a hurdle for imparting high quality education to the students.
- Lucrative financial packages as well as facilities / resources provided by the private/foreign competitors can cause migration of good faculty members
- Due to fast changes in government policies (in education sector), new foreign universities, private universities are coming up, which will cause great challenges and competition.

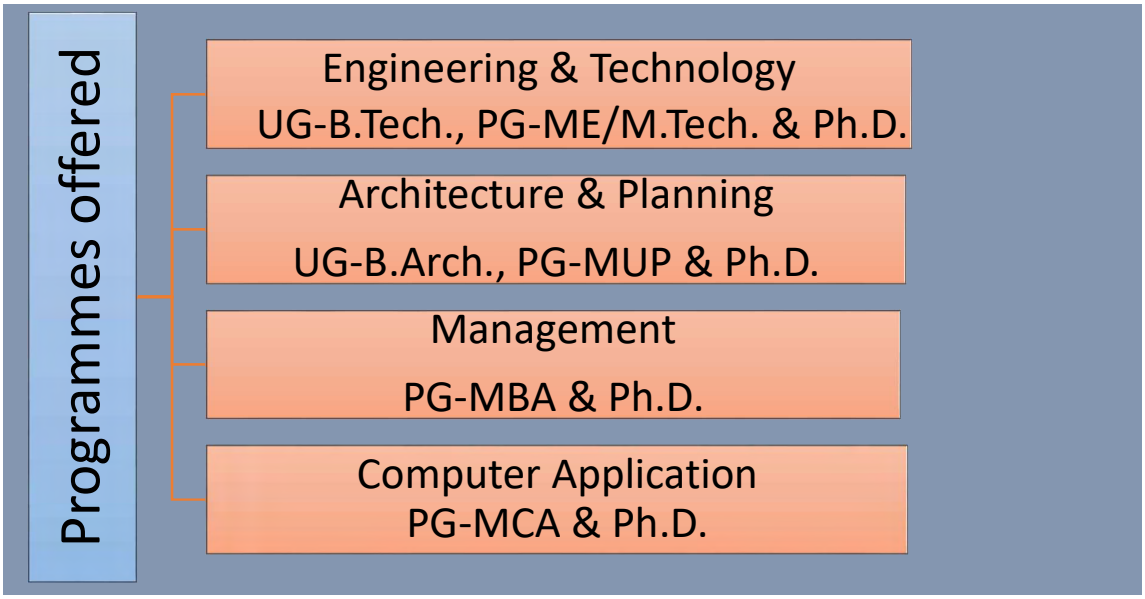
Goals

- Ensure outcome based education system for globally ranked knowledge, skills & values among students.
- Become a leading Institution for Education, Training, Skill development and life-long learning in emerging areas of Science & Technology.
- Centre of excellence for Innovative Research to contribute Society.
- Development of Infrastructure at par with International Standards.

Strategic Planning



Programmes Offered



UG & PG Courses

Degree Programmes	Year of Start	Intake as per AICTE
B.Tech. Civil Engineering	1956	120
B.Tech. Mechanical Engineering	1956	120
B.Tech. Electrical Engineering	1956	120
B.Tech. Electronics Engineering	1982	120
Bachelor of Architecture	1984	40
M.E. Construction Technology and Management	1986	25
Masters in Computer Applications	1986	60
B.Tech. Computer Science and Engineering	1994	120
M.E. Industrial System & Drives	1995	25
M.E. Communication Control and Networking	1995	25
B.Tech. Chemical Engineering	1996	60
B.Tech. Information Technology	2000	60
M.Tech. Production Engineering	2002	18

Masters in Urban Planning	2004	18
M.Tech. Computer Science & Engineering	2011	18
M.Tech. Information Technology	2012	18
M.Tech. Environment Engineering	2014	18
B.Tech. Electronics and Telecommunications Engineering	2015	60
B.Tech. Automobile Engineering	2015	60
MBA	2019	60
B.Tech. Information Technology (Artificial Intelligence and Robotics)	2020	60
B.Tech. Information Technology [Internet of Things (IoT)]	2020	60
B.Tech. Mathematics and Computing	2020	60
B.Tech. Electrical Engineering (Internet of Things)	2020	60
B.Tech. Artificial Intelligence (AI) and Data Science	2021	60
B.Tech. Artificial Intelligence and Machine Learning	2021	60
B.Tech. Computer Science and Design	2021	60

QIP-AICTE Research Centre for Ph.D.

Ph.D. Degree Programmes	Year of Start	Intake as per AICTE
Civil Engineering	2011	02
Mechanical Engineering	2011	02
Electrical Engineering	2011	02
Computer Science & Engineering	2011	02
Architecture	2011	02

- The Institute also offer Ph.D. Programme in all the existing Engineering & Technology, MCA, Architecture & Planning and Management Disciplines as Research Centre of RGPV Bhopal.

MoUs and Collaboration with Industries & Research Organizations

- **ABV-IIITM, Gwalior, under Abhigyan Abhikaushalam Students' Forum**
- **ACE Antenna, Hyderabad**

- **Aspen Tech., Pune**
- **Bennett University, Greater Noida**
- **Cancer Hospital and Research Institute, Gwalior**
- **Central Institute of Plastics Engineering & Technology (*CIPET*), Gwalior**
- **Central Road Research Institute, New Delhi.**
- **Centre for Research & Industrial Staff Performance (CRISP), Bhopal**
- **CII (Confederation of Indian Industry)**
- **Construction Industry Development Council (CIDC)**
- **CSIR- CBRI Roorkee.**
- **D'Auto Pvt. Ltd.,**
- **Delhi Technological University**
- **Department of Applied Science, ABV-IIITM, Gwalior**
- **Durvaa Informedia Fenchisee of Arena Animation, Gwalior**
- **Electronics and ICT Academy PDPM-IITDM, Jabalpur**
- **Eminent Biosciences, Indore**
- **Engipress Industries Limited, Gwalior**
- **FICCI (Federation of Indian Chambers of Commerce and Industry)**
- **Foundation for Innovation & Research in Science & Technology (FIRST), IIT Kanpur**
- **GitHub Campus Program**
- **Govt. Women Polytechnic College, Gwalior (GWPC)**
- **IBM India Pvt. Ltd.,**
- **IET (The Institution of Engineering & Technology)**
- **IG DRONES, Delhi**
- **IIT Gandhinagar**
- **India Solar Energy Consulting Pvt Ltd., Panipat, Haryana**
- **Indian Institute of Remote Sensing (ISRO)**
- **Indira Gandhi Rashtriya Uran Akademi (IGRUA)**
- **Infosys Ltd.,**
- **International Civil Aviation Organization, Montréal Canada**
- **International Development of Academic and Scientific Collaboration (AIDASCO), Novi Sad, Republic of Serbia**
- **Jiwaji University, Gwalior**
- **LUPIN, Laboratory Bhopal**
- **M.P.Police - Police Reforms, Madhya Pradesh**
- **M/S. Smart Controls India Limited, Gwalior**

- **Madhya Pradesh Poorv Kshetra Vidyut Vitaran Co Ltd., Jabalpur**
- **Madhya Pradesh Urja Vikas Nigam**
- **Mahatma Ghandi Chitrakoot Gramodaya Vishwavidyalaya, Citrakoot, Satna (MP)**
- **National Highways Authority of India (NHAI)**
- **PDPM, Indian Institute of Information Technology Design & Manufacturing, Jabalpur**
- **Police Training and Research Institute (PTRI) Bhopal, India**
- **Praedico Global R**
- **Scientech Technology Pvt. Ltd., Indore**
- **SKF India Limited., Pune**
- **Smart City, Gwalior**
- **Smart Control Pvt. Ltd., Malanpur**
- **Supercomputing Lab of Bennett University under Initiative "making Deep Learning and AI Skills Mainstream in India by Royal Academy of Engineering"**
- **Symbiosis International (Deemed University) Pune, Maharashtra, India**
- **University of Central Florida USA**
- **Vijaya Raje Govt. Girls P.G. College, Morar, Gwalior (M.P.).**

Alumni

The institute has strong alumni base. The alumni have served nationally and internationally at various prestigious positions like member of NITI Aayog, Chancellor and Vice Chancellor, Director of IITs, Director General, Indian Administrative Services, Indian Foreign Services, CEOs etc. Some of them have been conferred with prestigious awards like **Padma Bhushan and Padma Shree**.

Prominent Alumni

- **Vijay Kumar Saraswat**
  Former DG of the Defence Research and Development Organisation (DRDO) and the Chief Scientific Advisor to the Indian Minister of Defence Calm Mind, an health app and platform focusing on Mental Wellbeing
- **Abhay Karandikar**
  Director of IIT Kanpur
- **Raghunath K Shevgaonkar**
  Professor Emeritus at Indian Institute of Technology, Bombay
  Former Director of IIT Delhi
- **N.K. Gupta**

R & D in Aerospace propulsion, Cryogenics and Turbomachinery, ISRO Vadodara
Ex Dy Director and Project Director Cryogenics Liquid Propulsion Systems Centre

- **P. S. Kulshrestha**
  Vice President at Gammon India Ltd Ghaziabad, Uttar Pradesh
- **K .K. Sharma**
  Executive Director NTPC (1981 - 2009)
- **Anil Kumar Lahoti**
  General Manager, Central Railway
- **Sarbjit Sahota**
  Disaster Risk Reduction Specialist at UNICEF India, TEDx Speaker
- **Sachin Agrawal**
  Senior Vice President – R & D and Technology, Volvo Eicher Commercial Vehicles
- **Puneet Pandey**
  Architect and Urban Planner at Vima- The Dimension
- **Apurva Yaduvanshi**
  Senior Manager | Payment Products Development | VISA
- **Sudhir Saxena**
  DGP of Madhya Pradesh
  Senior IPS officer
- **(Dr) P K Shrivastava**
  Air Vice Marshal
- **Gangaram Baderiya**
  Additional Chief Secretary to Government of Karnataka Backward Classes Welfare Department
- **Gaurav Behere**
  Senior Architect at Blue Yonder
  Member of Technical Staff PayPal · Full-time, Sen. Software Engineer- Cisco
- **Madhav Singh**
  Executive Director Technical at EverYondr
- **Saumitra Kaushal**
  Senior Software Engineer at Amazon
- **Anurag Shukla**
  Director at Ericsson India Private Limited
- **Krishna Agarwal**
  Lead Software Engineer at Meesho

- **Arun Kapoor**
  Former Engineering Executive at Ford Motor Company
  Education: Wayne State University, M.S. Engineering, Industrial Engineering (966 - 1967)
- **Tarun Kumar Khulbe**
  Director & COO at Jindal Stainless Ltd.
- **S. Manasvi**
  Filmmaker and writer
- **Shri Narendra Nahata**
  Chancellor Mandsaur University & Former Minister Commerce & Industry, Govt. of M.P
- **Vijay Kalra**
  Head - Mahindra Institute of Quality, Member-Group Corporate Office Leadership Team & Member - Central Safety Council Ex ED & CEO MVML and Chief of Mfg.Operations AD, Chair- ISQ Earth Forum
- **Mr. Basant Jain**
  Founder- Aplos Ventures Private Limited
- **Mr. Rahul Chaudhry**
  Ex CEO Tata Power SED
- **Lokesh Saxena**
  Managing Director - DISA India Limited, Norican Group, Denmark
- **Ishan Shankar**
  Former Chairman Committee of Directors CEO BHEL CMD NIDCMDMD
- **Vimal Kaushik**
  Former CEO & MD IL&FS Engg. & Const. Co. Ltd. (Maytas Infra Ltd.)
  Former MD, Punj Lloyd
- **Anand Bhanpurkar**
  Business Head - Distribution Transformers at CG Power and Industrial Solutions Ltd.
- **Praveen Kumar Gupta**
  General Manager (Central Procurement) at Aditya Birla Group
- **Dr. Tripta Thakur**
  Director General, National Power Training Institute
- **MAHESH CHANDRA GUPTA**
  Director General, GITM Group of Institutions
- **S. K. Jain**

Chairman of the Governing Board of World Association of Nuclear Operators (WANO), Tokyo Centre. Chairman and Managing Director, Nuclear Power Corporation of India Ltd (NPCIL)

- **Keshav Jaiswal**
  Vice President, Global Client Experience at JPMorgan Chase & Co.
- **Pradeep Kumar Tambey**
  President | Tata Steel BSL (Formerly Bhushan Steel Ltd) (2018)
- **Rakesh Atre**
  Associate Vice President at Munjal Showa Ltd
- **Santosh Kumar Mantri**
  Vice President - Sales & Commercial at Kadevi Industries Ltd
- **Pradeep Kumar Kulshrestha**
  Chief Operating Officer at J Kumar Infraprojects Ltd
- **Anoop Bhatnagar**
  President (India Chapter) at International Business Council of Australia

Milestones-A Journey towards Uniqueness

1956

- **Foundation stone laid by Dr. Rajendra Prasad, the President of India**

1957

- **Establishment of Madhav Engineering College, Gwalior**
- **Introduction of Civil, Mechanical & Electrical Engineering Programme at Bachelors Level with an Intake of 40 Each**

1960

- **Enhancement in Intake of the Three Programmes**

1964

- **Building Inaugurated by the President of India, Dr .S. Radhakrishnan**

1965

- **Introduction of PG and Ph. D Programmes**

1966

- **Construction of Two Boys Hostels**

1974

- **Madhav Engineering College renamed as Madhav Institute of Technology & Science**

1978

- **Construction of additional Boys hostel**

1981

- Introduction of B.E Electronics Engineering

1982

- Introduction of M. Sc Applied Physics, Chemistry & Maths

1984

- Introduction of Architecture Programmes at Bachelors Level

1986

- Introduction of M.C.A Programme & M.E Construction Tech. & Management.

1987

- Implementation of approval of the courses by ACITE, New Delhi.

1988

- Establishment of Entrepreneurship Development Cell
- Inauguration of New Building for Electronics Department
- Addition of New Girls Hostel Building

1989

- Organized 5th State level Technical Exhibition.
- Addition of New learning Resource Centre

1990

- Addition of New Boys Hostel

1992

- Addition of Building for EDC

1994

- Construction of High Voltage Building

1995

- Introduction of B.E Computer Science & Engineering Programme
- Introduction of Industrial Systems and Drives & Computer, Communication and Networking Programmes at Masters Level

1996

- Introduction of B.E Chemical, ME CCN and ME ISD

1997

- Inauguration of Conference Hall

1998

- Addition of Class Rooms in Institute Building

1999

- Inauguration of New Building for Architecture Programme at Bachelors Level
- Establishment of Faculty Guest House

2000

- Introduction of Information Technology Programme at Bachelors Level

2001

- Great visionary H.H. Madhavrao Scindia takes over as Chairman of the Institute
- Institute coordinated ICTE- 2001 at Bhopal on behalf of Govt of MP.
- Inauguration of the New Institute Gate Complex
- Introduction of the Biotechnology Programme at Bachelors Level

2002

- Introduction of M. Tech Microwave Engineering. & M. Tech Production Engineering
- Institution got Academic Autonomy under RGPV in July 2002.

2003

- Accreditation of BE Civil, Mechanical , Electrical Electronics, Computer Science & Engineering & MCA by National Board of Accreditation (NBA), New Delhi
- Accreditation of BE Chemical, Information Technology and M.E. Computer Communication & Networking, Industrial Systems & Drives and Construction Technology & Management by National Board of Accreditation (NBA), New Delhi
- Establishment of Central Computer Centre with LAN /WAN
- Extension of Faculty Guest House
- Inauguration of ISTE Students Chapter by Chief Ministers of M.P & C.G. along with H.H. Jyotiraditya M Scindia

2004

- Introduction of Masters Courses- Urban Management and M.Tech (Biotechnology)
- Enhancement of Intake in B. Architecture Programme from 20 to 40
- Institute organized National Convention for students of Architecture (NASA)

2005

- Construction of Canteen and Students activity Centre

2006

- Extension of building infrastructure (Architecture, Electronics, CSE & Biotechnology)

2007

- Establishment of CTI, a DFID, UK & Govt of MP project.
- Celebrating 50 years of excellence in Technical Education
- Dedicating land for environmental cause (Madhav Van)

2008

- Foundation stone laid for Autonomy Cell and Extension of Architecture Department
- Postal stamp released to commemorate Institute Golden Jubilee by The President of India Dr. Pratibha Devisingh Patil

2009

- Credit Based Grading System Implemented

2010

- Approval for starting Masters Programme in Computer Science & Engineering
- Establishment of IBM Centre for Excellence

2011

- Inauguration of the CSE Building by H.H. Jyotiraditya M Scindia
- Institute selected for funding under the TEQIP-II Project of MHRD
- Approval for starting Masters Programme in Information and Technology
- Increase in intake for Bachelors Programme in Civil Engineering from 50 to 60
- Installation of 33kV substation in the campus

2012

- Established QIP Research Centre for Ph.D programmes in Civil, Electrical, Mechanical, Architecture & CSE

2013

- Accreditation of BE Civil, Mechanical, Electrical Electronics & Computer Science Engineering by National Board of Accreditation (NBA), New Delhi
- Introduction of Masters Programmes in Cyber Security & Chemical Engineering
- Enhancement of intake for Bachelors Programmes (Chemical Engineering from 30 to 60, Electronics Engineering from 60 to 120 and Mechanical Engineering from 65 to 120)

2014

- Introduction of Masters Programmes in Geo informatics and Environment Engineering
- Enhancement of intake for Bachelors Programme (Electrical from 65 to 120 & Electronics and Civil Engineering from 60 to 120)
- Commencement of Infosys Campus Connect Programme
- ISTE Students Chapter Received Best Student Chapter of M.P. & C.G. Award

2015

- Introduction of Automobile Engineering and Electronics & Telecommunication Engineering Programmes at Bachelors Level with an intake of 60
- Establishment of SKF reliability Centre

2016

- Addition of New Eight Storey Girls Hostel With Capacity to House 272 Girls
- Formation of IEEE Students Branch
- Formation of IET Students Chapter
- Six new class rooms, 6 new faculty chambers, 2 new labs were created by reorganizing and modifying the existing building space

2017

- Grant of Autonomy by University Grants Commission (UGC) for 6-years
- Accreditation by National Assessment and Accreditation Council (NAAC) for 5-years

- Institute Selected for Funding Under the TEQIP-III Project of MHRD
- Creation of a New Counselling Hall with a Sitting Capacity of 150
- MoU signed with CPRI-Central Building Research Institute for research and training
- Twinning agreement signed with Delhi Technological University, Delhi
- Flexible curriculum developed and implemented; interdisciplinary learning through the provision of DEs/OCs/Honours degree/Minor specialization/Credit transfer through MOOC
- The P.G. (ISD) programme was accredited by NBA
- Establishment of the NPTEL local chapter
- Provision in curriculum for promoting a culture of self-learning among the students
- Constitution of IQAC for internalizing quality culture
- Development of a structured Academic Audit mechanism
- Development of a structured mechanism for earning credits for extra & co-curricular activities
- Pioneer at state level in starting an open-source learning management system
- On-line dynamic learning platform MOODLE established; effectively used for teaching-learning-evaluation
- The 1st Ted talks organized by the TEDx Club with the theme, TEDxMITSG "Manoeuvring Ingenuity to mark a step towards innovation"
- 60 student clubs/professional society chapters established for the holistic development of the students.
- The practice of conducting 'Orientation Programmes' for UG and PG students at the beginning of each semester initiated
- Restoration & renovation of the old conference hall
- Creation of a new counselling hall with a sitting capacity of 150
- Campus road development and surfacing
- Faculty Resource Centre was developed

The Last Five Year Initiatives

2018	
	• NPTEL chapter appeared among the top 100 chapters at 87th and 25th position respectively in Jan-June and July-December sessions, in the first year itself • Implementation of e-governance, computerization of administration and library • Up-gradation of the IT and civil infrastructure, establishment of smart class rooms • 'In-house Summer Internship" to all the students of I year and II year was initiated • Structured online stakeholder feedback collection & analysis system established • Digitization of valuation, displaying Model Answer Sheets, Integrated valuation & On-line question paper feedback implemented • Full Time Ph.D. Fellowships initiated and Research Associates (RAs) appointed • Initiatives Taken for Increasing Effectiveness of Outcome Based Education (OBE) • Conclave Centre was developed • Commissioning of new 08 storey Boys' Hostel Phase-I • Development of Business Incubation Centre for catering the needs of Start-ups, Innovations, Entrepreneurship Cell and Design Centre • Retrofitting and interiors of 07 Smart Class Rooms completed

2019	
	• 'MOOC development studio' was established with state-of-the-art recording and editing facility • NPTEL chapter was listed at 46th and 31st position in Jan-June and July-December sessions respectively • With conduction of the AICTE sponsored 1st International Conference on "Sustainable and Innovative Solutions for Current Challenges in Engineering & Technology the ICSISCET conference series was launched • Conduction of Second International Symposium on 'Sustainable Development Research in the Asia-Pacific' (In collaboration with RMIT University, Melbourne Australia)

	• Dedicated research centre established in smart grid simulation lab with DST-FIST level 0 support • The 1st Induction programme conducted for the First Year Students as per AICTE norms • Funding under Collaborative Research Scheme (CRS) was received by 11faculty members • Online Finishing School Program initiated for final & pre-final year students, 15 modules developed for 734 students • Development of 'MOODLE Working Index' to institutionalize the use of this platform • On-line faculty feedback system and computation of 'Faculty Feedback Index' initiated • e-Repository on MOODLE to store dissertations and project reports • A 100kWp net-metered roof-top solar power plant installed with carbon sequestration capacity of about 6000 fully grown trees • Compost plant and Sewage Treatment Plant (STP) were commissioned • Roof-water harvesting, rain harvesting pits with bore pipes commissioned • Library infrastructure upgraded and digital Library established • Synthetic Basket Ball Court developed • New Academic Block approved and expected to start functioning by 2023

2020	
	• 'Digital Teaching-Learning Action Plan' (customised using the PRAGYATA guidelines of MHRD, now MoE) prepared and implemented to handle the teaching-learning challenges during the COVID period • NPTEL chapter appeared at 13th position in the annual listing with 61 course toppers and 581 elite certificates • Trained over1600 technical teachers of Madhya Pradesh for effective use of Digital Teaching-Learning platforms and practices during COVID-19 Pandemic • Examination reforms implemented through an end-to-end, fully automated and transparent online system • 'Nodal Centre of Virtual Labs', was established in association with IIT Delhi • Exhaustive Action Plan for NEP-2020 was prepared • AICTE sponsored 2nd International Conference on "Sustainable and Innovative Solutions for Current Challenges in Engineering & Technology (ICSISCET-2021) was organized • The 2nd Ted talks organized by the Tedx Club with the theme: TEDxMITSG "Moving the Margins"

	• Mechanism for computing Administrative Efficiency Index (AEI) was initiated for timely completion of quality practices • The 'Innovative Research Scheme' was launched • New UG Programmes in 'Mathematics & Computing', 'Artificial Intelligence & Robotics', and two batches of Internet of Things (IoT) were started • New UG Programme in 'Master of Business Administration (MBA)' was started

2021	
	• U.G. programmes in Civil, Mechanical and Electrical Engineering were accredited by NBA • NPTEL chapter listed at fifth position, with AAA grading, in top 100 chapters of India, with 89 course toppers and 604 elite certificates in January-December 2021 • Top rank among all the TEQIP-III funded institutes in the final performance audit • Listed in 251-300 band of NIRF & as a promising institute in ARIIA-2021 • A pioneer in the state of Madhya Pradesh to award a 'Minor Specialization in computer Science' to 11 students and 'Honours in parent discipline' to 25 students, in addition to B.Tech degree in parent discipline • 'Multiple Mode Teaching Learning Pattern' (MMTLP) was developed and implemented. • "Multiple Mode Logical Pattern Examination (MMLPE)" System was developed and implemented for conducting end-term examinations with mode flexibility. • Initiative taken for conduction of selected courses in collaboration with industry person • Practice of conducting 'Faculty Induction Programme' for new recruits was initiated • Conduction of "Novel Engaging Courses' for holistic development was initiated • Mechanism created and practice of full 'final semester internship' was implemented • Emphasis on 'continuous evaluation' initiated by increasing its weight • 'Skill based mini projects' integrated under continuous evaluation • Mandate provision of "Course Proficiency" integrated in the end semester evaluation • 3rd International Conference on "Sustainable and Innovative Solutions for Current Challenges in Engineering & Technology (ICSISCET-2021) was organized

	• 'Meritocracy Initiative' of the institute was initiated to award achievers • New UG Programme in 'Artificial Intelligence and Data Science', 'Artificial Intelligence and Machine Learning' and 'Computer science and design 'were started • Recruitment drive for appointing 45 quality faculty members • 'Gwalior Drone Mela', a mega event was organised jointly with Ministry of Civil Aviation, Government of India, Government of Madhya Pradesh and Federation of Indian Chambers of Commerce & Industry (FICCI) • Phase II of the Boy's Hostel structure completed

2022	
	• NPTEL chapter was listed at second position, with AAA grading, in top 100 chapters of India, with 147 star performers and 288 course toppers, in January-April 2022 • Total 12025 credits transferred so far for 243 courses offered to 1877 students till December 2022 • NPTEL chapter scored highest 65 number of 'Star Certificates' among all chapters in India, for July-December 2022 • Degree with Honours was awarded to 30 students and minor specialization in CSE to 03 students • Number of documents (112) and citations (1277) in Scopus • Full final semester internships were completed by students in software sector (50%), product development (20%), experimentation based (21%), testing work (6%) and hardware based (3%) • Research Internship Programme started for pre-final year students • In-house initiative to increase the faculty competencies in the upcoming areas • MoU signed with Madhya Pradesh Police Training Research Institute, Bhopal to work on road traffic systems using AI, ML, IoT, and DS • In Scopus 112 number of published documents and 1277 citations were listed • 4th International Conference on "Sustainable and Innovative Solutions for Current Challenges in Engineering & Technology (ICSISCET-2021) was organized • Hackathon-2022 was conducted in collaboration with Microsoft IDS Hyderabad, Cadre Design, Ansys and Dhiyotech

	• Conduction of faculty feedback through the IMS mechanism was initiated • Conduction of 'Skills Enhancement Program' for the pre-final year students • 'NEP-2020 Action Plan' executed; out of the 22 targeted parameters for year 2024-2025, 20 achieved • The exit survey index calculated using an 18-parameter feedback from passing out students increased from 2.97 in 2021 to 3.48 in 2022, on a scale of 4.0 • Recruitment drive for appointing 25 quality faculty members • Registration portal for 'Novel Engaging Course (NEC)' developed • Provision of 'Minor Degree in Research' approved by the Academic Council • Faculty Quality Index (FQI) developed using 16 parameters and 51sub-parameters to identify the need for upskilling and upscaling • Academic Bank of Credits (ABC) scheme established • Pedagogical targets were set by the BoG after conducting workshop on "Market Driven Analysis for Dynamic Curriculum Development • The Institute celebrates 65 years of excellence in Technical Education

The Distinctiveness of the Institute

1. The **NPTEL (National Project on Technology Enabled Learning) local Chapter** of the institute has been appearing among the top 100 local chapters of the country since its inception in 2017. During the 2021 and January-April 2022 session, the **chapter ranked 5th & 2nd across the nation respectively and secured AAA rating**. Highest number of star certificates in the special category were earned in July-December 2022.

2. The institute has a state-of-the-art **digital studio to facilitate development of online courses (MOOCs)** and the institute is getting ready to launch the courses for other institutes.

3. **Exhaustive NEP Action Plan (2020-2024) prepared and effectively implemented**. Out of the 22 targeted parameters twenty parameters have already been undertaken; either completed or are being manifested through various endeavors.

4. Quality is a journey and the major and unique achievements by the institute during the last five years are

(i) **Indian Knowledge System**: to promote Holistic Education and Informal Knowledge the "**Novel Engaging Courses**" (to promote Holistic Education and Informal Knowledge) are the part of curriculum since 2020 admitted batch. As of now, more than 80 NEC Courses have been introduced, including Performing Arts, Physical Health, Health & Hygiene, Arts & Crafts, Language Skills, Home Science under the mentorship of faculty members. Details are shown in Annex-VIII.

(ii) **interdisciplinary learning and flexibility** through open elective courses

(iii) students can opt for **minor specialization in allied discipline and honors in parent discipline**

(iv) there is a provision of **full last semester internship** at industry/research organization, and

(v) credit transfer has been implemented through **online courses of IITs through MOOCs**

(vi) credits are assigned for **learning outside the classroom**

(vii) provisions for **course proficiency component**, and **course specific mode of exam** are provided

(viii) A dynamic teaching-learning-evaluation environment through a **functional MITS-MOODLE**

(ix) **In-house summer internship programmes**

(x) The provision of "**Skill Based Mini Projects**" is introduced in the laboratory courses to facilitate the attainment of higher order thinking skills (HOTs; Analyse, Evaluate, Create/Design) through activity based learning. The project topics are designed such that some tangible outcome is achieved in the form of a coding exercise, software package, short paper, hardware, new lab experiment design, analysis of results obtained in lab or through the use of collected practical data.

5. Addressing the strategic needs of the country, Institute has started following **emerging area programmes** during 2020 - 2021:

- B.Tech. Information Technology (Artificial Intelligence and Robotics)
- B.Tech. Information Technology [Internet of Things (IoT)]
- B.Tech. Mathematics and Computing
- B.Tech. Electrical Engineering (Internet of Things)
- B.Tech. Artificial Intelligence (AI) and Data Science
- B.Tech. Artificial Intelligence and Machine Learning
- B.Tech. Computer Science and Design

5. There are **65 student clubs** on campus out of which about 10 clubs deal with **cultural, yoga, sports and games** activities exclusively.

6. **Preservation of the Environment:** The campus has only 33% built area and rest is green with total jungle area of about 20% with 3095 sq. meter of teak wood plantation. With more than 2100 trees, many varieties of birds, peacocks and parrots are part of the campus eco-system. The present solar power plant meets about 12.5% of the total demand and prevents about 1.20 Lac kilograms of CO_2 emission from the global atmosphere per year, which is equivalent to planting about 6000 fully grown trees. The soon to be added 280kWp plant will be a big step in environmental preservation. Sewage Treatment Plant, two waste to compost convertors and 12 water harvesting pits are also in place. Bio-disposable pits are established in the campus.

15 Years Strategic Vision Plan with 5 Year Rolling Implementation Plan

Objectives of proposed deemed to be university

- To provide instructions, teaching and training in higher education, vocational and professional education and make provisions for research, innovation advancement and dissemination of knowledge as per dynamic environment to create higher levels of intellectuals with innovative abilities.
- To establish new courses institutions and courses as per the need of the community.

- To award degrees, diplomas, certificates and other academic distinctions on the basis of examination or any other method of evaluation.
- To provide meaningful learning opportunities to students of India and overseas.
- To set up collaborative provisions with foreign/international Universities to enable students of the University to leverage the advantages of faculty and students exchange, dual degree options and semester abroad programmes.
- To provide for higher education leading to excellence and innovations in such branches of knowledge as may be deemed fit, primarily at undergraduate, at post-graduate and research degree levels, fully conforming to the concept of University as defined herein.
- To engage in interdisciplinary/ multi-disciplinary/ trans-disciplinary teaching and research in addition to domain-specific specialization.
- To provide for high quality teaching and research recognized nationally and globally.
- To recognize, identify and foster the unique capabilities of each student, by sensitizing teachers as well as parents to promote each student's holistic development.
- To provide multi-disciplinary and a holistic education across the sciences, engineering, technology, social sciences, arts, humanities, sports and other disciplines.
- To transform into Research Intensive University over a period of time.
- Focus on research and innovation by setting up start-up incubation centers; technology development centres; centres in frontier areas of research; greater industry-academic linkages; and interdisciplinary research including humanities and social sciences research.
- To provide flexible and innovative curricula which include credit-based courses and projects in the areas of community engagement and service, environmental education, value-based education, etc.

Specific Objectives

1. To acquire the status of "A degree granting autonomous institute"/"deemed to be university".
2. To strive for improvement in Ranking and Accreditation.
3. To improve institutional visibility and peer perception via ensuring Quality education for the holistic development of students.

4. To promote outcome based Education through Flexible curriculum system, mentoring system and reforms in examination.
5. To start programmes in Industry Partnership (Industry based programmes).
6. To establish Incubation Center for start-ups and center for business/technology development, training and support.
7. To establish centeres/laboratories for research to promote collaborative interdisciplinary research to promote vibrant research in the frontier areas.
8. To establish a calibration central certified by a National Agency.
9. To strengthen industry collaboration for internship/ placement and joint research.
10. To honour credits earned by an individual from various institutions /platforms through Academic Bank of Credit (ABC).
11. To enhance Alumni participation in the growth of the institute.
12. To start corporate training programmes/ short-courses for Industry persons.
13. To collaborate with foreign universities/student exchange programmes.
14. To build collaborations with research organizations/ prominent institutions for external mentorship.
15. To start multilevel diversified skill based courses.
16. To recruit high quality teachers and to provide support and motivation to existing teachers for Faculty Development activities.
17. To promote professional development of students through training and activities for the inculcation of team work, communication skills, leadership skills, time management skills, soft skills and to develop innovation/entrepreneurship and critical thinking.
18. To offer Vocational Courses.
19. To enhance interaction & linkages with industry, society, government/ non-government organizations to promote socially productive activities.
20. To contribute the society through research & development activities.
21. To establish CSR model to contribute to societal goals.
22. To promote NEP-2020 recommendations to enable and encourage high-quality multidisciplinary and cross-disciplinary teaching and research across fields through Cluster Institutions.
23. To promote publication of high quality research papers (SCI & Scopus), Patents & Copyrights by teachers.

Academic Plan

Academics at Institute

➢ Flexible Curriculum

The Institute has been granted academic autonomy from RGPV, Bhopal (State Technical University) since 2002 and UGC has also given the autonomous status from 2017. As a consequence, the curriculum is being revised on regular basis through the Board of Studies (BoS), which is confirmed by the Academic Council. The curriculum development is aligned with the local, regional, national and global needs and revision of curriculum also involves feedback from various stakeholders. The curriculum is dynamic and the courses are as per the current market and industrial need.

The institute has implemented Flexible Curriculum (as per the AICTE model curriculum) from the academic session 2017-18 onwards and the institute has also concluded its action plan for the effective integration of National Education Policy 2020, with focus on skill development, creativity, innovation and holistic development. The curriculum offers the provision of Minor Specialization and Honors by additionally earning 20 credits through SWAYAM/NPTEL platform based courses. These courses are approved by the respective BoS and offered to the students who are opting degree with honours or minor specialization. Moreover, the arrangement of Departmental Elective and Open Category courses through SWAYAM/NPTEL platform with credit transfer is in place and under this arrangement, the total number of 20,123 Credits have already been transferred to the transcript of students. To ensure the holistic development of students, Novel Engaging Courses (with the arrangement of four credits in the overall UG programme) in diversified areas have been included in the curriculum such as - Environment protection, Bhagwad Gita- An Introduction. The curriculum also recognizes attainments in the co-curricular activities through credits under its “Professional Development” component.

Further, to ensure that the students have the required domain knowledge, skills and attitude following factors are considered:

(i) Reports of various reputed organizations like NASSCOM, Sustainable Development Goals by UN etc.
(ii) Model curriculum prescribed by AICTE,
(iii) Mapping with Program Outcomes (PO),
(iv) Suggestions by industry experts and alumni,

(v) Syllabi of various competitive exams like GATE, IES, etc. Curricula addresses the following national missions: Digital India (Incorporation of MOOCs & digital pedagogy in the curriculum), Unnat Bharat Abhiyan, Women Empowerment, and Skilling India (provision of Skill Based Mini Project) .

The provision to opt for Full Semester internship or major project in the final semester of UG programmes is in place. Many students have already completed their internships with good stipend and placement offer in the same industry after the internship.

The curriculum and relating practices are in line with the Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the various Programmes. The curriculum also includes recent technologies and the opportunities existing at regional and global level with all necessary elements.

The Institute observes the attainments of PEO, PO& PSO for respective programmes which in turn relates to Vision and Mission of the Institution and Department as well. The outcomes as stated have been integrated in curriculum and displayed on the Institute website to facilitate access to various stakeholders, including the teachers and students.

- The Board of Studies proposes the curriculum. The syllabi are continuously updated in consultation with experts from industry, academia, alumni and students, taking advantage of the academic autonomy from the affiliating university since year 2002.
- The curricular structure is prepared after rigorous discussions and pedagogical workshops, both conducted in-house as well as with external experts. Keeping in mind the national and international needs, desired graduate attributes, and guidelines such as United Nation's sustainable development goals (UN-SDGs), a balanced structure is proposed.
- There are course committees at the department to address each vertical/sub-discipline. A structured feedback system is in place. The Board of Studies (BoS) meetings followed by the Academic Council meetings are conducted twice a year. Before the meeting, feedback on existing curriculum is collected from stakeholders.
- All faculty members are the members of the BoS along with nominated experts from the state, outside the state, alumni and industry persons.
- The points related to the institute policy are included and circulated by the Academic Development Cell (ADC).
- All the courses are developed by identifying the specific course outcomes, which are mapped with the POs and PSOs. Shortfall in POs the attainment is backtracked to identify gaps in COs and curriculum is accordingly revised or new courses are developed

- The provision of 'Professional Development' is made by assigning 02 credits, evaluated at the final semester, for extra & co-curricular activities.
- Professional Ethics, Gender, Human Values, Environment and Sustainability, Project Management, Disaster Management, Indian Constitution & Traditional Knowledge are mandatory audit courses.
- About 78 different optional courses are also offered in 'Novel Engaging Course' category.
- For preparing future ready engineers, courses such as Cyber Security, Intellectual property Rights, Data Science, Artificial Intelligence & Machine Learning are mandatory courses.
- Interdisciplinary learning and flexibility is already included through the provision of DEs/OCs/Honours degree/Minor specialization. Students can earn minor specialization & Honours degrees in addition to UG degree by earning 20 additional credits
- There is a provision of full VIII semester internship at industry/research organization for making them job ready.

➢ Teaching-learning and Evaluation

- In order to unburden the students from high stake end-term examinations, the weight of continuous evaluation is slowly being increased. Presently the ratio of continuous to end-term evaluation has been increased from 30:70 to 40:60.
- Continuous evaluation of theory course consists of 20% weightage to learning through quizzes and assignments, mini projects etc. and 10% each to two mid-semester examinations. To promote modern tool usage, laboratory courses have a "Skill Based Mini Projects" component with 20% weightage and the other 20% weightage is given to lab-work/sessional.
- The Learning Management System, MOODLE (Modular Object Oriented Dynamic Learning Environment) is effectively used by faculty and students of the institute for teaching, learning and assessment purposes providing a student centric 'any-time-any-where' format of learning.
- MOODLE is also very effectively used for continuous and online end term evaluation, setting MCQ based question paper and conduction of exam.
- The lecture plans are prepared according to the 'Multiple Mode Teaching Learning Pattern' (MMTLP) developed by the institute. The lecture plan reflects the mode and pedagogical methods of teaching.

- The "Digital Teaching-Learning Action Plan" was prepared during the COVID period by customizing the PRAGYATA guidelines of Ministry of Education, (then MHRD), New Delhi to the scheme, scope and needs of engineering education.
- Some Department Elective and Open Category Courses are offered through MOOC platform (NPTEL/SWAYAM) and credits are directly transferred.
- MITS is a NODAL center of Virtual Labs (An Initiative of Ministry of Education under the National Mission on Education through ICT) from 21st July, 2020 onwards in association with IIT-Delhi. Some experiments are conducted in virtual mode also.
- The Examination Control System is automated resulting in extensive improvement in the efficiency and transparency of the whole process. Valuation is conducted digitally and answer books are displayed to the students.
- The examination reforms based on 'Outcome Based Education' have been implemented. The end-semester evaluation for theory courses is conducted in multiple modes viz, Pen & Paper, Assignment plus Oral and Multiple Choice Questions.

➢ Student Support and Mentoring

- The institute curriculum and practices are designed to achieve all three domains of learning; knowledge, skills & attitudes.
- The first two domains are addressed through curriculum, pedagogy and various academic activities, working in well-equipped laboratories, skill based projects and assignments.
- For the development of a good attitude and behavior, ethical conduct, team spirit and soft-skills there is provision of activity based learning through focused courses, presentations, proficiency evaluation, group learning and various activities in the campus which are organized by the students.
- The Institute has established Students Development Cell for promoting and organizing extracurricular and co-curricular activities. There are 65 student clubs on campus which are active year the round.
- There is a practice of conduction of 'Orientation Programs' at the onset of semester to brief them on 14-specific points related to academic, extracurricular and career related activities to be conducted during the semester. Separate support and sessions are conducted for the lateral entry students to address the curriculum gaps for transition to the degree programme.

- The slow learners are identified by the course faculty and regular remedial classes, extra assignments and quizzes are conducted for slow learners. Similarly, support is provided to the fast learners also.
- The institute follows a 'Mentor-Mentee System'. Besides this, personal counselling is given to students through a full time, qualified professional Student Counsellor.
- A number of sports and cultural activities/competitions are organized by the institute every year wherein the students play an important role in planning and organizing the activity.
- The institution also has a transparent mechanism for timely redressal of student grievances. Students are represented in several academic & administrative committees of the institute.
- In-house internship programmes are conducted mandatorily for students in first year and second year while internship support is provided to the third year students on a need basis.

The academic plan for the next fifteen years

The academic plan for the next fifteen years for following activities/process is prepared considering the SWOC analysis, requirement of Quality Assurance agencies and NEP-2020 recommendation for the Holistic, Multidisciplinary, Value Based Education and Flexibility to learners.

(a) Curriculum Reforms

(b) Examination Reform & Evaluation process

(c) Teaching Learning & Evaluation Process

(a) Curriculum Reforms

Year	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Curriculum Design & Development			Twice/Year	Dynamically
2	Introduction of new courses focused on employability/entrepreneurship/skill development			Introduced as open electives	Technology Based
3	Revision of Syllabus as per current Societal & Industrial Need			Twice/Year by conducting syllabus revision workshops	Continuous Improvement
4	Industry & alumni involvement in the program			Direct & Indirect	Continues

	design and Curriculum		Improvement
5	A Balanced Structured Curriculum for attaining the Program Outcomes (POs) & Program Specific Outcomes (PSOs)	Implemented from 2017-18	Continues Improvement
6	Implementation of Academic Flexibility through Flexible Curriculum System	Implemented from 2017-18	To be continued
7	Curriculum Enrichment via audit courses	Implemented from 2018-19	Dynamically
8	Implementation of Feedback System to collect feedback from Students, Teachers, Employer & Parents for Curriculum development	Through Online feedback mechanism	To be continued
9	Conduction of Value-added courses to impart transferable and life skills	Implemented from 2017-18	Need Based
10	Provision of Internship (in-house/Industrial) in every academic year of study	In-House Summer Internship Program started in 2017-18 for I year & Industrial Internship is mandatory for II & IIII Year students, Provision of full semester Internship in final year with industry/ organizations	To be continued
11	Encouraging for Industrial Projects to solve the real time Industrial problems	Partial Financial Support for Industrial and Interdisciplinary projects	All Deserving
12	Review & Corrective measures on implementation of OBE: ❑ Mapping courses and the POs & PSOs. ❑ Framing COs for every course.	The Cos, Pos and PSOs are prepared and revised as per	Continuous Improvement

	❑ Availability of COs embedded in the syllabi. ❑ Course Articulation Matrix (Mapping of CLOs with COs) table. ❑ Program Articulation Matrix (Mapping of CLOs with POs) tables. ❑ Development of assessment tools and processes used to gather the data upon which the evaluation of Course Outcome is based. ❑ Attainment of Course Outcomes of all courses with respect to set attainment levels. ❑ Development of assessment tools and processes used for assessing the attainment of each of the POs & PSOs. ❑ Evaluation of each PO & PSO. ❑ Review and improvement in attainment levels of Cos, Pos & PEOs.	NBA guidelines. The attainment level of each COs is evaluated and corrective measures are taken for improvement in attainment levels.	

(b) Teaching Learning & Evaluation Process

Years	2023-2028	2028-2033	2033-2038	Status	Intervention
Academic Reforms: Adapting Cafeteria Approach against the existing Rice-Plate Approach					
1	Adherence to academic Calendar			100% adherence to academic calendar	To be continued
2	Learning Management System: Effective teaching with the use of e-learning resources, ICT tools & Institute MOODLE, MOOCS, SWAYAM			Up to 100%	100%
3	Teaching-learning through ICT enabled classrooms & Smart Class rooms			100% classrooms are effective	100%
4	Pedagogical initiatives (real life examples, collaborative learning, ICT supported learning, interactive classrooms, e-resources & latest techniques)			Up to the level of 70%	100%

5	Effective Students mentoring system	Scheme is very effective since 2016	Enhance Effectiveness
6	Implementation of effective support system for weak students & to encourage bright students (identification, action taken, impact observed)	Up to 70%	100%
7	Student's feedback on teaching process and Corrective measures.	Online feedback system & actions accordingly. 02/Sem.	Enhance Effectiveness
9	Flexible Curriculum Scheme: - Core Courses - Electives and Open Elective Courses - Inter-Disciplinary Courses - Credit Transfer Provision for Online Courses including courses of foreign Universities - Industry training/Course Crediting - Add-on/Audit Course Crediting etc. -NEC Novel Engaging Courses Provision of minor specialization & Honors	Implemented w.e.f 2017-18	Enhance Effectiveness
10	Assuring Quality of assignment and its relevance to COs (to promote self-learning, survey of contents from multiple sources, assignment evaluation and feedback to the students, mapping with the COs)	Implemented	To be continued
11	Question paper analysis based on HOT & LOT and gap analysis & corrective measures.	Implemented	To be continued
12	Developing mechanism for students grievances about evaluation	Manual System	Online System
13	Digitization of Evaluation Process	Online Evaluation System has started w.e.f. 2017-18 as a pilot project & started as complete	Complete Digitization

		online evaluation from 2018-19	
14	Digital Examination Process	Objective	Subjective
15	Innovative practices for Identification of students projects and allocation	Under Progress	100% Implementation
16	Classification and relevance of the projects and their contribution towards attainment of POs and PSOs	Under Progress	100% Implementation
17	Establishing Industry supported laboratories	SKF, IBM	01/ Program
18	Industry involvement in partial delivery of any regular courses for students	Under Progress	Effectiveness Enhancement

(c) Examination Reform & Evaluation process

Year	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Implementing effective Process of internal semester question paper setting and evaluation (effective process of question paper setting, model answers, evaluation and its compliance)			Implemented	To be continued
2	Implementing effective system to ensure the questions from outcome/learning levels perspective			Implemented	To be continued
3	Implementing effective system to ensure evidence of COs coverage in class test/mid-term test.			Implemented	To be continued

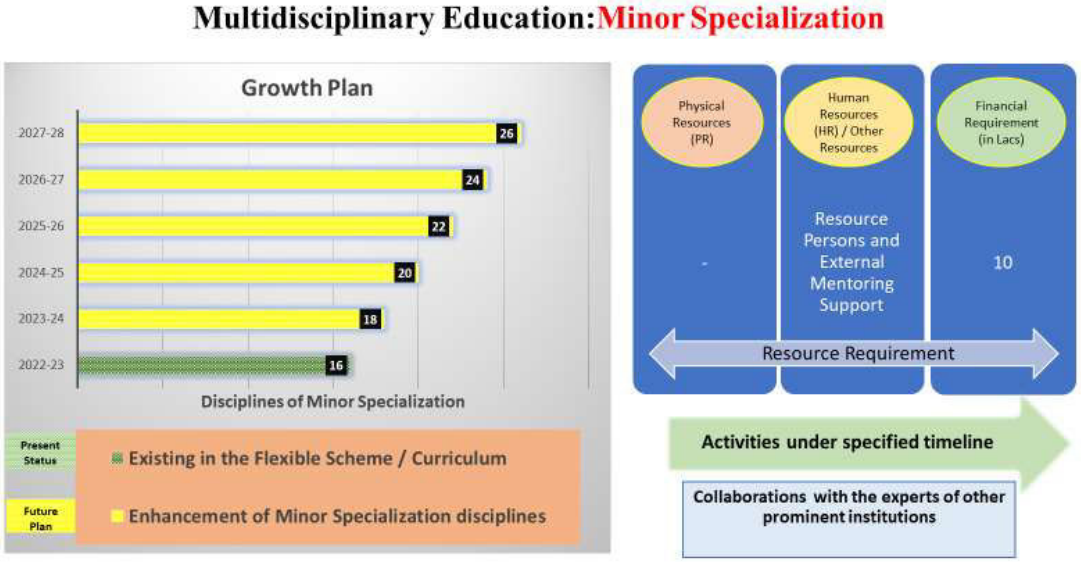
The Five Year Academic Plan

Following academic provisions which are already implemented in the Institute are considered for the prepration of **Academic Plan for next five years (2023-2028):**

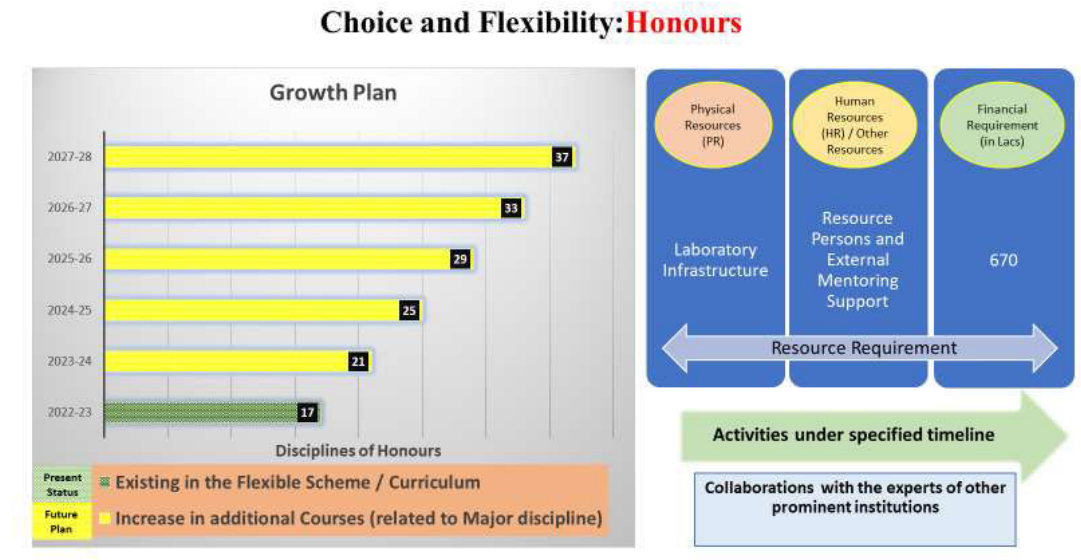
- Multidisciplinary Education: Provision of Minor Specialization
- Choice and Flexibility: Provision of Honours
- Cross Disciplinary Thinking: Open Courses
- Online Education: Credit Transfer Through SWAYAM/NPTEL/ MITS MOOCs
- Accessibility and Flexibility: Blended Teaching Learning
- Holistic Education and Informal Knowledge: Novel Engaging Courses

- Skill Development and Creativity: Skill based Projects
- Facilitation of Proficiency Development, Natural Science & Skill courses and Mandatory Audit Courses in scheme of study & examination
- In-house Internships for skill development
- Industrial/External Working Exposure: Full semester Internship
- All Round Involvement/ Professional Development: Extra Curricular Activities in the Curricula
- Moving Away from High-stake Examinations (unburden the students): Continuous and Comprehensive Evaluation
- Humanities and Arts Integration with STEM: Mandatory Value based Courses
- Innovative/Multidisciplinary Research: Research Internship
- Industry Readiness: Industry Collaborative Courses
- Industry Partnership Programmes: Industry Collaborated Degree Programmes
- Industry Readiness: Vocational Courses
- Enrichment of Faculty and Staff knowledge: Facilitation of Training
- Innovative Teaching, Learning & Assessment: Criterion Based Grading
- Cross Disciplinary and Interdisciplinary Thinking, Innovation: Interdisciplinary Projects
- Entrepreneurship: Skill based Courses in Local/Regional Language & Start-up Activities
- Future Skill Areas and Innovative Domains: New UG Programmes in Diversified Domains as per Societal and Industrial Need
- Certificate Courses in Future Skill Areas and Innovative Domains
- Industry Executive Training: Courses for Industry Persons
- Outcome Based Education as per NBA guidelines
- Degree with Research to offer Flexibility and Choice
- Multiple Entry & Exit Option
- Academic Bank of Credit (ABC) for Accountability of Credits Earned Through Various Platforms
- Open Distance Learning (ODL): provision for Courses and Grades Acquired Through Distance Learning

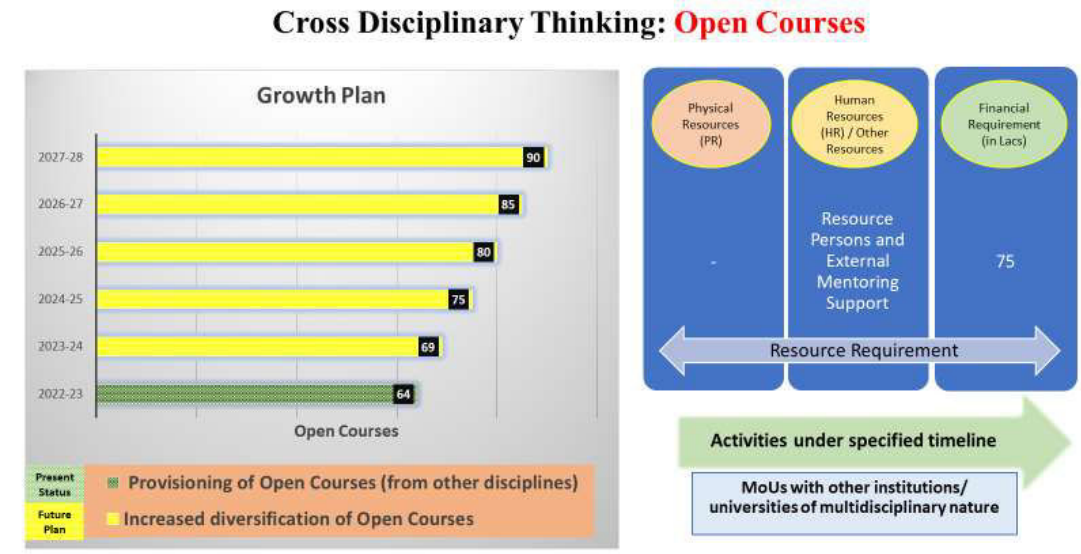
Attributes	Strategies
Multidisciplinary Education	Provisioning of Minor Specialization through additional credits



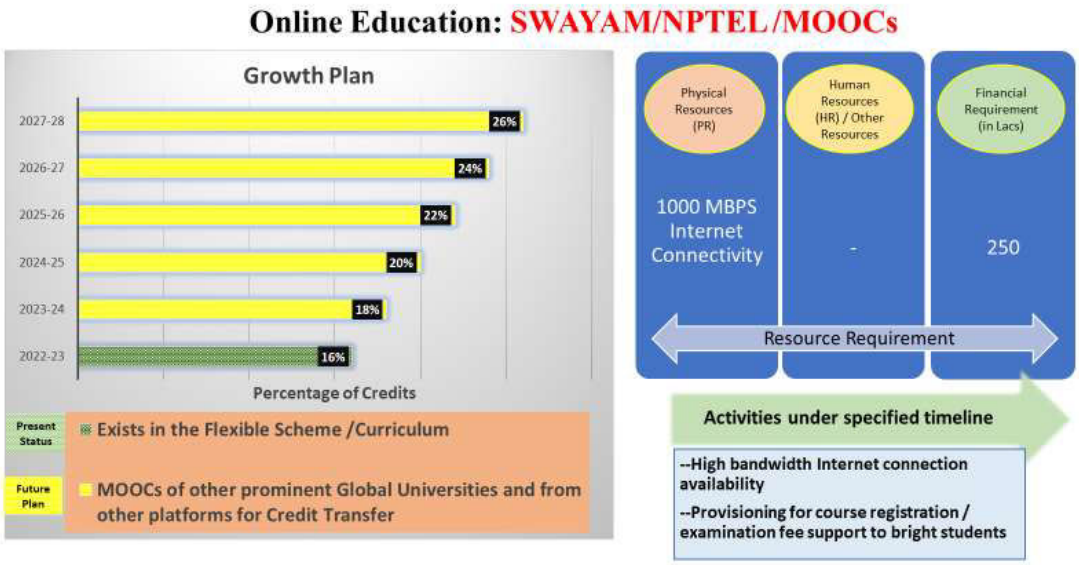
Choice and Flexibility	Provisioning of Honours through additional credits



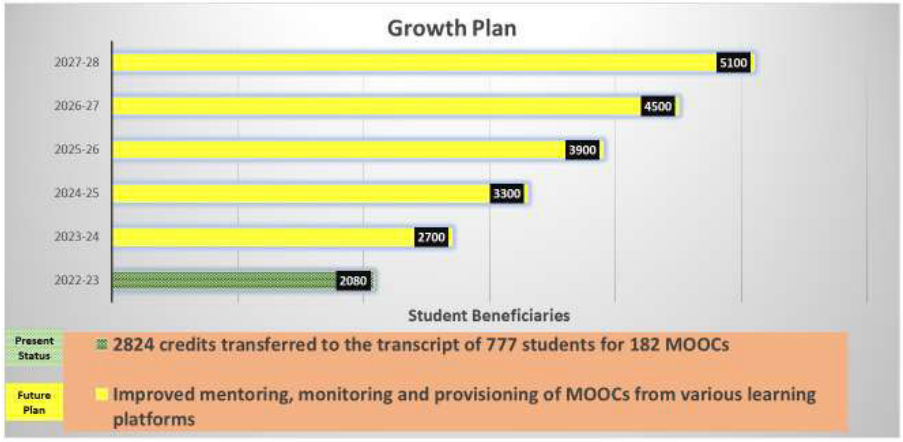
Cross Disciplinary Thinking	Provisioning of Open Courses (from other disciplines)



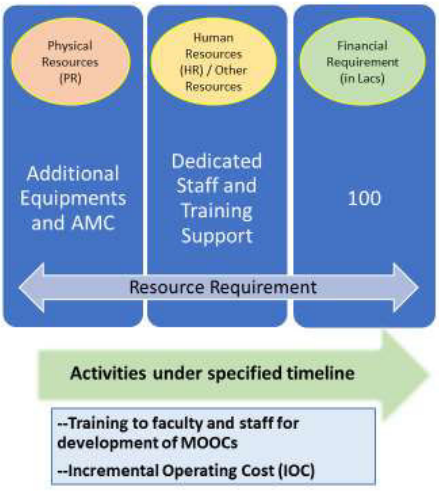
Online Education	• Provisioning of MOOC based courses from various learning platforms / other institutions • Credit transfer facilitation through MOOC based learning platforms / other institutions • Development of Institutional MOOCs for credit transfer



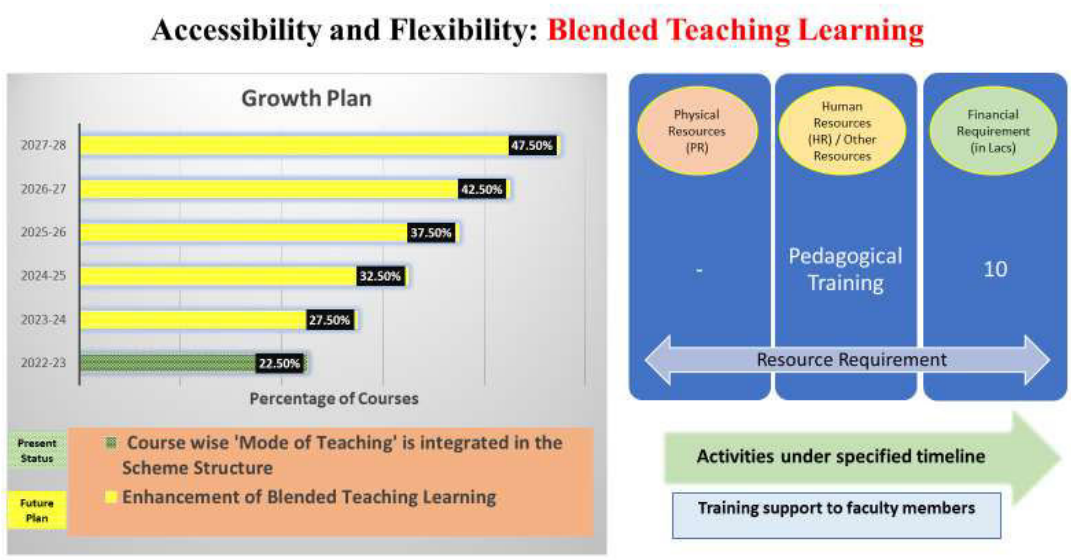
Online Education: Credit Transfer Through SWAYAM/NPTEL/ MOOCs



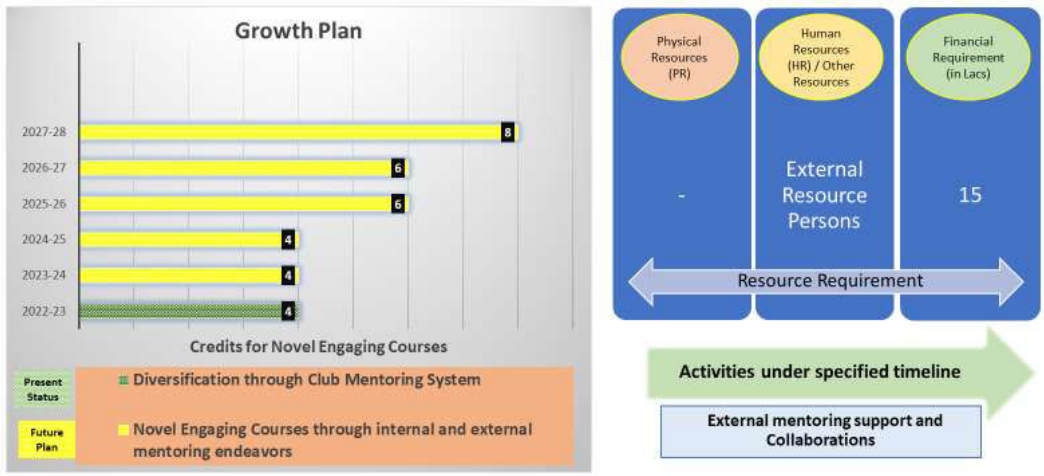
Online Education: MITS MOOCs



Accessibility and Flexibility for Teaching Learning	**Provisioning of Blended Teaching Learning under various modes of Teaching Learning, as per the nature of the course**

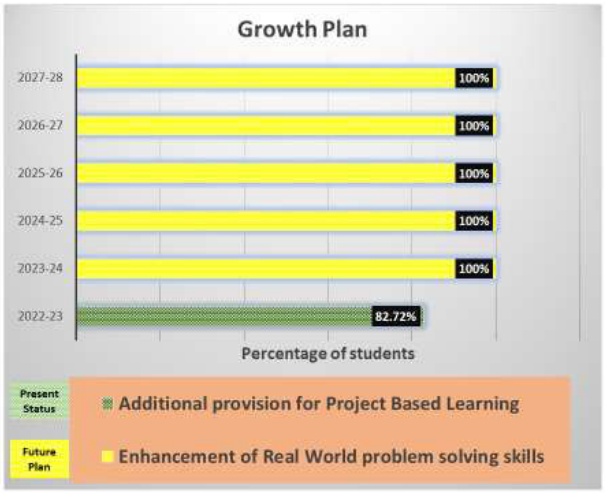


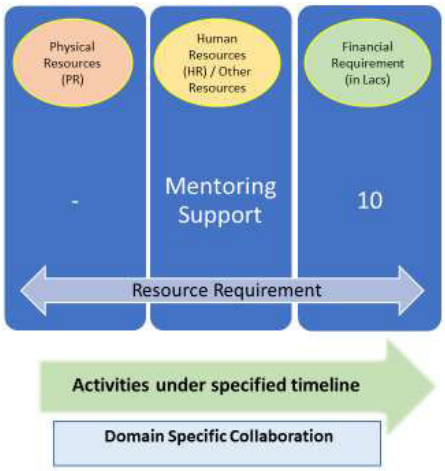
Holistic and Multidisciplinary Education, Knowledge of Many Arts" or "Liberal Arts", Integration of all branches of Creative Human Endeavour	• **Provision of "Novel Engaging Courses" through mentoring system** • **External mentoring from various other institutions**



Skill Development and Creativity	**Provision of Skill based Projects for effective learning**

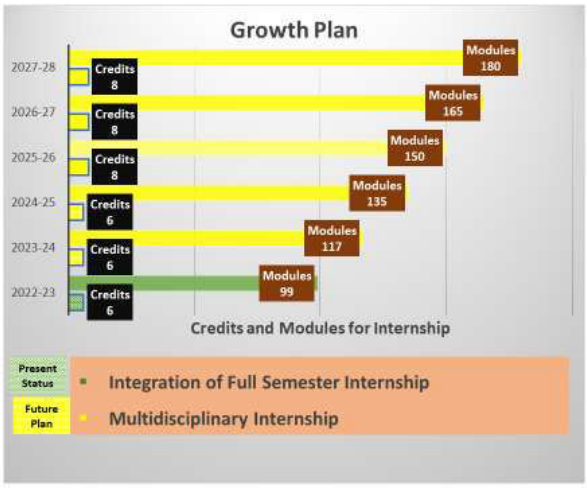
Skill Development and Creativity: Skill based Projects

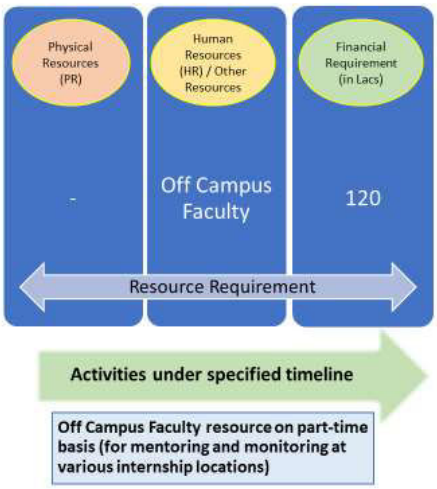




Industrial/External Working Exposure through Internship	• **Provision of full semester Internship with industry/ organizations** • **Scope enhancement (inclusion of SMEs, businesses artists, craft persons etc. for the enrichment of external working environment)**

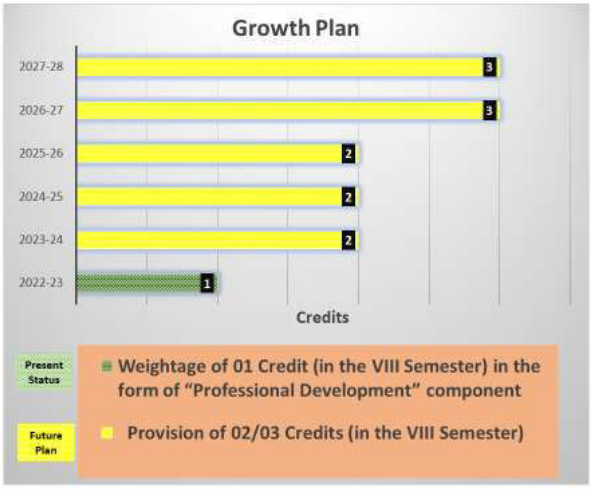
Industrial/External Working Exposure: Internship

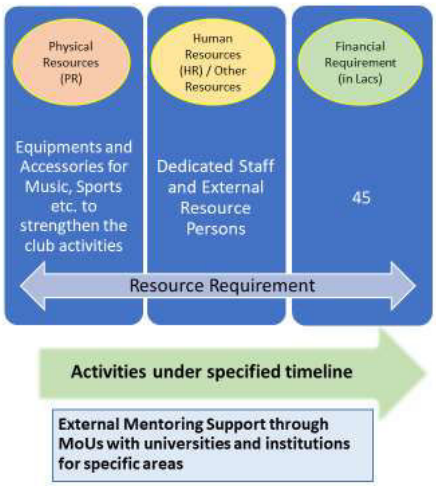




All Round involvement	• **Inclusion of Extra Curricular Activities and attainments in the Curricula through credits (Professional Development)**

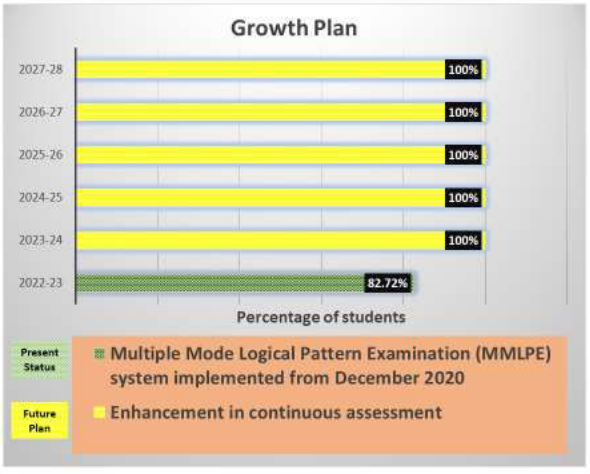
All Round Involvement: Extra Curricular Activities in the Curricula

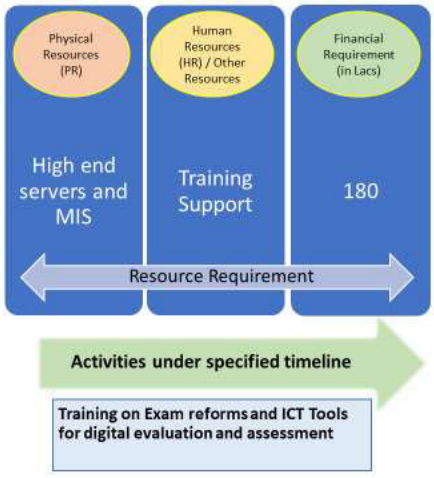




Move Away from high-stake examinations (unburden the students)	• **More continuous and comprehensive evaluation** • **Implementation of Multiple Mode Logical Pattern Examination (MMLPE) System** • **Emphasis on internal assessment and evaluation through well structured mechanism**

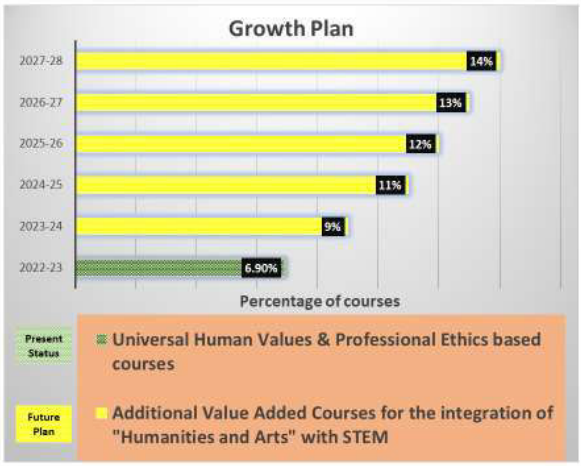
Moving Away from High-stake Examinations (unburden the students): Continuous and Comprehensive Evaluation

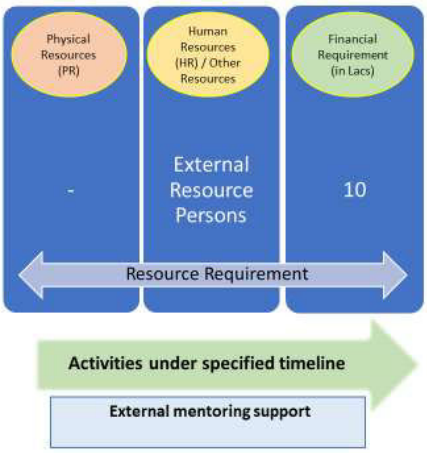




Integration of "Humanities and Arts" with STEM: Science, Technology, Engineering and Mathematics as STEAM	• **Provision of Mandatory Value based Courses for positive learning Outcomes** • **Enhancement of scope by provisioning more value based courses, as per NEP 2020**

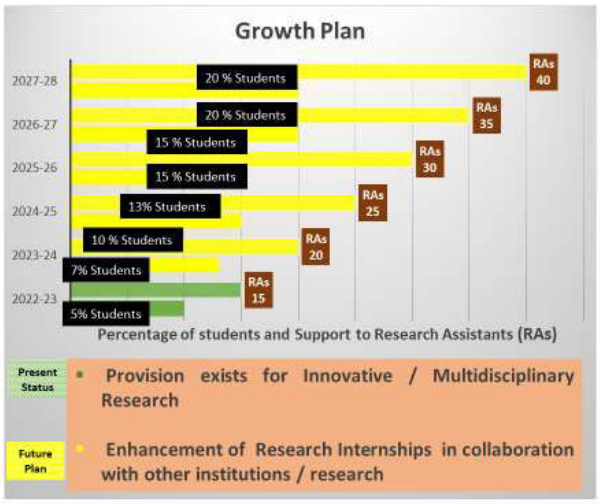
Humanities and Arts Integration with STEM: Mandatory Value based Courses

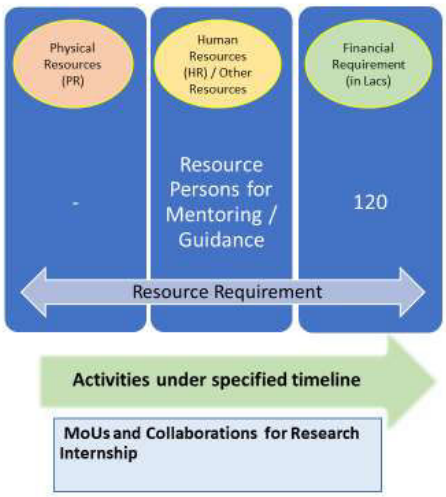




Innovative / Multidisciplinary Research	• **Promote research activities by extending support to Research Assistants (RAs)/ students/ faculty members** • **Provision for Research Internship for active engagement of students with the practical side of their learning**

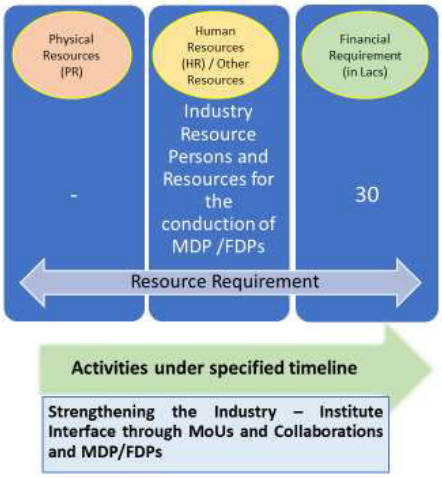
Innovative/Multidisciplinary Research: Research Internship





Industry Readiness	• Provision of Industry Collaborative Courses • Provision of Industry Partnership Programmes • Provision of Vocational Courses

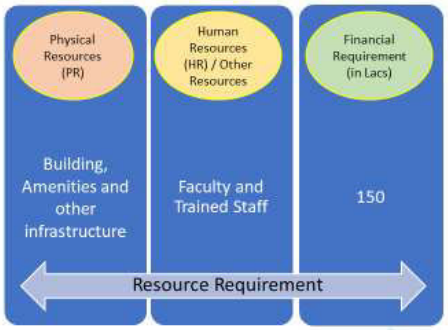
Industry Readiness: Industry Collaborative Courses



Activities under specified timeline

Strengthening the Industry – Institute Interface through MoUs and Collaborations and MDP/FDPs

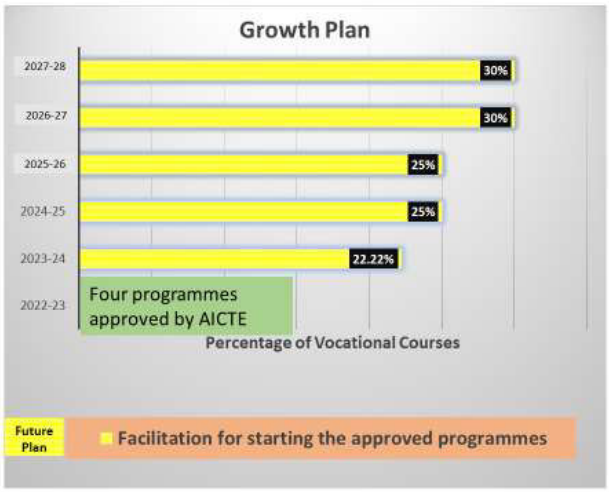
Industry Partnership Programmes: Industry Collaborated Degree Programmes

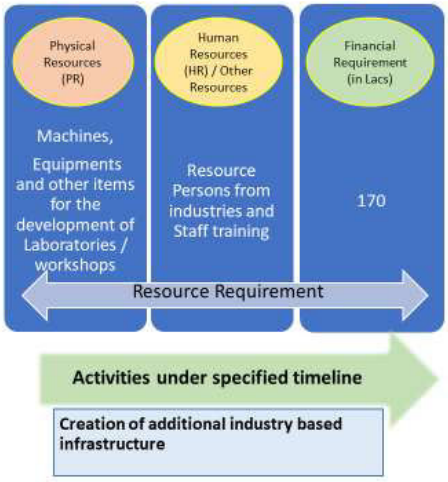


Activities under specified timeline

Industry Collaboration, Physical Infrastructure and Manpower

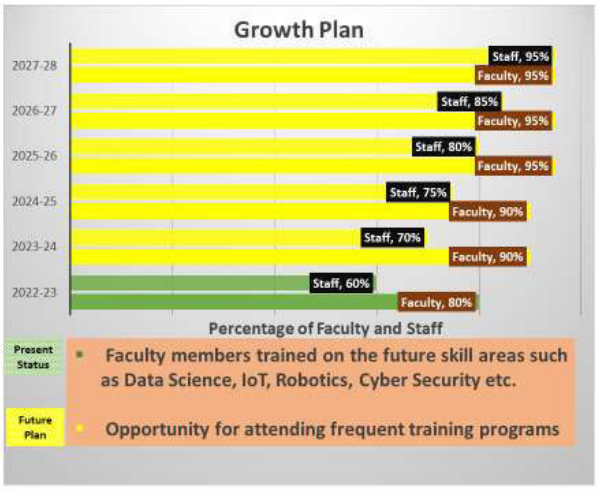
Industry Readiness: Vocational Courses

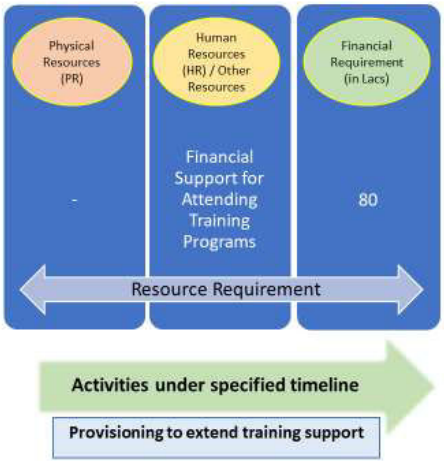




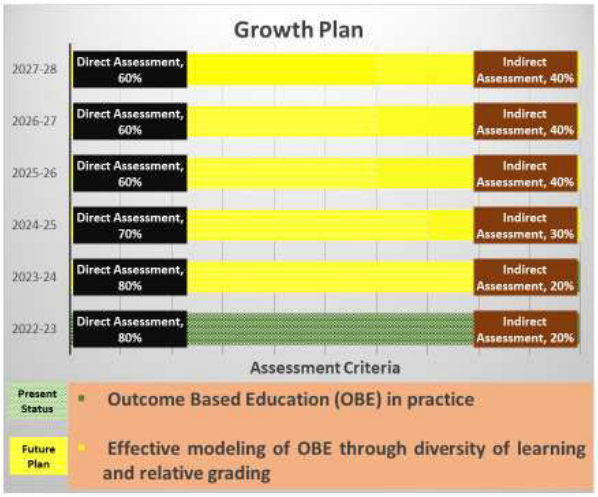
Facilitation of Training and Innovative Teaching, Learning & Assessment	• **Training of faculty members and technical staff for enrichment of their knowledge** • **Adoption of Criterion Based Grading** • **Diversity of learning methods to be included for more effective modeling of Outcome Based Education (OBE) Model**

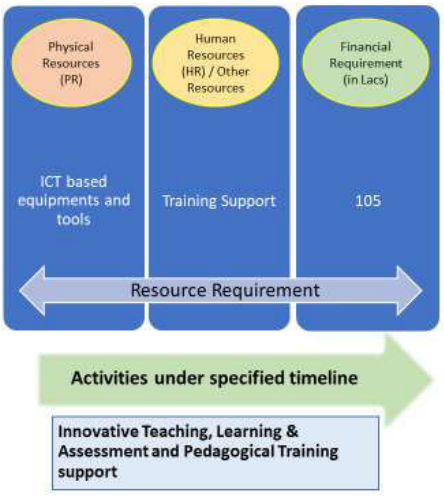
Enrichment of Faculty and Staff knowledge: Facilitation of Training





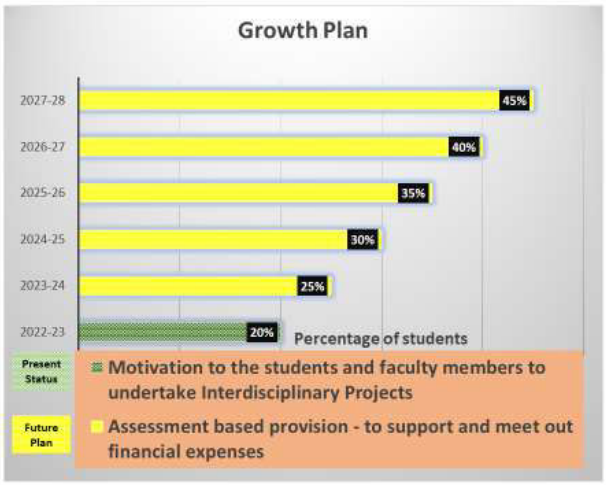
Innovative Teaching, Learning & Assessment: Criterion Based Grading

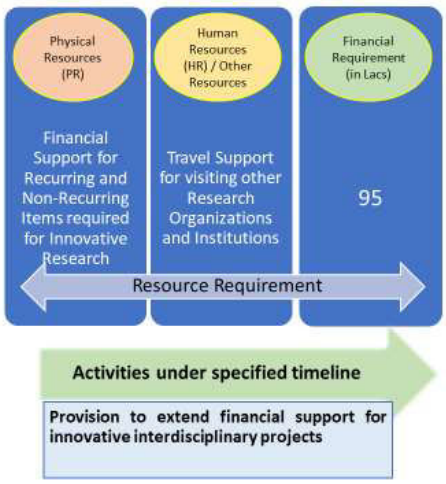




Cross disciplinary and Interdisciplinary thinking, Innovation	• **Focus on Interdisciplinary Projects**

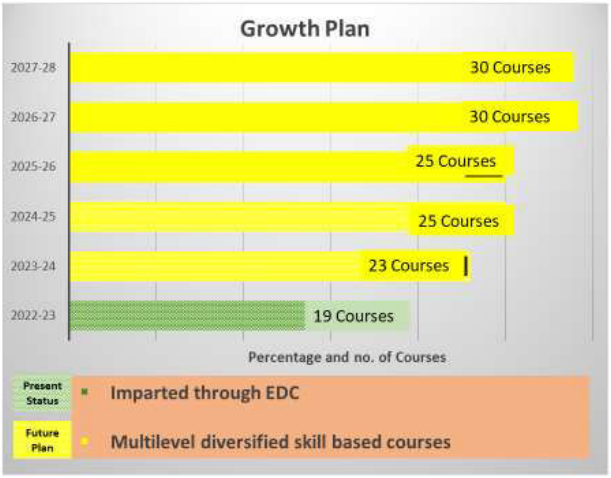
Cross Disciplinary and Interdisciplinary Thinking, Innovation: Interdisciplinary Projects

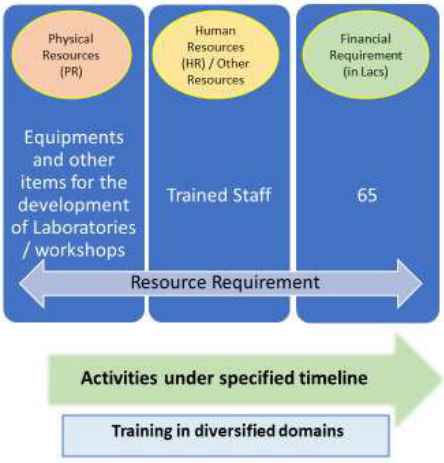




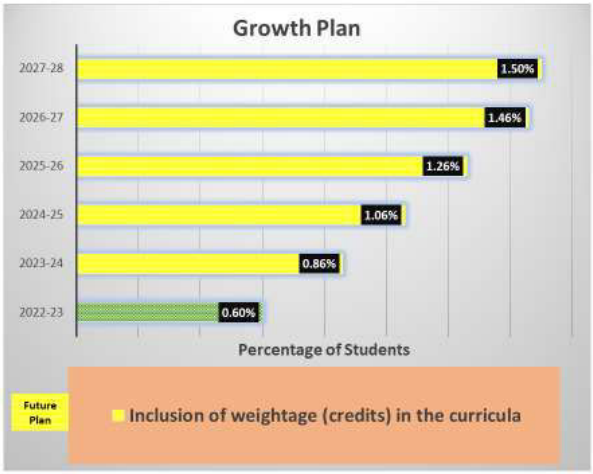
Promote Entrepreneurship, Start-up activities	• **Provision of Skill based Courses in Local / Regional Language** • **Facilitation for Incubation Center, Start-up and Business Development training and support**

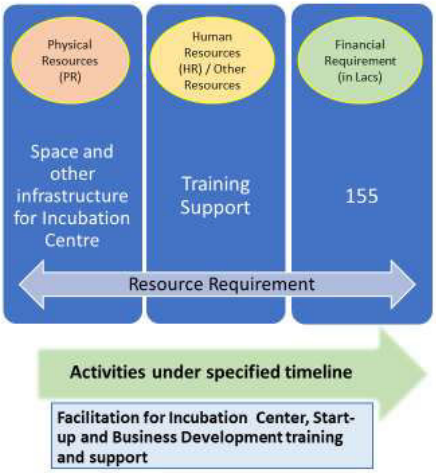
Entrepreneurship: Skill based Courses in Local/Regional Language





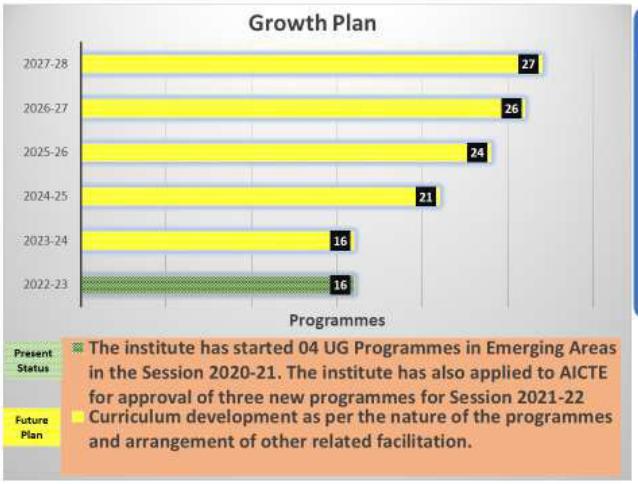
Entrepreneurship: Start-up Activities

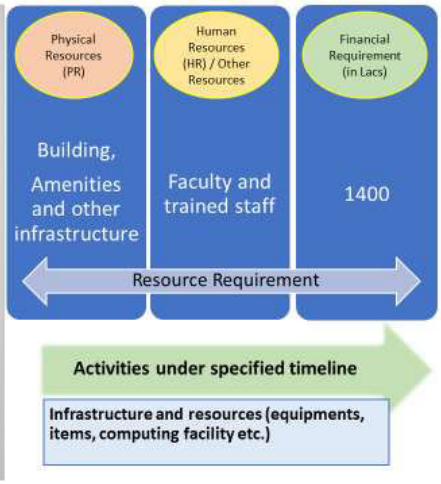




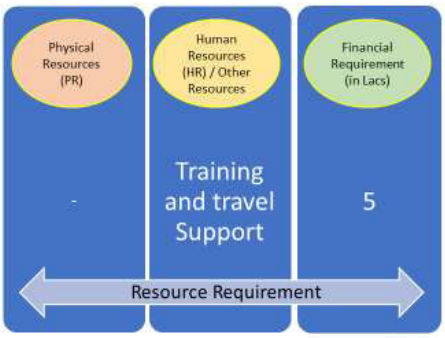
Future Skill Areas and Innovative Domains	• **Introduction of new Programmes in emerging areas** • **Provision of Certificate Courses** • **Provision of courses for Industry Persons (industrial executives / manpower)**

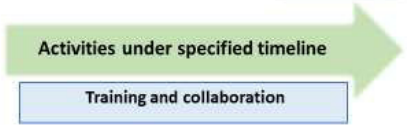
Future Skill Areas and Innovative Domains: New UG Programmes in Diversified Domains as per Societal and Industrial Need

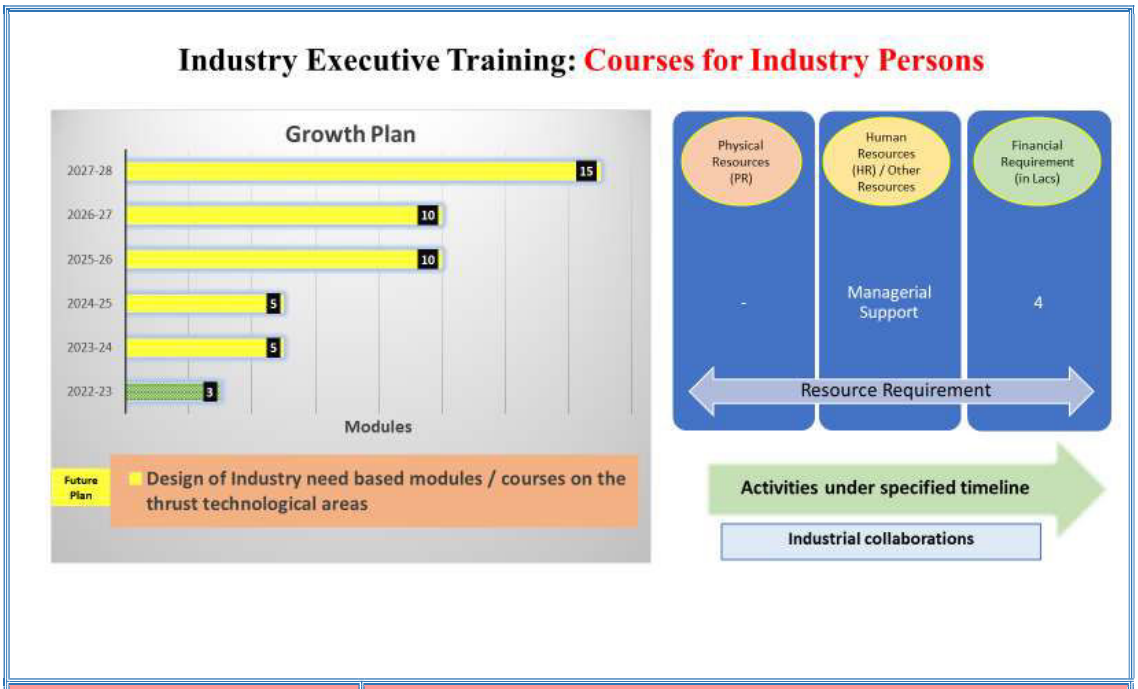




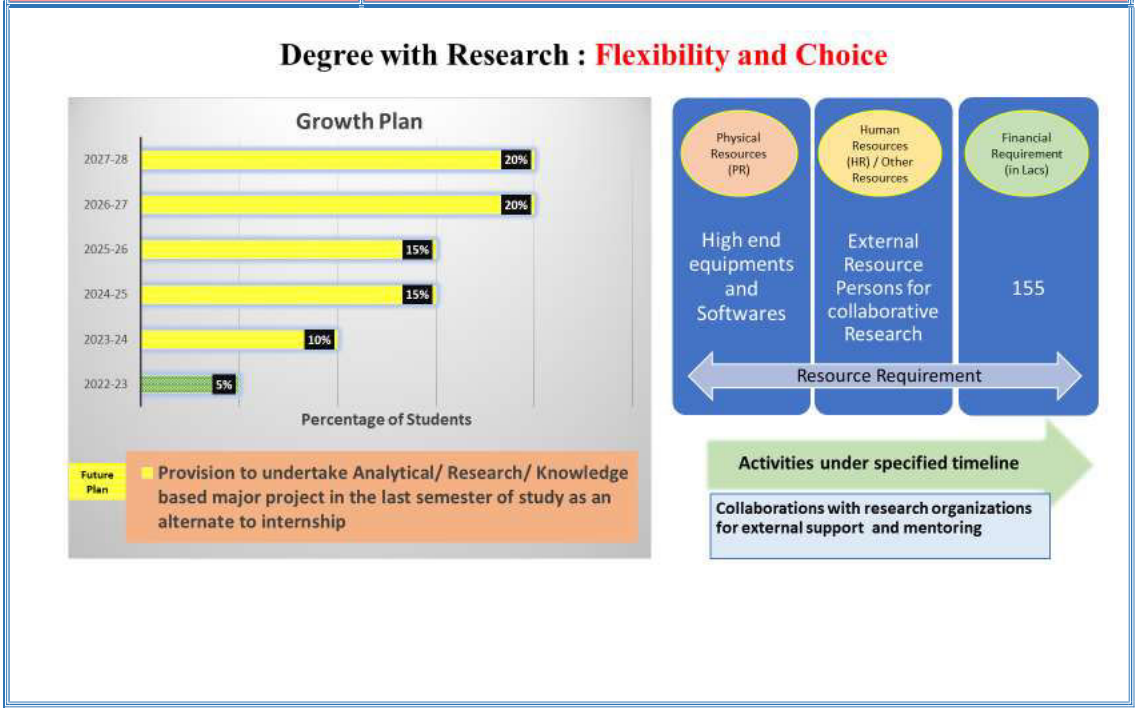
Future Skill Areas and Innovative Domains: Certificate Courses





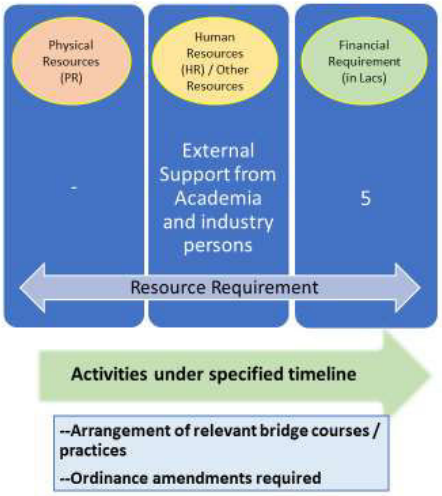


Degree with Research at UG Level	• **Provisioning of Research oriented major project for the award of UG Degree with Research**



Multiple Entry and Exit Options	• **Provisioning to offer certificate, diploma & Bachelor degree for enhanced choice and flexibility**

Multiple Entry and Exit Options: Flexibility and Choice



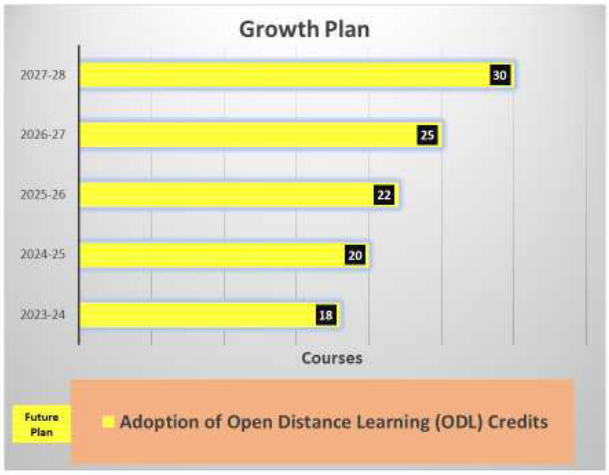
Activities under specified timeline

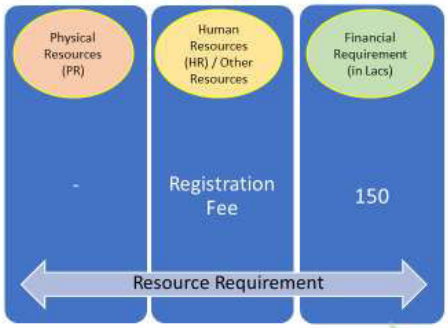
--Arrangement of relevant bridge courses / practices

--Ordinance amendments required

Promote Education through Open Distance Learning (ODL)	• **Provision for the courses and Grades (with credit transfer) through Distance Learning**

Open Distance Learning (ODL): Courses and Grades Acquired Through Distance Learning

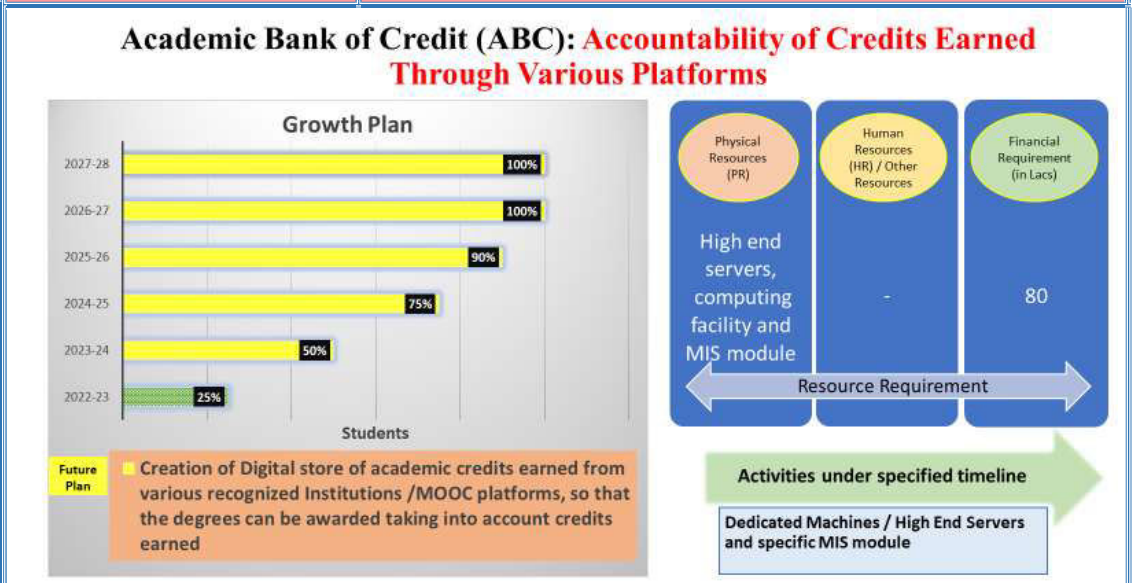




Activities under specified timeline

Collaborations with the institutions of repute for courses in Open Distance Learning (ODL) mode

Academic Bank of Credit (ABC)	• Accountability of Credits earned by an individual from various institutions /platforms



Research Plan

- Institute has a well-defined Research Promotion Policy which is disseminated through its website. The Institute has an established Research Committee to promote and encourage research among students and Faculty. Support is provided to faculty members in applying for research projects offered by different funding agencies.
- There are about100 scholars working in different domains of engineering and science. Institute has created an ecosystem for innovation, creation, and transfer of knowledge by establishing R&D cell, MOUs with industries.
- Research scholars undergo a rigorous coursework and their progress is monitored regularly through the Research Advisory Committees. Scholars are required to publish minimum two papers in the area of their research before submission of the thesis.
- Technical events such as quizzes, projects exhibitions, paper presentations, posters, etc. are organized to showcase talents of students. The Institute organizes FDPs, STTPs, Technical Workshops, Seminars, and National and International Conferences on a regular basis.
- The faculty qualifications are good and many of them have good exposure and research collaboration with institutes of repute and due to being on the expert panels of Central Agencies like the NBA, UPSC etc.
- During the last five-years, faculty members at Institute have published more than 400 research articles in different journals and conference publications. In order to create a research culture among students and faculty, the institution has collaborations with about 400 plus industries/organizations.
- Research grants of more than 3 Crore were received from various agencies for research projects. About 80 workshop/awareness programmes were conducted on Research Methodology, Intellectual Property Rights (IPR), Entrepreneurship and Skill development.
- More than 100 books and chapters in edited volumes/books were published and around same number of papers were presented in national/international conference-proceedings.
- Revenue of around Rs. 1.0 Crore was generated from consultancy during the last five years. More than 100 extension and outreach activities were carried out by the Institute through NSS/NCC.

- More than 500 collaborative activities are carried out for research, faculty/student exchange and industry Internships. 25 plus active collaborations and MoUs have been in action with industries, government and research organizations in India.

Fifteen Year Research Plan

Research, Development, Innovations & Professional practices					
Year	**2023-2028**	**2028-2033**	**2033-2038**	**Status**	**Intervention**
1	Providing research grant/ Seed money to faculty for innovative research			Implemented	Enhancement
2	Recognition & support to faculty for national/international fellowship for advanced studies/research			Yes	Enhancement
3	Recognition & support to faculty for receiving Research & development funds from various agencies, industries and other organizations (minor, Major, interdisciplinary, industry supported projects)			Yes	Enhancement
4	Support for Innovative Students projects			Partially	Fully Deserving
5	Support for International projects taken by faculty & students.			NA	Implementation
6	Conduction of Workshop and seminar on IPR & Industry-Academia Innovative Practices			03/Year	05/ Year
7	Recognition & awards for innovation by faculty/research scholars/students			Yes	To be continued
8	Development of Incubation Centre			In-Process	Fully supported including Financial Support

9	Promotion for Start-up incubated on campus to commercialise research innovations annually	In-Process	Fully supported including Financial Support
10	Increase in number of Ph.D. awarded & Admission	Awarded-53 Admitted: 65	Awarded: 103 Admitted: 100+
11	Increase in Research Publication in SCI/SCOPUS indexed journals (in last 5 years)	308/401	500/700
12	Increase in Books and Chapters in edited volumes	Books/ Chapters: 80	Books/ Chapters: 200
13	Increase in Publication of research papers in national and international Journals & conference proceedings/Year	01 /Per Faculty	02 Per Faculty
14	Increase in Quality of publication-Citation Index of Faculty Members (Last five year Web of Science & Scopus Index)	Web of Science: 1565 Scopus: 2093	10% increase per year
15	Increase in Patents applied/awarded/published	Granted:08 Published: 11 Applied: 15	Granted:35 Published: 50 Applied: 20
16	Support for Faculty Participating in Seminar / Conferences	100% Support	100%
17	Increase in Revenue generation through Consultancy & Industrial training	5%	8%
18	Linkage with Institutes/industries for internship, on-the job training, project work, sharing of research facilities along with Faculty & Students exchange program	Initiatives taken	Effective implementation
19	Signing MoUs with institutions of national, international importance, other institutions, industries, corporate houses.	51 MOUs	100+ MOUs
20	Motivating research and development leading to technologies with immediate societal value (water, energy, housing,	Initiatives taken by framing research groups	Effective implementation

	healthcare, education, etc.)	of faculty	
21	Establishing research centres of excellence	NA	01 /Year
22	Establish mechanism to support high impact research through an annual call for proposals and a process for identification of thrust areas.	Implemented w.e.f 2017-18	All Deserving
23	Encourage formation of multi-disciplinary research centres in high potential areas.	Developed	Effectiveness Enhancement with induction of students with faculty of other institute
24	Proactive and flexible mechanisms to attract high quality faculty and researchers	Under Process	Effectiveness Enhancement
25	Create research groups to attract students for PhD programme.	Implemented w.e.f 2018-19	Increase in numbers
26	Encourage and support advanced research conferences at the Institute.	02/Year	04/Year
27	Enable PhD student exchanges with partner international universities.	Under process	Effective Implementation
28	Enhance facilities and working environment for PhDs and post-doctoral researchers.	Adequate Level	As per Global Standard
29	Enhancing Placement activities and dedicated PlaceComm Cell to promote and enhance PG & PhD placements.	Adequate Level	Effectiveness Enhancement
30	Increased publications per faculty, citations per faculty, citations per paper	Adequate	As per NIRF
31	Increase in annual research funding.	3.28%	7%

32	Initiate Joint Academic Courses in Medicine/Healthcare/Agriculture/physical education in collaboration with other institutions.	Under Progress	Implemented

Five Year Research Plan

S. No.	Parameter	2023-24	2024-25	2025-26	2026-27	2027-28
1.	Seed money to Faculty for research	Up to 01 Lacs/ Faculty	Up to 02Lacs/ Faculty	Up to 03 Lacs/ Faculty	Up to 04 Lacs/ Faculty	Up to 05 Lacs/ Faculty
2.	Percentage of Faculty receiving national/ international fellowship/financial support by various agencies for advanced studies/ research	05%	05%	06%	07%	07%
3.	Research funding from Government and non-government sources	20 Lacs	20 Lacs	40 Lacs	40 Lacs	50 Lacs
4.	Percentage of Faculty having research projects	30%	30%	30%	35%	35%
5.	Percentage of Faculty recognised as research guides	30%	30%	30%	35%	35%
6.	Number of candidates	06	06	06	06	06

	registered for Ph.D per Faculty					
7.	Number of research papers published per Faculty in the Journals as notified on UGC CARE list	01	02	02	02	02
8.	Number of books and chapters in edited volumes published per Faculty	01	01	01	02	02
9.	Bibliometrics of the publications during the last five years based on Scopus/ Web of Science – h-index of the Institution	20	20	20	20	20
10.	Number of functional MoUs/linkages/collaboration with institutions/ industries in India and abroad for internship, on-the-job training, project work, student / faculty exchange and collaborative research	06	06	08	08	08
11.	Revenue generated from consultancy	50 Lacs	50 Lacs	100 Lacs	100 Lacs	100 Lacs

	and corporate training					
12.	Number of Exchange Programme for Student and Faculty for Research	03	03	05	05	07

Identified Research Domains	
Adhoc Network	Marketing Management
AI applications to Electrical Power Systems	Mathematical Modelling in ecology
Bio- Medical Instrumentation	Mechanical Behaviour of Materials
Bio Signal Processing	Mechanical system Design
Biomaterials	Medical Image Processing
Biomechanics	Microfluidics
Biometrics	Microwave Engineering
Catalysis	Modeling & Simulation
Cement	Molecular Biology
Communication Engineering	Multilevel Inverters
Composite Materials	Nanoelectronics
Computational Fluid Dynamics	Network Security
Computer Networks	Number Theory
Computer vision and machine learning	Numerical Method
Condition Monitoring	Optical Communication & Networking
Construction Technology & Management	Optimization Techniques
Control systems	Performance and Economic Analysis
Cryptography	Power Quality
Data Mining	Power System
Data Science	Power System Operation & Control
Data Science using Python	Product Design
Data Structures,	Production & Operation Management
DBMS	Production & Manufacturing
	Psychoanalytical Approaches to English Fiction
	Quality Assurance
	Renewable energy

Deep learning	Repair and seismic retrofitting and strengthening
Differential equation	of structures
Computation	Security
Digital Communication	Sentiment Analysis
Digital modulation	Separation Processes
Digital Signal Processing	signal Processing
EEG Signal Processing	Smart City
Electric Vehicles	Soft Computing Application
Antenna Designing	Solar Energy
Energy	Solar Rooftop PV systems
Energy Auditing and management	Solid Waste Management
Engineering Materials	Special Functions
Environmental Engineering	Speech Recognition
Finite Element analysis	Spray Forming
Fluid Dynamics	Stress and Vibration analysis
Fuzzy logic	Structural Engineering
Geotechnical engineering	Structural Response Control
Grid Connected Systems	supplementary cementitious materials
Hesitation Mining	System Reliability
High Performance Computing	Technical Education
HRM OB Operations	Thermal Engineering
Hybrid evolutionary computing	Toxicology and Environmental Engineering
Hybrid renewable energy systems	Tribology and Maintenance
Image and Signal Facing	Ultra-high performance concrete
Image Processing	Urban Planning
Impact and blast resistant structures	VLSI Design
Information Security	Water Resource Engineering
Integration of Renewable Energy	Welding Technology
Intelligent Computational Techniques	Wireless Networks
Internet of things (IoT)	
Maintenance Management	

Infrastructure Development Plan

- The Institute is spread over an Area of 44.6 acre which is lush green and has an aesthetic landscape.
- The Institute constantly endeavors to provide quality education and ensure all round development of students.
- The Institute has well maintained adequate number of class rooms, laboratories, computing equipments well beyond the regulatory guidelines conducive for teaching learning activities.
- The Institute has total 59 number of class rooms including seminar halls, conference halls and studios which are well equipped with ICT Audio Video facilities like Smart LCD Projectors, Wi-Fi LAN enabled etc. which help teachers and students to share their ideas among themselves.
- The Institute has total of 68 number well equipped laboratories including computing labs in all the departments to provide hands-on experience to the students, some of the laboratories are equipped with ICT facilities. Virtual labs are also developed for lab classes.
- A total of 615 computers are available exclusively for student usage. Apart from these, computers and laptops have been provided to the departments for faculty usage.
- The computing facilities include licensed software's and also open software's are being used as per the curricula requirements. Some of the licensed software's are ANSYS, MATLAB, PS CAD, Proteus Design Suite, Office Pro Plus 2016, SQL Server ST2016, Turnitin (for plagiarism checking) etc.
- The Institute has internet connectivity via lease line of 100 MBPS from NKN and 100 MBPS from IshanNetsol.
- The entire campus is Wi-Fi enabled with 24/7 internet facilities to the students and staff. The Institute has following servers available: HP Xeon 8 Core (2.10 GHz), Intel Xeon E5-2603v3 (1.6 GHz) State –of –art MOOC development centre has been established in the Institute where in faculty members develop their MOOCs.
- The Institute has its own MOODLE server since 2017 to facilitate E-learning, evaluation including conduction of Mid Semester & End Semester Exams (MCQ based type). NPTEL local chapter has been established since 2017 to provide e-learning through MOOC courses.
- There is a shop for Xerox and stationery within the campus to cater to the needs of students.

- There are 01 Boys Hostel & 03 Girls Hostel functional in the Institute at the moment which are equipped with facilities including mess etc.
- As per the Vision of Institute, the Institute has created administrative block, Academic Infrastructure & amenities. Presently, Construction of one additional Academic Block is also under progress to accommodate the need of increased intake of students in future.
- In the last three years, augmentation in physical infrastructure, equipment, library & Digital Teaching-Learning facility is done to ensure the need arisen due to increase in intake, market demand for emerging areas of Technology & Covid-19 pandemic challenges.

Methodology to ensure adequacy of Teaching-Learning Infrastructure & Facilities: Every year, before commencement of next financial year, a need based analysis is done by every department & section to identify the additional requirement for teaching-learning infrastructure considering following:

- AICTE Norms
- Recommendation of BoS
- Removal of obsolesce as per current Technological Demands
- Students strength/Intake
- Feedback received from Stakeholders
- Perspective Plan of Institute
- Budget constraints (if any)
- Guidelines of Quality Assurance Bodies like NBA, NAAC etc.

The proposals received from various Departments/Sections are compiled at Institute level for the review and approval of Infrastructure committee of BoG. The recommendations of Infrastructure committee are further reviewed and approved in the Finance/BoG meeting for budgetary provision in next financial year.

Teaching-Learning Facilities in the Institute:

The Institute has twelve Departments namely Civil Engineering, Electrical Engineering, Mechanical Engineering, Electronics Engineering, Computer Science & Engineering, Information Technology, Chemical Engineering, Architecture & Planning, Management, Mathematics & Computing, Applied Science & Humanities. In all the departments & central level following facilities are provided as per AICTE standards and curriculum needs:

Classrooms: As per AICTE guidelines on area requirement, Institute has developed adequate number of well-furnished, well ventilated, classrooms equipped with ICT facility.

Laboratories: All the laboratories are established as per AICTE norms & equipped with equipments, machines, software and computing facilities according to BoS

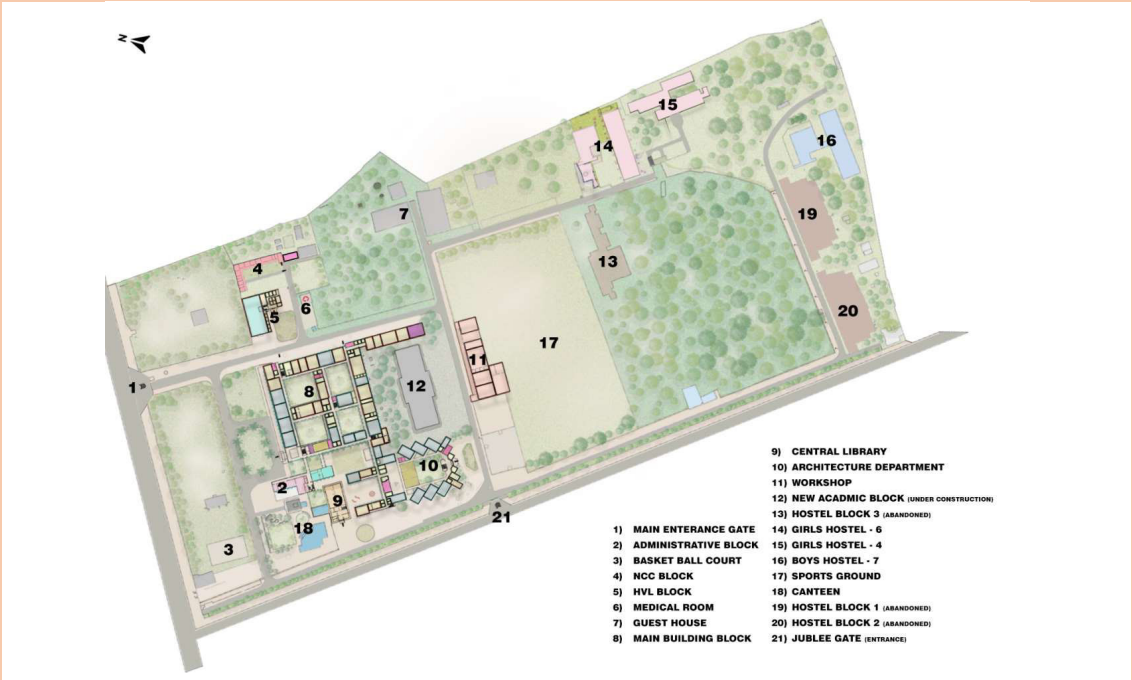
recommendations on curriculum for the conduction of experiments/practical's to ensure achievement of lab course outcomes. Laboratories are also utilized for mini & major projects, skill based component as a part of teaching & contents beyond the syllabus. The virtual labs are also developed for online lab classes.

Seminar Hall/ Tutorial rooms: The Institute has multiple seminar Halls & Tutorial for presentations, various expert talks, group discussions, tutorial & remedial classes.

Central Library: Central Library of the Institute can be considered as a very special place in the MITS Campus with its rich collection of books and journals in the field of Engineering and Architecture related disciplines. Central Library currently houses around 109443 books in different heads i.e Library grant, Student chapter grant & Book bank grants, collection includes textbooks and Reference books for Engineering Graduates, Post Graduates and Ph.D. curriculum in Civil Engineering , Mechanical Engineering, Electronics, Electrical, Computer Science & Information Technology , Management, and Architecture Disciplines. Library collection also includes documents in Computer Science, History of Science, Fictions, Stories, General books, Encyclopaedias and Dictionaries, Magazines etc.

Internet

- National Knowledge Network (NKN) through RailTel: Available bandwidth: 100 MBPS Dedicated Leased Line
- Ishan Netsol: Available bandwidth: 100 MBPS Dedicated Leased Line
- Wi Fi availability: Yes, Both in Academics Area and Hostels. The entire campus is WiFi enabled with 24/7 internet facilities to the students and staff.
- Internet access in labs, classrooms, library and offices of all Departments: Yes (everywhere with Fibre Backbone) Wired and well as Wireless with Firewall and protected and being monitored through Proxy.
- Security arrangements: Linux proxy server is being used for recording user activity on the server. The internet access (wireless and wired both) is password protected. Iptables are being used as firewall and to define access rules. Un-required Sites are blocked by using pattern matching rules.
- The Institute has following servers available: HP Xeon 8 Core (2.10 GHz), Intel Xeon E5-2603v3 (1.6 GHz)
- Some of the licensed software's are ANSYS, MATLAB, PS CAD, Proteus Design Suite, Office Pro Plus 2016, SQL Server ST2016, Turnitin (for Plag checking) etc.

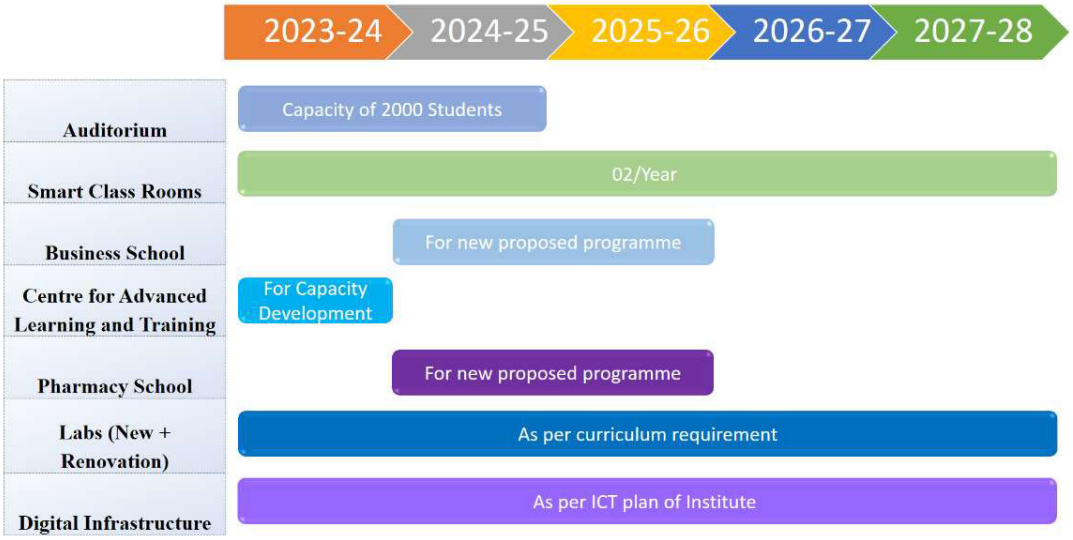


Fifteen Years Infrastructure Development Plan

Years	2023-2028	2028-2033	2033-2038	Status	Intervention
Improvement /up-gradation & increase in existing facilities					
1.	Modernization and expansion of Class rooms, Laboratories, Seminar halls, smart classrooms, & equipment.			70%	100%
2.	Automation of Library (integrated Library Management System)			70%	100%
3.	Automation/digitization of examination, evaluation system			60%	100%
4.	Up-gradation of LMA (Learning Management System)/MOODLE			Under progress	Continuous up-gradation
5.	Up-gradation in IT Infrastructure (Computer, Internet, Browsing Centre, Computer centres, Departments CC, Available band width			Under Progress	Continuous up-gradation

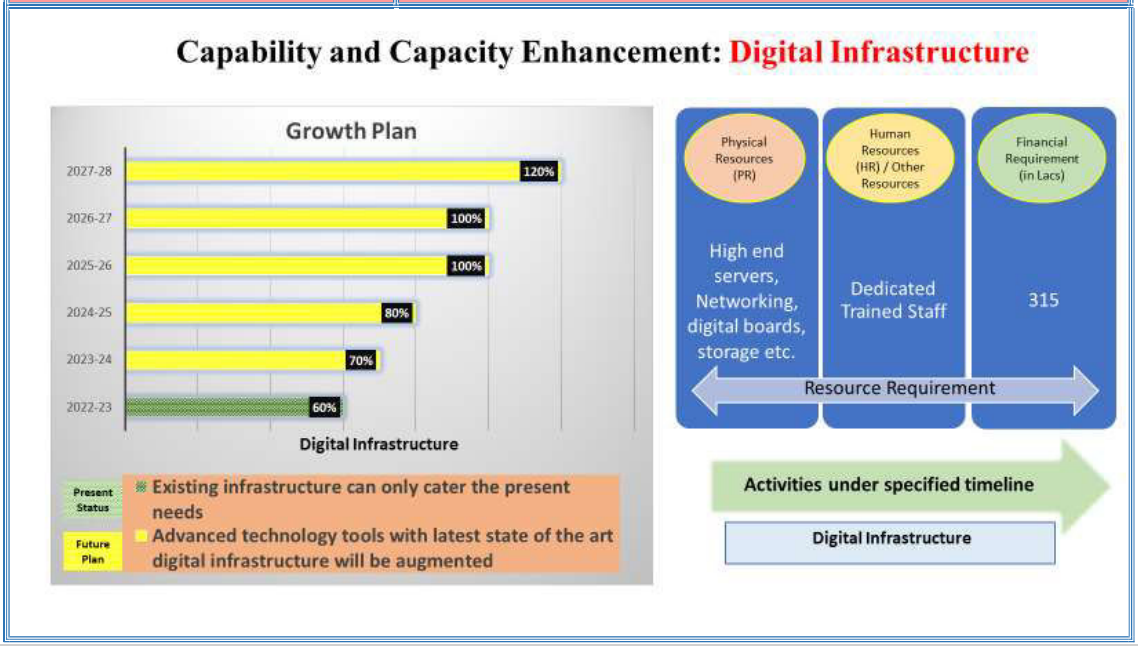
6.	Up-gradation of all buildings and their surroundings to global standards in cleanliness and safety	Adequate	As per Global Standard
7.	Creating comfortable accommodation to all students and scholars in hostel	Accommodating 600 Students	2000
8.	Provide well-maintained and accessible sports facilities for all major sports	Partial	Full facilities
9.	Development of Additional Academic Block	--	Academic block for new UG & PG programmes/ increase in intake
10.	Development of Auditorium for Academic Activities	--	Auditorium with capacity of 1000 Students
11.	Provide sufficient well-maintained quarters for the faculty and staff	Limited	Adequate
12.	Development of "Continuing Education Program Centre/ Centre for Advanced Learning and Training" for organizing various faculty & Staff Development activities	--	Dedicated faculty & Staff Development Centre
13.	Project laboratory/Incubation Facilities for students and faculty	Limited	Adequate
14.	Renovation of Institute Guest House	Limited	Adequate
15.	Renovation of Laboratories and Development of New Laboratories	Adequate	As per future needs
16.	Development of Business School	-	For new proposed programme
17.	Development of Pharmacy School/Department	-	For new proposed programme

Infrastructure Development Plan for next Five Years



Capability and Capacity Enhancement through Digital Infrastructure

Digital Infrastructure: Enhancement of Capability and Capacity	• **MOOC Development Centre, Smart Class Rooms** • **Arrangement of advanced technology tools with latest state of the art digital infrastructure**



Governance & Administrative Plan

- The Board of Governors of the Institute plays an important role in the growth of the Institute through regular reviews of policy matters and initiating new practices by creating 5-year vision plans. Year-wise targets have been set through the 'NEP-2020 Action Plan' prepared by the institute and approved by the BoG in its meeting in July 2020.
- The Institute is administered on a day to day basis by the Director with other faculty members holding key administrative and academic responsibilities.
- The organizational chart and the roles and responsibilities of each functionary are clearly defined and also available on Institute website.
- The vision, mission, branding Statement and value framework is aligned with the perspective plan of the Institute, which is prepared with the contribution from BoG members and faculty members considering the SWOT analysis, vision plan of each department and feedback from stakeholders.
- Powers are given to Class Coordinators to ensure decentralization of all processes, monitoring records of attendance, student leaves, forwarding various documents & applications of students and final forwarding of examination form.
- For each initiative taken by the IQAC separate coordinators are appointed at the department level to help in administration of the different activities such as, OBE coordinator for monitoring activities related to attainment of learning levels, coordinator for remedial/bridge classes, web coordinator for departmental webpage management, Coordinator for departmental e-Newsletter, alumni coordinator for enhancing and managing alumni interaction and plagiarism administrator have clearly defined responsibilities.
- Due to the constant efforts of MOODLE coordinators, use of MOODLE for teaching-learning-evaluation has been institutionalized now.

Other Committees

- Internal Quality Assurance Committee
- Academic Council
- Development Cells
    - Academic Development Cell
    - Student Development Cell
- Board of Studies
- Research Committee
- Proctorial Board
- Internal Audit Committee

- Industry-Institute-Interaction Cell
- Library Advisory Committee
- Women Guidance, Grievances and Redressal Committee
- Girls Counselling Cell
- Students Grievances Cell
- Discipline Committee
- Central Purchase Committee
- Anti Ragging Committee as per guidelines of Honorable Supreme Court of India
- Internal Complaint Committee (ICC) for Women (Students & Staff) for Sexual Harassment at workplace
- Hostel Admission Committee

Internal Quality Assurance Cell:

To monitor standards of the higher educational institutions the University Grants Commission (UGC) has established the National Assessment and Accreditation Council (NAAC) as an autonomous body, under section 12(ccc) of its Act in September 1994. According to the 12th Plan guidelines of the UGC for Establishment the Internal Quality Assurance Cell (IQAC), is being constituted in the institute for building a mechanism to ensure a quality culture at the institutional level to develop proper structure and processes to meet the diverse needs of the stakeholders, for continuous improvement.

Academic Council:

Academic Council of the Institute is constituted according the UGC Guidelines January, 2018 consisting of following members:

1. The Principal (Chairman)
2. All the Heads of Department in the College.
3. Four teacher of the college representing different categories of teaching staff by rotation on the basis of seniority of service in the college.
4. Not less than four experts/academicians from outside the college representing such areas as Industry, commerce, Law, Education, Medicine, Engineering, Science etc, to be nominated by the Governing Body.
5. Three nominees of the university not less than Professors.
6. A faculty member nominated by the principal (Member Secretary)

The meeting of Academic Council of the Institute is conducted at least twice in a year.

Development Cells:

Following Development cells are taking efforts for the development of various Academic & Administrative activities of the Institute though continuous meetings &

efforts as per development plan of the Institute for ensuring Quality Enhancement, compliance of existing practices and developing new strategies:

- Academic Development Cell
- Student Development Cell

Decentralization in working and grievance redressal mechanism

- Dean (Academics)
- Dean (Students Welfare)
- Proctor
- Registrar
- Deputy Registrar
- Controller (Examination)
- Dy. Controller (Examination)
- Assistant Controller (Examination)
- Head of the Department
- Class Coordinator
- Mentor
- Chief Warden
- Sr. Wardens
- Wardens
- Section In-charge
- Chairperson Central Purchase Committee
- Finance Officer
- Other Coordinators/In-charges

Fifteen Years Governance & Administration Plan

The Governance & Administration Plan for the next fifteen years is prepared for quality assurance and efficient management to ensure the objectives of proposed deemed to be university for following categories:

(a) Governance & Quality Assurance
(b) Technical & Internal Support System
(c) Students Support & Progression
(d) Engagement with Alumni, Industry & Society
(e) **Internationalization**

(a) Governance & Quality Assurance

Years	2023-2028	2028-2033	2033-2038	Status	Interventions
1.	Conducting regular Governing Body Meetings			04 Meetings/ Year	To be continued
2.	Organizing regular meetings of **Finance Committee**			04 Meetings/ Year	To be continued
3.	Organizing regular meetings of **Academic Council & Board of Studies**			04 Meetings/ Year/ Committee	To be continued
4.	Assurance for Vision and Mission of the Institute			Review & Assurance	To be continued
5.	Effective Implementation and Monitoring of the Institutional Perspective & Development Plan			Six Monthly Review	To be continued
6.	Decentralization and participative management in working and grievance redressal mechanism			Decentralized management	Increase in IT support Mechanism
7.	Effective Management Information System			IT based Management Information System for selected modules	IT based Management Information System for all required modules
8.	Providing Administrative & Financial Support for Quality Improvement strategies for: ❑ Curriculum Development ❑ Teaching & learning ❑ Examination & Evaluation ❑ Research & Development ❑ Library, ICT and physical Infrastructure/Instrumentation ❑ Human Resource Management ❑ Industry Collaboration/Interaction ❑ Admission of students			Providing as per proposal submitted by various departments & sections after evaluation of availability of funds	100% support

9.	Providing Administrative & Financial Support for Implementation of e-governance in areas of following operations: ❑ Planning & Development ❑ Administration ❑ Finance & Accounts ❑ Students admissions and support ❑ Examination	Partial support	100% support
10.	Providing Financial support for the participation of faculty, staff in Conference/workshop & membership of professional bodies	Providing for participation In conference/ workshop	Provision for membership of professional bodies
11.	Providing Administrative & Financial Support for Conduction of professional development/Administrative training programmes for teaching & non-teaching staff	Providing for state level training programmes	Provision for national level programmes
12.	Providing Financial support for Participation of faculty in professional development programmes, orientation programme, refresher course, short term course, FDP	Providing for participation in India	Provision for International participation
13.	Faculty & Staff recruitment and hiring of various services required in administrative system	Inadequate	100% Adequacy to be achieved
14.	Implementing Welfare scheme for faculty, teaching & non-teaching staff, and students	Partial support	100%
15.	Use of Internal & External Financial audit	100%	100%
16.	Review & publication of service rules, policies and procedures, functions of various bodies, recruitment and promotional policies.	Regularly	Regularly
17.	Delegation of powers to Administrative Committees and Administrative Heads for taking administrative decisions	100%	100%

18.	Delegation of Financial powers to the Heads of Departments and relevant in-charges	Partial	Up to Rs. 50,000/-
19.	Show Transparency and availability of correct/unambiguous information in public domain	100%	To be Continued with online portal mechanism
20.	Dissemination of the information about student, faculty and staff	100%	To be continued
21.	Effective Budget Allocation, Utilization, and Public Accounting at Institute level	100%	To be continued
22.	Availability of effective Security mechanism	Upto the appropriate level	IT based surveillance system
23.	Initiatives for Environment control and sustainability	Upto the appropriate level	100% Implementation
24.	Development of "Urban Green Zone" at institute of 30% land area	22% Available	Increase up to 30%
25.	Conducting meetings of IQAC (Internal Quality Assurance Cell) in every quarter of Academic Year	01/Quarter (04 / Year)	To be continued
26.	Conducting regular meetings of Development cells of the Institute: ❑ Academic Development Cell ❑ Students Development Cell	02/Quarter (08 Meetings /year)	02/Quarter (08 Meetings /year)
27.	Administrative Audit in every Academic Year	01/Year	02/Year
28.	Academic Audit every Academic Year	01/ Year	02/ Year
29.	IT Audit	00/Year	01/Year
30.	Environment Audit	01/Year	02/Year
31.	Laboratory Audit	01/Year	02/Year
32.	Infrastructure Audit	As per requirement	01/Year

33.	Overall development of Institute through 360 degree feedback system-Structured feedback system to collect and Analyse feedback collected from:- ❑ Students ❑ Faculty ❑ Employers ❑ Alumni ❑ Parents	Feedback from: Students- 02/Sem. Faculty- 01/Sem. Employers- 01/Year Alumni- 01/Year Parents- 01/Year	Feedback from: Students- 02/Sem. Faculty- 01/Sem. Employers- 01/Year Alumni- 01/Year Parents- 01/Year
34.	NBA Accreditation of UG & PG Courses	ME-ISD is Accredited and EE Accreditation expired in Sep, 2018. *All the UG courses accredited twice in past	NBA Accreditation of all offered eligible Courses will be
35.	ISO Certification of Administrative Offices	NA	Every Year
36.	Participation in NIRF	applied	Every Year
37.	Participation in AISHE	Every Year	To be continued
38.	Participation in Swachh Campus Ranking	Every Year	To be continued
39.	Participation in Atal Ranking of Institutions on Innovation Achievements Framework (ARIIA)	Not applied	Every Year
40.	Participation in CII Survey	Every Year	To be continued

41.	NAAC Accreditation	Accredited with B++ Grade in Cycle-1	Cycle-2: NAAC Accreditation [Target A+]
42.	Submission of AQAR to NAAC	Every Year	To be continued

(b) Technical & Internal Support System

Year	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Implementing Simplify systems and processes with the use of digitization & IMS system.			Up to 80%	100% implementation
2	Implementing Use of IT support for purchase, maintenance and administration.			Partial	Complete Support
3	Implement new recruitment/engagement rules to attract qualified staff at various levels.			As per Govt. Norms	In Addition R&D Support for deserving
4	Conducting annual satisfaction survey for services improvement.			Implemented	Increase in Parameters & Effectiveness
5	Organizing Orientation and training for Faculty, Technical & Administrative staff			Organising	Frequency will be increased
6	Development of online complaint systems.			Implemented	Fully Online
7	Organizing Orientation and mentorship programme for new faculty members.			Partially Implemented	Effective Conduction
8	Reducing in average processing times for various administrative issues/services.			Up to the level of 80%	100% Satisfaction
9	Development of online Tracking system for complaint redressal.			Partial	100%
10	Appointment of Technical manpower for program-specific curriculum			Implemented	Numbers will be increased
11	Maintenance and overall ambience in			National	International

	Laboratories.	Level	Level
12	Safety measures in laboratories	80%	100% as per standards

(c) Students Support & Progression

Year	2023-2028	2028-2033	2033-2038	Status	Interventions
1	Providing scholarship and financial support from institute and other sources.			Limited	Numbers will be increased
2	Conducting Capability enhancement & Development scheme-Soft skill development, remedial coaching, language lab, bridge courses, yoga, Meditation, personal counselling and mentoring			100% implemented	100% Effectiveness
3	Guidance for competitive exams			Full Support	Increase in Participations
4	Organizing Induction & Orientation programs for all UG & PG students.			In-Place	Continued
5	Students grievances redressal system			In-Place	Minimum Grievances
6	Prevention of sexual harassment and ragging			Measures are in-place	Reducing complaints to Zero
7	Support for Career Counselling, Placement, Students progression for higher education & entrepreneurship			Up to 80%	100%
8	Increase in Students qualifying in state/national /international level examination (GATE/CAT/ GRE/TOFEL/Civil Services/State Govt. Services.			30% Approx.	60%
9	Organizing Sports and cultural activities/competitions			Yes	Increase in numbers
10	Enhancing Participation of students in cultural activities/competitions at national & international level			Adequate	Increase in Numbers

11	Involvement of Students representations in academic & administrative bodies/committees of the Institute	IQAC, T&P Cell, OBE, Anti-Ragging & Grievances Redressal committee, Woman Grievances, SWAYAM etc.	Participation will be increased
12	Providing support and counselling through Professional counsellor and medical practitioner	Full Support	100% Effective
13	Conducting annual student satisfaction survey	Adequate	Increased Parameters & Effectiveness
14	Providing Adequate facilities for PhD students & Special training for PhD students for Teaching and Entrepreneurship	Adequate	Industry connect
15	Promotion and support for learning by doing	At initial stage	100% Effective
16	Supervised internships for students in industry for longer duration	Implemented	More Industry will be connected
17	Providing Self – Learning facilities, materials for learning beyond syllabus, Webinars, Podcast, MOOCs etc.	Adequate	Increase Effectiveness via Self Developed e-learning materials
18	Conduction of Co-curricular and Extracurricular Activities through sports and cultural facilities, NCC, NSS and other clubs, Annual students activities	Adequate	National & International Level
19	Opening Professional societies / chapters and organizing engineering events	12	22

(d)Engagement with Alumni, Industry & Society

Year	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Establishment of an "Alumni Development Cell" at the Institute to support alumni visits, activities and engagement.			Adequate	Effective Development
2	Development of alumni support system for continued learning and career improvement.			Partial	Full Development
3	Development of "Online Learning Modules" for Alumni for Lifelong learning.			Under Process	Full Development
4	Alumni interaction through: ❑ Interaction between alumni and students, ❑ Involvement of alumni for students mentoring, ❑ Interaction between alumni and faculty, ❑ Alumni members in Departmental BOS for curriculum development, ❑ Alumni linkage for student placements and internships, ❑ Alumni representation in IIIC, IQAC and BOG of the Institute. ❑ Enhancing the innovation ecosystem ❑ Enhance alumni interaction during technical, cultural and sports activities organised by Institute.			Partial	Effective Interaction
5	Engagement of alumni as adjunct faculty/visiting faculty.			Limited	Increase in Number
6	Conduction of courses/workshops/networking events for alumni.			Limited	Increase in Frequency
7	Development of online portal on Institute website to promote engagement between alumni, students and faculty members.			Portal Developed	Engagement through portal will be increased
8	Meetings/activities organized by Alumni Association			Adequate	Increase in Frequency

9	Development of “Extension & Outreach Cell” to explore the support and services towards community.	Through Different Committees	Effective Development
10	Effective use of “Business Development Centre” for Industry Linkage, start-up and incubation strengthening.	Established	Increase in Effectiveness
11	Motivating Joint Intellectual Property (IP) commercialisation with industries.	Partial	Full Support
12	Effective use of entrepreneurship development cell in the institute.	Adequate	Increase in Activities
13	Development of dedicated cell for research on societal problems.	Under Process	Development of Research Group
14	Enhancing interaction with industries, educational and research organizations in the region for versatile exposure to students and faculty.	Implemented	To be continued
15	Conduction of joint workshops/activities with govt. & NGO for students and local community.	Limited	Increase in Number
16	Conduction of joint research, workshop & Training programs with industries.	Limited	Increase in Number
17	Organising Public lectures/colloquia/competitions on global issues.	Limited	Increase in Number
18	Enhancing faculty engagement with industries.	Limited	Enhance through research & Development Activities
19	Conduction of training programs for Govt. staff/industry personals and other organizations.	Adequate	Increase in Activities
20	Conduction of students Competitions on city and state problems	Conducting through clubs & societies	Level & Quality Enhancement
21	Joint conduction of sport and cultural activities	Adequate	Increase in

	with other institutions and organizations.		Activities
22	Establishment of MITS foundation to contribute to technical education and to address various social issues including development of financial resources	Under Progress	Effective Development

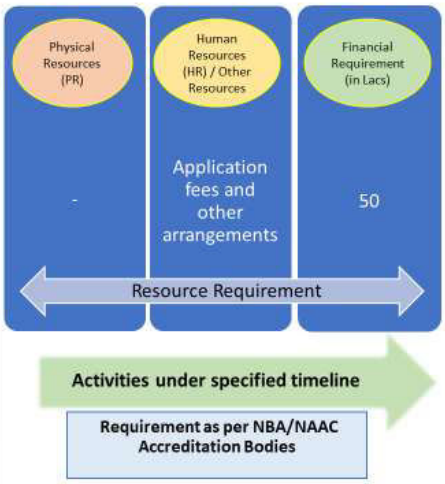
(e) Internationalization

Years	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Increase in the activities of International affairs cell to attract international students for admissions			Initiative Taken	Enhancement in Effectiveness
2	Enhance Institute information availability and publicity in target countries to attract students			Limited	Fully Developed System
3	Development of linkage with international universities			At Initial Stage	Adequate
4	Facilitate student exchange and joint-PhD programmes			--	Implementation of Student Exchange Program
5	Attract international faculty and students on short term engagement in conferences, GIAN courses & Conferences			Partial	Increase in Frequency
6	Attract international faculty on long term engagement in research and development activities			Limited	Effective Engagement
7	Increase percentage of International students (exchange students and regular students)			--	1%
8	Increase in admissions of International Students			--	25/per year
9	MOU with International University/Organization			Limited	Effective Collaboration for Micro level Activities

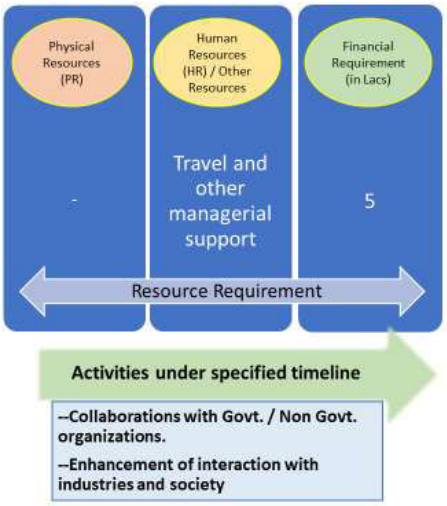
Five Years Governance & Administration Plan					
Parameters	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**
NIRF Ranking	Under 200	Under 100	Under 100	Under 100	Under 100
NAAC Accreditation	A+	A+	A+	A+	A+
NBA Accreditation	06 Programmes	08 Programmes	10 Programmes	12 Programmes	14 Programmes
Total MoU/Collaboration with National Institute	25	30	35	35	40
Total MoU/Collaboration with International University	04	06	08	10	10
MoU/Collaboration with Industries	25	30	35	35	40
Conversion of Institute in to Degree Granting Institute/Deemed to be university	Acquired	Maintained	Maintained	Maintained	Maintained
Number of International Students (Off-campus)	10	20	25	30	35
Institutional visibility and peer perception	70%	70%	75%	85%	90%

Quality Assurance	• NBA/NAAC Accreditation • NIRF Ranking

Quality Assurance: Accreditation

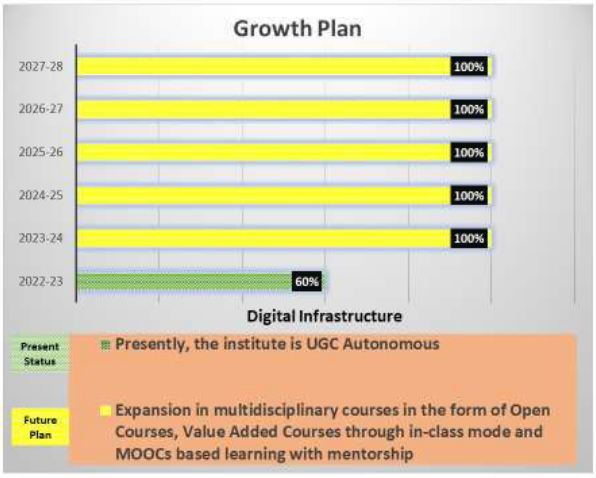


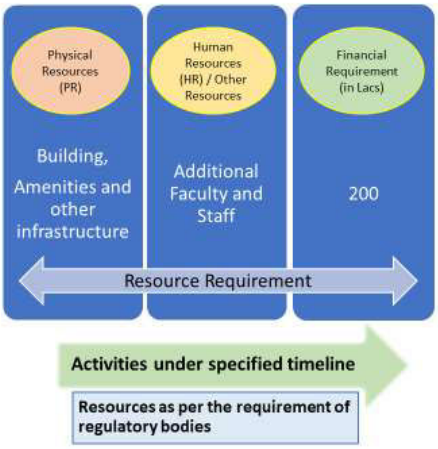
Institute Recognition: Ranking



To attain the status of "Teaching Intensive University" or "Research Intensive University" or "Autonomous Degree Granting College (AC)"	• **Expansion in multidisciplinary education and research activities** • **Arrangement of resources as per the requirement of regulatory bodies** • **Arrangement of Building, Amenities and other infrastructure [as needed for attaining the status of Teaching Intensive University or Autonomous Degree Granting College (AC)]** • **Arrangement of faculty and staff as per norms**

Teaching Intensive University or Deemed to be University Status:
Towards More Flexibility and Academic Autonomy





Faculty Recruitment & Human Resources Empowerment Plan

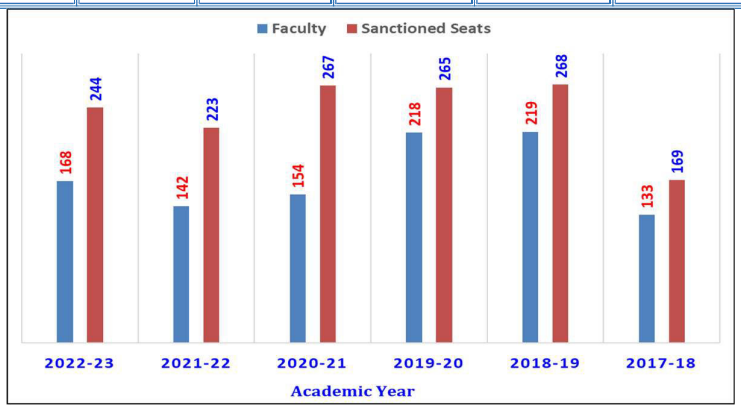
Teaching & Non-Teaching Staff

- Selection and or Promotion of faculty (Teaching posts): as per the MHRD/AICTE/CoA & MP Government rules and regulation (whichever applicable).
- Regular Staff: As per state government norms through Staff Selection Committee of the Institute constituted by Board of Governors from time to time.
- Non-Teaching posts will be as per the decision of Board of Governors from time to time and in force at the time of advertisement/recruitment. Minimum/ maximum age and educational qualifications: as per MHRD/AICTE/CoA/UGC & MP Government norms as applicable in force from time to time.
- Selection and or Promotion of faculty (Teaching posts): as per the MHRD/AICTE/CoA & MP Government rules and regulation.

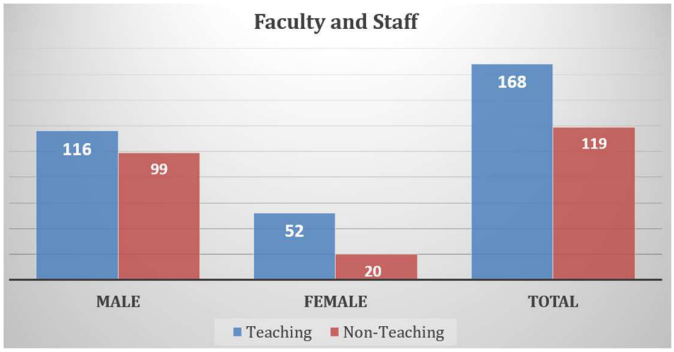
- Promotion of class II, III & IV: as per M.P. Government rules adopted and approved by BoG.
- The General Service Rules/Conditions, code of conducts exists in the institute for the employees who are in service or will join the Institute in future.

The total number of faculty against the sanctioned positions for the last six years are as follows:

Academic Year	2022-23	2021-22	2020-21	2019-20	2018-19	2017-18
Number of Faculty	168	142	154	218	219	133
Sanctioned Seats	244	223	267	265	268	169



Faculty & Staff	Male	Female	Total
Teaching	116	52	168
Non-Teaching	99	20	119



Fifteen Years Faculty Recruitment & Human Resources Empowerment Plan

Recruitment of Faculty will be done as per AICTE/COA/PCI requirement of cadre and faculty students ratio and to maintain the FSR as per Quality Assurance agencies like NBA/NAAC. The Effort will be made to appoint faculty in the field of specialization not available in the Institute/department. Overall target is to achieve Faculty Students Ratio below 1:20.

Year	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Appointment of full time Quality teachers			FSR=1:25	FSR=1:20
2	Provision of Visiting /Adjunct/Emeritus faculty etc.			Implemented	To be continued
3	Off campus Faculty from Industry and academia			Implemented	To be continued
4	Recognition and appreciation for the faculty on receiving of fellowships, awards, recognition from Govt or recognized bodies at state/national/International level			Implemented	To be continued
5	Implementing Faculty Performance Appraisal and Development System			Implemented	To be continued
6	Providing API based promotion and rewards.			Implemented	Frequency Enhancement
7	Rewarding high-achieving faculty members once every year.			Implemented	To be continued
8	Promoting Faculty participation in Faculty development /training activities /STTPs			100% Support	To be continued
9	Providing Support to faculty members to obtain higher qualification			Implemented	To be continued
10	Recognition and support to faculty for participation in following activities: Sponsored Research/Product Development/Research laboratories/Instructional materials/Working models/charts/monograms etc./Consultancy (From Industry).			Implemented	To be continued
11	Providing Training support to technical & administrative staff for participation in staff development activities.			100%	100%
12	Motivation & support to achieve higher qualification during service.			Adequate	Increase in Numbers

Five Years Faculty Recruitment Plan

The following proposed number of high quality faculty members will be recruited in next five years through a transparent open selection process:

(a) Existing Programmes:

Faculty/Resource Person	2023-24	2024-25	2025-26	2026-27	2027-28
Total [Target FSR1:20]	253	253	253	253	253
Appointment of Faculty Members (Regular)					
(i) Professor	3	2	1	1	-
(ii) Associate Professor	7	5	2	2	
(iii) Assistant Professor	20	13	7	7	
Appointment of Faculty Members (Full-time 03 year contract)	40	20	10	5	5
Appointment of Adjunct Faculty, visiting Faculty and resource persons from Industry					
(i) Adjunct Faculty from Industry	3	3	3	1	1
(ii) Resource Persons from Academia	3	3	3	1	1
(iii) Off campus Faculty from Industry and academia	7	7	7	6	6

(b) Proposed Programmes

Faculty/Resource Person	2023-24	2024-25	2025-26	2026-27	2027-28
Total [Target FSR1:20]	-	18	51	88	117
Appointment of Faculty Members (Regular)					
(i) Professor	-	02	04	07	09
(ii) Associate Professor	-	03	08	14	19
(iii) Assistant Professor	-	09	25	42	57
Appointment of Faculty Members (Full-time 03 year contract)	-	02	04	07	09
Appointment of Adjunct Faculty, visiting Faculty and resource persons from Industry					
(i) Adjunct Faculty from Industry	-	01	02	04	04
(ii) Resource Persons from Academia	-	01	02	04	04
(iii) Off campus Faculty from Industry and academia	-	02	06	10	15

Students Admission Plan

Intake & Reservation policy: The seats allocated for admission in UG and PG program are as per the sanctioned intake approved by AICTE and guidelines issued by AICTE & Directorate of Technical Education, Madhya Pradesh:

- The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 without affecting the reservation percentages of SC/ ST/ OBC/ General.
- Tuition Fee Waiver (TFW) Scheme
  d) Admission Procedure • Under this Scheme, up to a maximum of 5% of "Approved Intake" per Course shall be available for this admission.
- Supernumerary seats for the Union Territories J&K and Ladakh under Prime Minister's Special Scholarship Scheme (PMSSS)
  b) 2 seats per Course shall be available for these admission with the maximum of 10 seats per Institution. These seats shall be supernumerary in nature and shall be available to such Course(s) in an Institution.
- CSAB-NEUT: CSAB North Eastern States and Some of Union Territories (NEUT)

Total Sanctioned Seats are as follows: Sanctioned Seats as per AICTE Approval letter+ EWS Seats +TFW Seats +PMSSS/ CSAB-*NEUT* Seats

As per the guidelines issued by Directorate of Technical Education, Madhya Pradesh for admission in UG and PG program in Autonomous and Govt. Aided institutes, 16%, 20% and 14% of the MP domicile candidates (90% of total seats) are reserved for candidates belonging to Scheduled Caste (SC), Scheduled Tribe (ST) and Other Backward Classes (excluding Creamy Layer) OBC categories respectively.

In addition to above, 3% seats in each category viz - UR, SC, ST and OBC shall be reserved for Physically handicapped candidates (with disability percentage of 40 or above and satisfying MP domicile requirements). This reservation is compartmentalized horizontal reservation and vacant seats in this category is filled by converting such seats into Open Seats of the NIL (X) category.

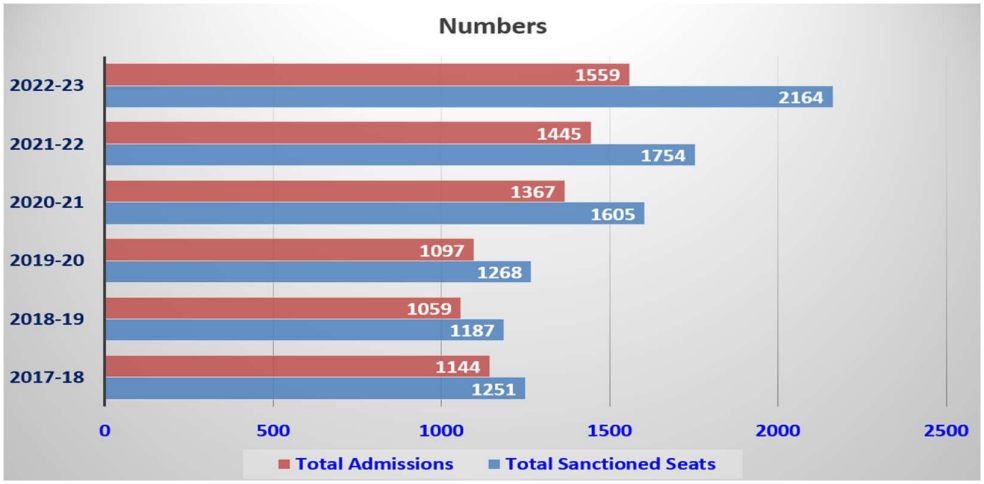
Availability of Seats: 90% Seats for MP domicile candidates 5% All India Seats 5% NRI Seats (All India Seats & NRI seats if not filled then converted into Seats for MP domicile candidates)

Admissions:

- As per Directorate of Technical Education, Madhya Pradesh/State Government norms, through Joint Entrance Exam (JEE)-Mains-I II for B.Tech./B.Arch. NATA for B.Arch.
- As per intake approved by AICTE, the admission for UG/PG students is online through state level counselling managed by the Directorate of Technical Education (DTE) of the state.
- Students of other states are admitted through Central Seat Allocation Board (CSAB) of Government of India.
- Foreign students are admitted through Ministry of External Affairs (GOI) Quota.

The total admissions against the sanctioned seats/intake for the last six years is as follows:

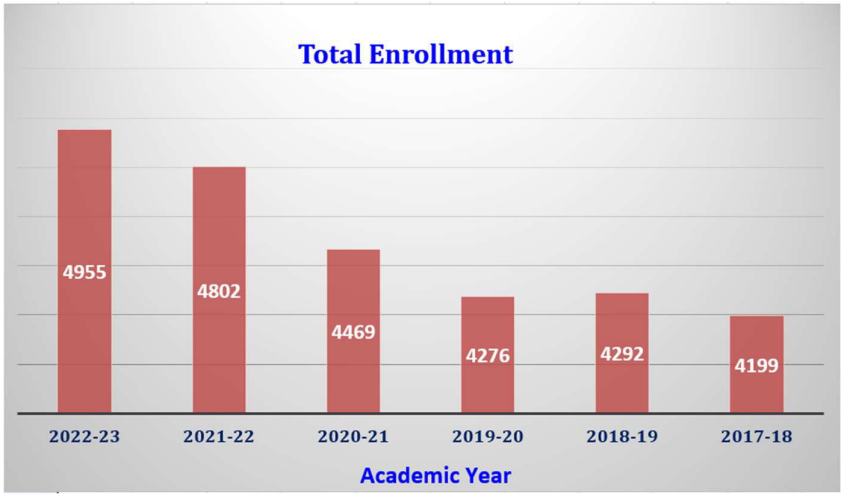
Academic Year	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Total Sanctioned Seats/Intake	1251	1187	1268	1605	1754	2164
Total Admissions	1144	1059	1097	1367	1445	1559



Students

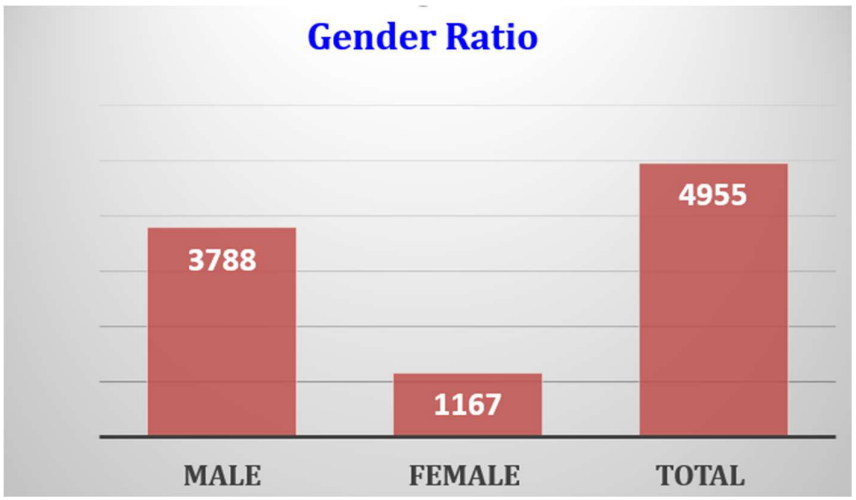
The total number of students enrolled during last six years are as follows:

2022-23	2021-22	2020-21	2019-20	2018-19	2017-18
4955	4802	4469	4276	4292	4199



Number of Students on roll by gender

- **Male 3788**
- **Female 1167**
- **Transgender 0**
- **Total 4955**



The admissions for Certificate, Diploma, Degree (UG & PG) and Ph.D. programmes for national and foreign students will be made purely on merit basis. The merit position of the candidate for admission will be based on the norms prescribed by the academic council of Institute. However, their eligibility for admission will be as per requirement of AICTE/UGC/other regulatory agency.

The Institute will offer Certificate, Diploma, Degree (UG & PG) and Ph.D. programmes as per NEP guidelines of off-campus & online education.

Academic Bank of Credits will be utilized to enable multiple entry-multiple exit for students to complete their degrees as per their time preferences, providing mobility across various disciplines and HEIs for Degree/ Diploma /Certificate programs programme. ABC will ensure the opening, closure, and validation of Academic Bank of Accounts, verification, accumulation, and transfer or redemption for students. ABC facilitate students to choose their own learning path to attain a degree /Diploma /Certificates, working on the principle of multiple entry-multiple exit as well as anytime, any-where, and any-level learning.

Degree with Research at UG Level: Provision will be available to undertake Analytical/Research/Knowledge based major project in the last semester of study to promote research in the degree level Institutions.

The proposed admissions in various Certificate, Diploma, Degree (UG & PG) and Ph.D. programmes is shown below:

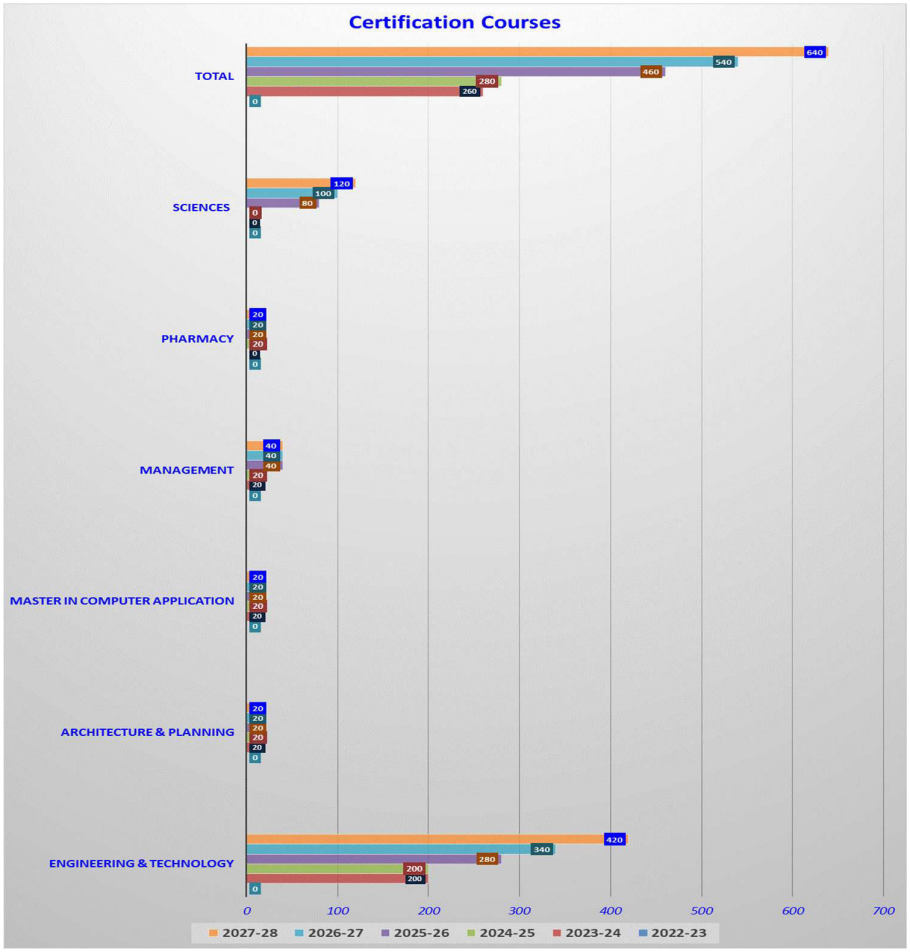
Programmes	Certificate						Diploma					
	B.L.	I	II	III	IV	V	B.L.	I	II	III	IV	
Engineering & Technology	0	200	200	280	340	420	0	-	60	60	120	120
Architecture & Planning	0	20	20	20	20	20	0	-	-	-	-	-
Master in Computer Application (MCA)	0	20	20	20	20	20	0	-	-	-	-	-
Management	0	20	20	40	40	40	0	-	-	-	-	-
Pharmacy	0	-	20	20	20	20	0	-	30	30	30	30
Sciences	0	-	-	80	100	120	0	-	-	-	-	-
Total	**0**	**260**	**280**	**460**	**540**	**640**	**0**	**0**	**90**	**120**	**150**	**150**

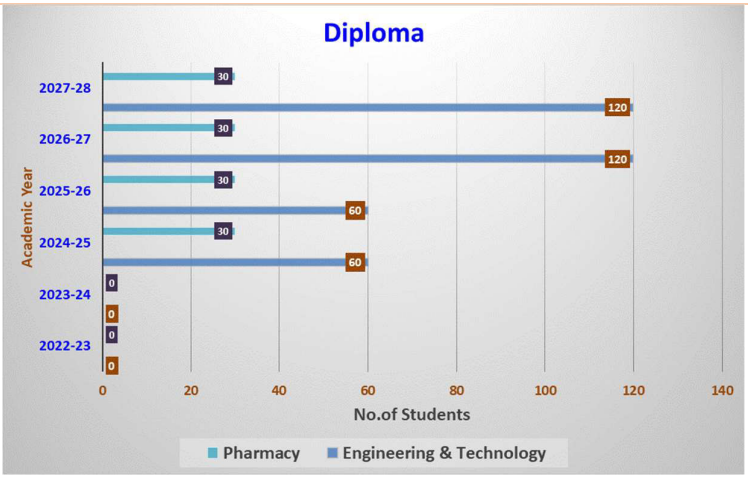
Programmes	UG						PG					
	B.L.#	I	II	III	IV	V	B.L.	I	II	III	IV	V
Engineering & Technology	1397	1683	1761	1839	1917	1995	9	60	90	100	181	181
Architecture & Planning	22	40	40	40	60	60	8	18	18	18	18	18
Master in Computer Application (MCA)	-	-	-	-	-	-	78	78	78	78	78	78
Management	-	-	-	-	-	-	45	60	120	120	120	120
Pharmacy	0	-	60	60	60	60	0	-	60	60	60	60
Sciences	0	-	60	120	150	150	0	-	60	120	150	150
Total	**1419**	**1723**	**1921**	**2059**	**2187**	**2265**	**140**	**216**	**426**	**496**	**607**	**607**

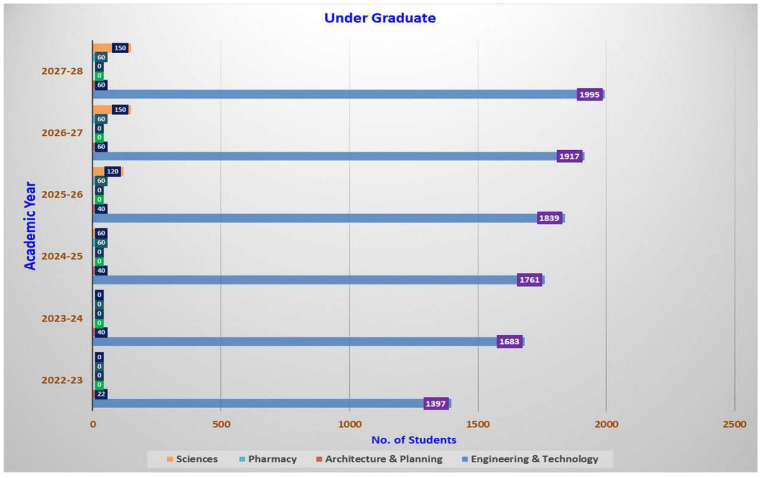
Programmes	Ph.D					
	B.L.	I	II	III	IV	V
Engineering & Technology	6	10	20	30	30	30
Architecture & Planning	2	2	2	2	2	2
Master in Computer Application (MCA)	-	2	2	2	2	2
Management	-	2	2	2	2	2
Pharmacy	-	-	1	2	2	2
Sciences	-	-	2	5	10	10
Total	**8**	**16**	**29**	**43**	**48**	**48**

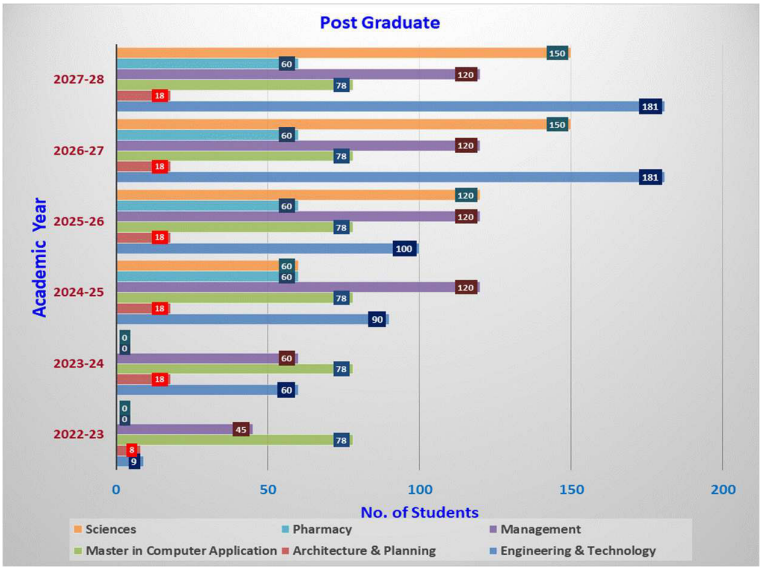
B.L. : Baseline: 2022-23	I: 2023-24	II: 2024-25	III: 2025-26	IV: 2026-27	V: 2027-28

Programmes	Total Admissions		
	2023-28	2028-33	2033-38
Certificate	1030	1200	1500
Diploma	510	700	1000
UG	11574	12000	15000
PG	2490	2700	3000
PH.D.	192	250	300




Diploma
2027-28
2026-27
2025-26
2024-25
2023-24
2022-23
Academic Year
30
120
30
120
30
60
30
60
0
0
0
0
0
20
40
60
80
100
120
140
No.of Students
Pharmacy
Engineering & Technology


Under Graduate
2027-28
2026-27
2025-26
2024-25
2023-24
2022-23
Academic Year
150
60
0
0
60
1995
150
60
0
0
60
1917
120
60
0
0
40
1839
60
60
0
0
40
1761
0
0
0
0
0
40
1683
0
0
0
0
0
22
1397
0
500
1000
1500
2000
2500
No. of Students
Sciences
Pharmacy
Architecture & Planning
Engineering & Technology


Post Graduate
2027-28
2026-27
2025-26
2024-25
2023-24
2022-23
Academic Year
150
60
120
78
18
181
150
60
120
78
18
181
120
60
120
78
18
100
60
60
120
78
18
90
0
0
60
78
18
60
0
0
45
78
8
9
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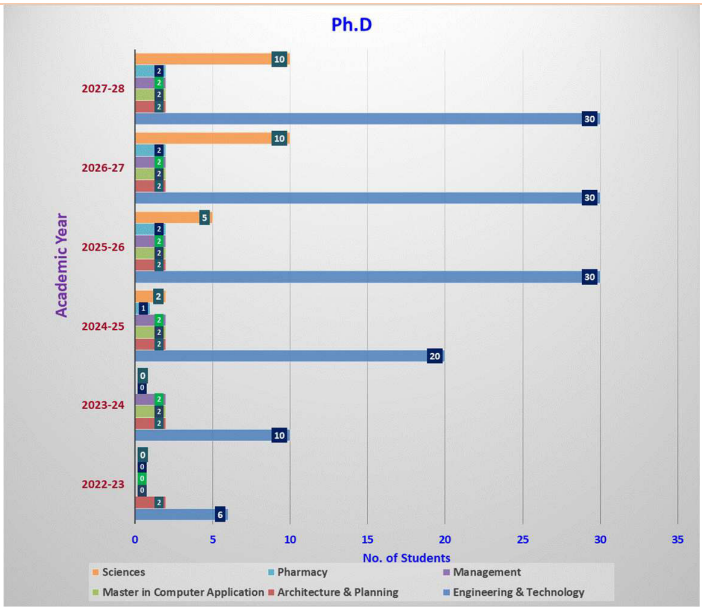
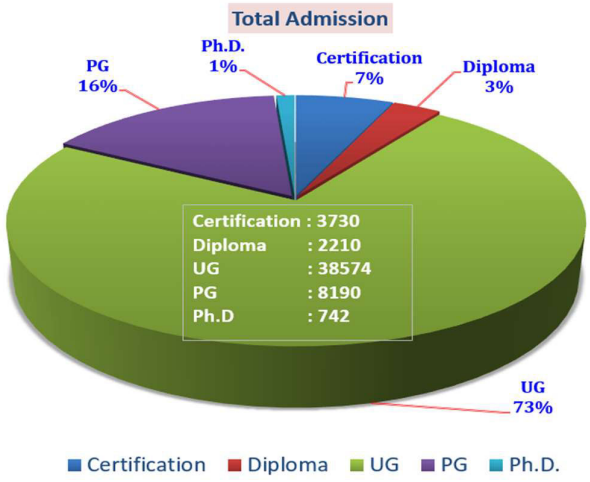
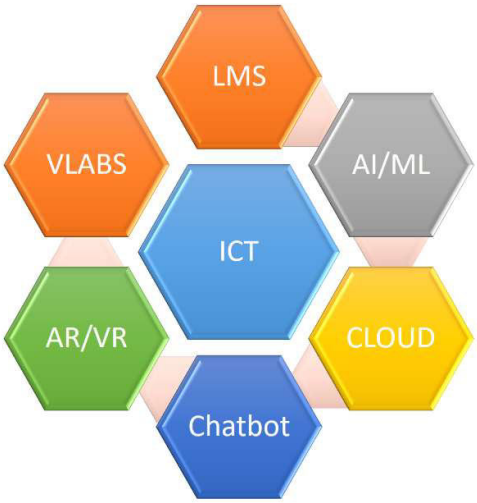
50
100
150
200
No. of Students
Sciences
Pharmacy
Management
Master in Computer Application
Architecture & Planning
Engineering & Technology


Ph.D
2027-28
2026-27
2025-26
2024-25
2023-24
2022-23
Academic Year
10
30
5
20
6
0
1
2
0
5
10
15
20
25
30
35
No. of Students
Sciences
Pharmacy
Management
Master in Computer Application
Architecture & Planning
Engineering & Technology


Total Admission
PG 16%
Ph.D. 1%
Certification 7%
Diploma 3%
UG 73%
Certification : 3730
Diploma : 2210
UG : 38574
PG : 8190
Ph.D : 742
Certification
Diploma
UG
PG
Ph.D.

Campus Information & Communication Technology Plan

In today's digital age, Information and Communication Technology (ICT) has become a necessity for higher education institutions to effectively prepare students for the rapidly changing world. ICT enables institutes to offer a more modern and engaging learning experience, facilitate collaboration and communication among students and faculty, streamline administrative processes, and provide students with the technical skills required for success in their future careers. The increasing demand for ICT skills in the job market, coupled with the need for engineering colleges to keep pace with technological advancements, makes it imperative for institutions to incorporate ICT into their programs and operations. Without ICT, engineering colleges risk falling behind their peers and failing to adequately prepare their students for the challenges of the future.



Scope: There are some of the areas where ICT can be applied in the institute:

1. Learning Management Systems: to develop and manage learning management systems which can provide students with access to course materials, assignments, and assessments. These systems can also facilitate communication between students and faculty, allowing for more effective collaboration and feedback.

2. Virtual Labs and Simulations: the development of virtual labs and simulations that provide students with hands-on experience in a safe and controlled environment. This can be particularly useful in areas like engineering design and analysis, where physical prototypes can be expensive and time-consuming to create.

3. Computer-Aided Design and Manufacturing: to develop and use computer-aided design (CAD) software, which enables students to create, modify, and analyze 3D models of products and systems. Similarly, computer-aided manufacturing (CAM) can be used to control manufacturing processes, such as CNC machining and 3D printing.

4. Cyber security: As technology becomes increasingly integrated into every aspect of our lives, cyber security is becoming more critical. ICT can be used to develop and teach cyber security skills to students, enabling them to identify and mitigate security threats in systems and networks.

5. Data Analytics: The vast amounts of data generated in the engineering field can be challenging to manage and analyze. ICT can be used to develop and teach data analytics skills, enabling students to extract insights from large data sets and make data-driven decisions.

Five year Plan (2023-2028)

2023-2024

- In the first year, the focus will be on developing a strong foundation for the university's ICT infrastructure. This includes upgrading the network infrastructure, installing high-speed internet connectivity.

- Implement a comprehensive learning management system (LMS) that enables students to access course materials, assignments, assessments, and collaborative tools: To enable effective distance learning, a robust Learning Management System (LMS) will be implemented. This system will allow students to access course materials, assignments, assessments, and collaborative tools. Faculty members will be trained to effectively use the LMS and create engaging course materials.

- Develop and implement a program to train faculty and staff on the use of ICT tools and technologies: To ensure faculty and staff can use the new technologies and systems, a training program will be implemented. This program will include training on the use of the LMS, cloud-based computing, cybersecurity measures, and other technologies.

2024-2025

1. Implement a cloud-based infrastructure that supports greater scalability and flexibility: This involves adopting a cloud-based computing system, which allows the college to store, access, and manage its data and applications over the internet. The advantages of this approach include greater scalability, flexibility, and cost savings.

2. Develop an online assessment and grading system that provides students with real-time feedback and progress tracking: This involves creating an online platform for student assessment and grading, which would allow students to receive feedback and track their progress in real-time.

3. Implement digital signage and kiosks around campus that provide real-time information on events, schedules, and university news: This involves installing digital displays and kiosks throughout the campus to provide students, faculty, and staff with real-time information on events, schedules, and university news. These displays and kiosks can be interactive, allowing users to navigate and explore campus resources, and can also be used to provide emergency notifications and alerts.

2025-2026

1. Expand the use of virtual labs and simulations to provide students with hands-on experience in engineering and science courses: This involves incorporating more virtual labs and simulations into the curriculum to provide students with hands-on experience in engineering and science courses.

2. Develop and launch an online course catalog that enables students to browse and register for courses online: This involves creating an online platform that enables students to browse and register for courses online. The online course catalog would provide students with up-to-date information on course offerings, schedules, prerequisites, and other relevant information.

3. Develop a mobile application that enables students to access course materials, schedules, and other university resources from their mobile devices: This involves developing a mobile application that enables students to access course materials, schedules, and other university resources from their mobile devices.

2026-2027

1. Explore the use of artificial intelligence (AI) and machine learning (ML) to improve teaching and learning outcomes: This involves investigating the use of AI and ML technologies to improve teaching and learning outcomes in engineering and science courses.

2. Expand the use of augmented and virtual reality (AR/VR) technologies in engineering and science courses: This involves expanding the use of AR/VR technologies in engineering and science courses to provide students with immersive and interactive learning experiences.

3. Implement a data analytics program that enables faculty and students to extract insights from large data sets: This involves implementing a data analytics program that enables faculty and students to extract insights from large data sets generated by research projects, experiments, and other academic activities.

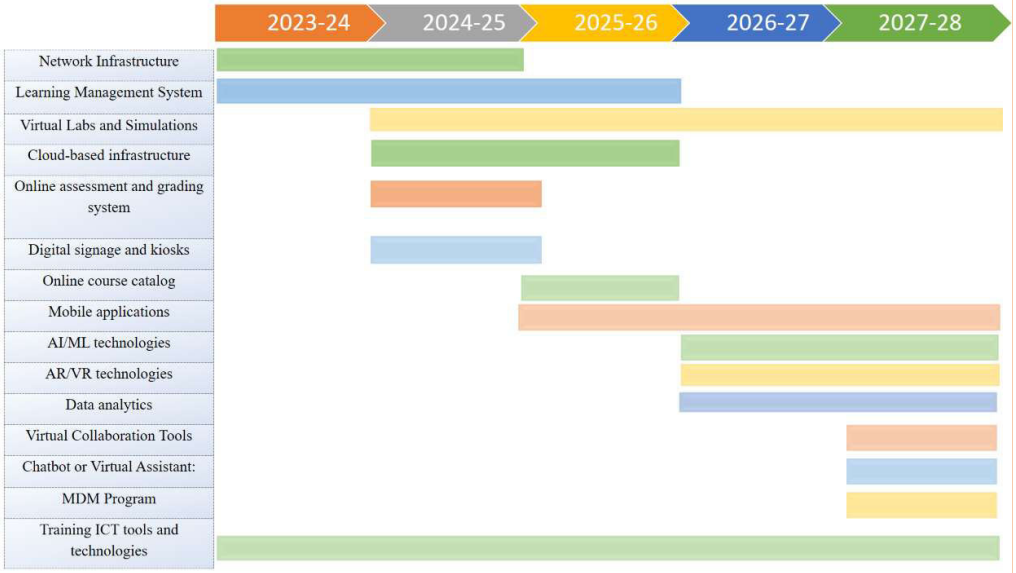
2027-2028

1. Mobile Device Management (MDM) Program: The first component of the plan is to develop an MDM program that enables the university to securely manage and distribute mobile devices to students and staff. With the increasing reliance on mobile devices for learning and work, it is important to have a program that can ensure the security and privacy of data on these devices. The MDM program will enable the institute to remotely manage and update mobile devices, enforce security policies, and track device usage.

2. Chatbot or Virtual Assistant: The second component of the plan is to implement a chatbot or virtual assistant that can answer student inquiries and provide assistance 24/7. With the increasing demand for online learning and support, a chatbot or virtual assistant can provide immediate assistance to students, without the need for human intervention. The chatbot or virtual assistant will be able to answer common questions, provide guidance on assignments and assessments, and direct students to appropriate resources.

3. Virtual Collaboration Tools: The third component of the plan is to expand the use of virtual collaboration tools, such as video conferencing and virtual whiteboards, to enable remote collaboration among students and faculty members across different locations and time zones. With the increasing popularity of remote learning and working, it is important to have tools that can facilitate collaboration and communication among team members.

ICT Plan 2023-2028



ICT Plan for 2028-2033

- Smart Campus Technology: Implement a smart campus technology system that will provide real-time data on energy consumption, occupancy rates, and other important information. This technology will enable the university to optimize its resources and improve sustainability.
- Cybersecurity Measures: Strengthen cyber security measures by implementing advanced security protocols and technologies to protect the university's sensitive data from cyber threats.
- Internet of Things (IoT) Integration: Integrate IoT devices into the university's infrastructure to enable real-time monitoring and control of campus facilities, such as lighting, temperature, and air quality.
- Blockchain Technology: Explore the use of blockchain technology to create a secure and decentralized system for managing student records and academic credentials.
- Data Analytics and Visualization: Implement a data analytics and visualization program to enable faculty and students to extract insights from large data sets and make data-driven decisions.

- Quantum Computing: Explore the potential of quantum computing in solving complex engineering problems and develop a plan for integrating this technology into the university's infrastructure.
- Social Media and Marketing: Develop a comprehensive social media and marketing strategy to promote the university's brand and attract top talent to its engineering programs.

ICT Plan for 2033-2038

- Quantum Computing: Fully integrate quantum computing into the university's infrastructure and curriculum, allowing students and faculty members to explore and solve complex engineering problems using this cutting-edge technology.
- Robotics and Automation: Expand the use of robotics and automation in engineering courses, providing students with hands-on experience in designing, building, and programming robots and automated systems.
- Immersive Learning Environments: Develop immersive learning environments using technologies such as virtual reality, augmented reality, and mixed reality to provide students with realistic and interactive simulations that enhance their learning experience.
- Smart City Integration: Collaborate with local municipalities to integrate the university's infrastructure with the smart city technologies, creating a more connected and sustainable community.
- Digital Twins: Develop a digital twin of the univesity's infrastructure, allowing for real-time monitoring and optimization of campus facilities, and providing students with a virtual model for experimentation and learning.
- Internet of Things (IoT) Security: Enhance IoT security protocols to ensure the safety and privacy of the university's data, devices, and infrastructure.
- Personalized Learning: Develop a personalized learning system that uses artificial intelligence and machine learning to tailor course content and assessments to individual students' learning needs and preferences

Finance Plan

The Finance plan is prepared for next fifteen year based on proposed academics & Administrative activities, further the income and expenditure plan for next five years is prepared:

Year	2023-2028	2028-2033	2033-2038	Status	Intervention
1	Increase internal revenue through masters & Ph.D. level courses, executive programmes and professional courses.			5%	10%
2	Increase research & Development grant from Central & State Government.			3.28%	7%
3	Increase research projects from industry			Limited	1 Per Program
4	Increase internal revenues via consultancy and industry R&D receipts			1%	5%
5	Cultivating Industry linkages to attract corporate social responsibility (CSR) funding.			Initiative Taken	Development of Effective System
6	Increase in financial support from alumni			Initiative taken	Development of Effective System
7	Developing approach to donations and for enhanced engagement with stake holders.			Initiative Taken	Development of Effective System

Five Year Finance Plan

(a) Fund Requirement

Expenditure Head		Fund Requirement in Financial Year					
		2023-24 (Lakhs)	2024-25 (Lakhs)	2025-26 (Lakhs)	2026-27 (Lakhs)	2027-28 (Lakhs)	Total
Infrastructure Development	New Academic Block	400	-	-	-	-	400
	Centre for Advanced Learning and Training	-	-	-	200	-	200
	Auditorium	415	1000	722	-	-	2137
	Business & Pharmacy School	-	200	500	300	200	1200
	Smart Class Rooms	60	60	80	80	90	370
	Laboratory & Central Facility, Digital Infrastructure Development	80	100	100	150	150	580
Refurbishment & Maintenance of existing Infrastructure		112	90	110	110	120	542
Up-gradation & Procurement of Learning Resources, Digitization and IT support facilities		50	50	50	50	50	250
Academic Activities (Faculty & Students)		50	50	50	50	50	250
Expenditure on Salary & Services		4510	4730	4970	5620	5900	25730
Other Expenditure		543	346	370	503	635	2397
Total		**6220**	**6626**	**6952**	**7063**	**7195**	**34056**

(b) Projection of Fund

Fund Sources	Projection of fund in Financial Year					
	2023-24 (Lakhs)	2024-25 (Lakhs)	2025-26 (Lakhs)	2026-27 (Lakhs)	2027-28 (Lakhs)	Total
State Govt.	626	626	626	626	626	3130
Central Agencies (MHRD/UGC/ AICTE/DST/CSIR/etc)	100	100	100	100	100	500
Tuition Fee	3658	3953	4158	4158	4158	20085
Other fee	1826	1927	2038	2149	2271	10211
IRG (Testing, Consultancy etc)	510	520	530	530	540	2630
Total	**6720**	**7126**	**7452**	**7563**	**7695**	**36556**
Corpus Fund	500	500	500	500	500	2500
Proposed Expenditure	6220	6626	6952	7063	7195	34056
Total	**6720**	**7126**	**7452**	**7563**	**7695**	**36556**

Conclusion

- The institute has a 65-year old legacy; its alumni have attained distinction all over the globe during the past 60 years. A steady growth has been maintained over the years. A commitment to quality has always been the defining principle at MITS. The administration is transparent and decentralized and the policies are well documented.
- During the last five years, a large number of quality initiatives have been taken by the IQAC in-line with the national policies, guidelines of regulatory bodies, UN's sustainable development goals, guidelines of the outcome based education (OBE), global market needs & trends resulting in the present Flexible Curriculum of the institute with integration of NEP-2020 provisions. The quality practices adopted by the institute are dynamic, are revised as per the changing needs and monitored continuously till these are institutionalized.
- The institute, in July 2020, prepared an exhaustive Action Plan for implementing NEP-2020. Out of the 22 targeted parameters for the year 2024-2025, twenty parameters have already been undertaken; either completed or are being manifested through various endeavors.
- MITS is at present the only institute in the state where examination reforms are effectively implemented and Multiple Mode Logical Pattern Examination (MMLPE) system is in place. The mode of examination is decided by the nature of the subject/course and the learning levels to be assessed.
- The existence of large number of student clubs & chapters, mandatory multidisciplinary electives, inhouse internship programmes, award of U.G. degree with Minor Specialization in other disciplines or Honors in parent discipline are some of the unique practices.
- Quality is a journey and the major milestones achieved by the institute during the last five years are development and effective implementation of Flexible Curriculum with integration of the key NEP-2020 parameters and provisions, creating a culture of self-learning through online courses/MOOCs, facilitating credit transfer through MOOCs and establishing a dynamic teachinglearning-evaluation environment through a highly effective & functional MITS-MOODLE. With these initiatives, MITS has emerged as a leader in the field of technical education in the state and region.

Thus, the institute has established a unique curricular and teaching-learning structure, making full use of the autonomy granted by the UGC and is now ready to take on the mantle of a 'Deemed to be University'. This status will immensely help in taking the quality initiatives to the next level and in fulfilling the government mandate of providing a holistic system of technical education that can prepare well rounded individuals for serving the future global needs and strengthen the nation in becoming the Vishwa Guru.

Annexure-1

Establishment of Business School:

As per the approval of Board of Governors in its meeting held on 06.12.2022, the collaboration with SYMBIOSIS University, Pune, Maharashtra will be establish in following phases:

Phase-I: Academic Collaboration for excellence in Management & Technology programmes

Phase-II: Faculty & Students Exchange, joint collaboration with Industries & International Institutes and support for incubation centre &business development

Phase-III: Joint Degree for Management, Integrated and research Programme

Phase-IV: Joint establishment of Management Institution at Gwalior

At initial stage under **Phase-I & Phase-II**, the Institute has signed a MoU with SYMBIOSIS INTERNATIONAL (Deemed University), Pune, Maharashtra for following areas of cooperation:

i. Faculty exchange, where selected faculty members can pick courses and teach at the identified programmes at the institutions, which can help both the institutions.
ii. Student immersion where students from MITS can take an immersion programme at identified institution of SIU.
iii. Knowledge transfer in the area of business management and Engineering & Technology.
iv. Exchange of Students for the completion of requirement of academic programme in the area of management/Engineering & Technology.
v. Joint research work by selected faculty members identified from both the institutions.
vi. Joint publication by selected faculty members identified from both the institutions in high quality (SCI, SCOPUS and Web Of Science) Journals.
vii. Presence of selected faculty members of MITS as member in academic bodies like Board of Studies, Academic Council, Senate etc of SIU and vice versa.
viii. Registration of Research Scholars of MITS at SIU for Ph.D. Programmes.

Concluding Remark:

Further, as per scope of cooperation under phase-IV, the Management Institute/Business School may be established in the year 2025 with the collaboration of SYMBIOSIS INTERNATIONAL (Deemed University), Pune, Maharashtra as separate Institute. Further avenues of Industrial Collaboration need to be explored.

However, it may be appropriate for the future to collaborate with International Business School so as to impart higher level of management studies with focus on futuristic global needs such as MSE, Entrepreneurship, Product Management, ebizz etc.

Annexure-2

Establishment of Pharmacy School:

The Board of Governors in its meeting held on 28th Sept. 2019 decided to start the Bachelors Program in Pharmacy with an intake of 60 from the Academic Session 2020-2021. However, due to moratorium by government to start New Pharmacy programme (only govt., institute of North East and states of union territories where less Institutes exists may apply), pharmacy programme was not started w.e.f. 2020-21.

Further, the Pharmacy School will be established in the academic year 2024-25 (intake-60) with the collaboration of renowned **Industry and Pharmacy Institute** to promote skill based Teaching-Learning and other associated activities. The other diploma, certificate and Ph.D. programmes along with under graduate degree programme will also be started as per guidelines of Pharmacy Council of India. The increase in intake in proposed programmes beyond 2024-25 will be introduced as per need.

Annexure-3

Development of Centre for Advanced Learning and Training:

The Multidiversity development centre for advanced learning and training may be developed in collaboration with industry, research organization or academic institutions within India or outside country.

The Centre for **Advanced Learning and Training** at Madhav Institute of Technology & Science, Gwalior can be developed to support and meet the vision, mission, and branding statement of the institute. Further, it aims to assist the academic community in designing and practicing the teaching learning process that would best facilitate students learning. Apart from the faculty development in the emerging areas, this Centre will contribute in a great way to upgrade the skills of practicing engineers, professionals and technical staff members through various skill development programs, workshops, and short-term courses. Moreover, this will also facilitate and extend the module based training and short-term certification programs to the industry persons in the market driven technology areas.

Industry/ Research/Academic collaboration key Objectives:

- Showcase and promote ongoing Industry and Institution cutting edge technology research collaborations.
- Create awareness about technology research projects of industry interest.
- Harness potential disruptive collaboration opportunities between Industry and Institute.
- Generate perceptual acuity by providing platform for enriching discussions on industry's current-day technology needs, potential solutions and channels to create cogent collaborations.

The Institute has given a special focus on FDPs/Professional Development Programs (PDPs) and continuous learning since its inception. Over the years the Institute has positioned itself as an interface between the academia and industry through programs it organises for different stakeholders across the nation.

The objective of the **Centre for Advanced Learning and Training** is to specially design and deliver short-duration quality programs for the working executives of Indian industry, education, and government sectors, in order to equip them with the advanced knowledge and skills in the evolving realities of business and management practices and applications; and also in facilitating their personal contribution to the future success of their organizations. The Training programmes aims to achieve the following key objectives, and will help the

participants to develop a good mix of various hard and soft skills, spanning across analytical ability, decision-making, strategic mindset, collaborative work, leadership, innovativeness and stakeholder perspective.

Functional & Analytical Skills

- Attain analytical problem-solving ability to address the relevant managerial problems
- Sharpen the skills & competencies required for effective managerial decision making through data and evidence-based approach

Soft Skills & Leadership

- Leverage the power of collaborative working for effective management
- Develop a strategic mindset & align leadership skills to meet organizational goals

Innovativeness & Stakeholder Perspective

- Inculcate an innovative & entrepreneurial approach to help organizations grow
- Broaden the horizons to be a socially & environmentally responsible manager

The programme will achieve these objectives through excellent design and delivery of courses using a wide array of pedagogical tools such as lectures, discussions, case studies, simulations, in-class activities, individual / group assignments and projects. The courses will be delivered by expert in-house faculty of as well as visiting/guest faculty from senior positions in industry and academia.

These training programmes furnish the executives a chance to refresh and rejuvenate their knowledge and to reacquaint themselves with present-day thinking and to gain insights and self-enrichment. The participants get chance to familiarize themselves with the latest tools, techniques and skills spanning different streams of Engineering, Technology & management such as:

- Internet of Things
- Artificial Intelligence & Robotics
- Data Science
- Machine Learning
- Computer Science & Design
- 3D Printing
- Education Management
- General Management
- Human Resources
- Finance
- Information Systems
- Marketing, Operations Management
- Strategic Management and Sustainable Development

- Recent advances in Engineering & Technology
- Infrastructure Management
- Innovations and IPR
- Renewable Energy
- Product Design

Ready to offer programs:

(A) Training Programme on Recent Trends in Electronics Engineering

This Training Programme will cover topics in next-generation applications in electronics, photonics, memory technologies, biochemical sensors, solar cells, energy storage and converters for the advancement of knowledge. This FDP is designed to give an exposure to design of experiments, material growth, characterizations, and device/system fabrication. This course is aimed to bring together engineers, technologists, scientists, and researchers through academic training and learning activities to augment and expand on acquired knowledge and encourage in-depth discussions through tutorials to prepare for research-led activities. Semiconductor devices such as Solar Cells, LEDs, Photodetectors, Sensors, Non-volatile memories & machine learning algorithms are used for various energy, optical, chemical, biological, computing & other applications. This program gives an insight into various electronic technologies from basic level to advanced level. Further, next-generation innovations in devices and various challenges involved will be discussed to elaborate on current research and enhancements in the respective fields.

Course Outcomes:

- Understand the basic as well as recent research opportunities in fundamentals and advances in nanotechnology, optical networks and various machine learning algorithms used in electronics engineering.
- Apply standard CAD tools for simulating the behaviour of nanomaterial, optical networks, micro strip patch antenna and various signals.

(B) Training Programme on Computational Intelligence in Computer Vision, Machine Learning and Data Mining

The computational intelligence is an important domain for academicians and researcher. In view of this, there is a need of a platform, which enhance the research knowledge of faculty members and research scholar across the country. The proposed Faculty Development Programme enriches the research ideas and development activities of the above-mentioned target audience in the domain of Artificial Intelligence, Computer Vision, and its applications. Participants will receive an

exposure about the Machine Learning and Data Analytics techniques to solve the real-world research problems. Hands-on training and practice sessions will help participants gain confidence on machine learning concepts by creating their own neural networks, object detection models etc. Thus, the programme will be valuable for participants to get the current research trends of AI based computational intelligence.

Course Outcomes:

- Understand basic concepts regarding Machine Learning, Computer Vision and Data Mining.
- Analyse various techniques to enhance the applicability of Machine Learning, Computer Vision.

(C) Short Term Course (STC) on Advanced Materials and Manufacturing Techniques (AMMT-2022)

Material selection and manufacturing processes are playing critical role in today's competitive and sophisticated product development environment. There has been substantial advancement in research and development of polymers, ceramics, semiconducting materials, and composites as functional materials in the field of structural, biomedical, sensor and energy applications. This faculty development program is aimed to disseminate the state-of-art research and development activities in the advanced materials design and manufacturing process.

Course Outcomes:

- Understand the basic components and working in the area of advanced materials and manufacturing respectively.
- Apply the latest research and development insight for research in potential areas of manufacturing with flexibility and sustainability.

(D) Training Programme on Renewable Energy Sources Integration into the Power System

The Indian energy scenario is characterized by shortages of supply and increasing demand. A detailed study shows that the present gap between demand and supply of electrical energy may grow up to 70% by the year 2050, if corrective measures are not taken immediately. At the same time use of coal and other fossil fuels need to be rationalized in view of the local and global environmental concerns. The situation therefore needs corrections to introduce measures that reduce demand.

The power system is continuously evolving to meet the rise in demand, integrate renewable energy, and meet the decarbonization goal posed by the government. The evolution inevitably introduces formidable challenges to the system. Therefore, an in-depth understanding of the changing system is the need of the power industry. The challenges associated with Renewable Energy Integration to Power Systems, Distributed Energy Resources, Power System Planning and Modeling, will be covered in this FDP.

Course Outcomes:

- Understand the conceptual knowledge of renewable technologies, economics and regulation related issues associated with wind and alternative sources of energy
- Analyze the viability of renewable energy projects to integrate various options and assess the business and policy environment

(E) Training Programme on Mathematical Modelling of Digital Data Security in Image Processing and Cloud Computing

This program will introduce participants to the basic mathematics behind the data security in image -processing and cloud computing. The program will cover the full spectrum of modelling of data security in Image-processing and Cloud computing application. They shall also be familiar with the programs/syntax written in different symbolic software (MATLAB, MATHEMATICA, etc.).

Course Outcomes:

- Understand the basic mathematics and the key concepts behind image-processing and cloud computing.
- Create models for data security in image-processing and cloud computing applications.

(F) Training Programme on Emerging Areas in Civil & Environmental Engineering Applications

Civil Engineering is the ever-changing industry. With advancements in technology, we've seen the civil engineering field evolve from working solely with concrete to now designing and building everything from bridges to buildings. This course focus on to the key developments in civil engineering like Ultra high-performance concrete, Earthquake resistant design of structures, introduction to hydro-geological modeling, Introduction to geo-synthetics and its applications, Rock discontinuities and properties, industrial safety & hazard, industrial dewatering, and Bituminous Mix

Design.

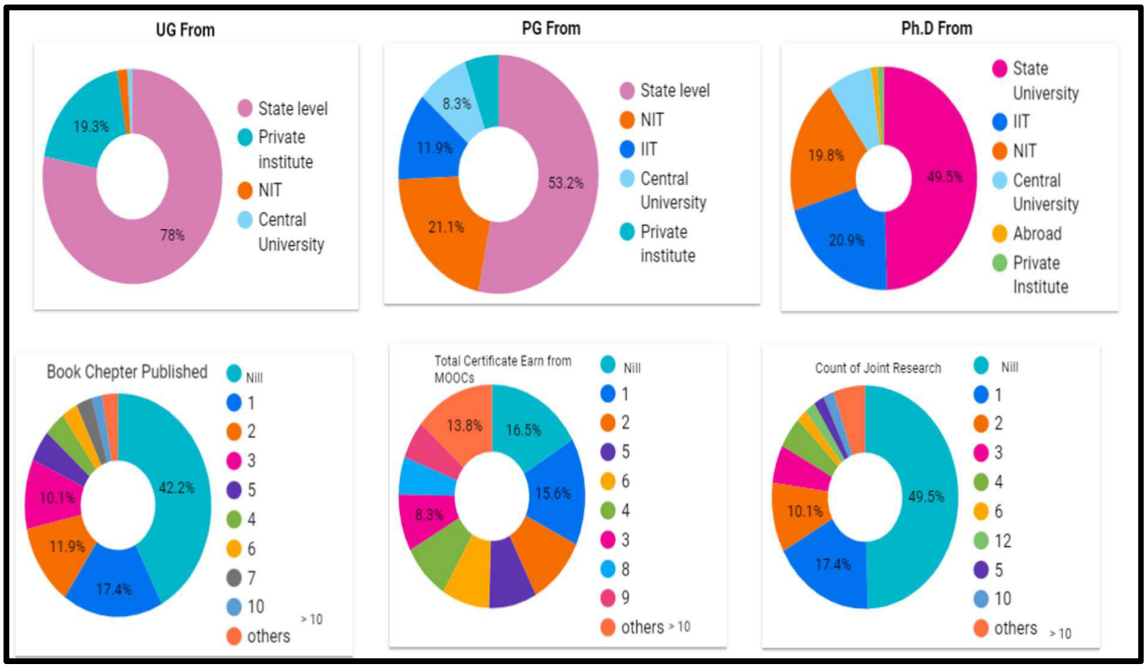
Course Outcomes:

- Apply general and discipline-specific concepts and methodologies.
- Understand the technical materials in a professional manner to potentially diverse audiences and for a variety of circumstances.
-

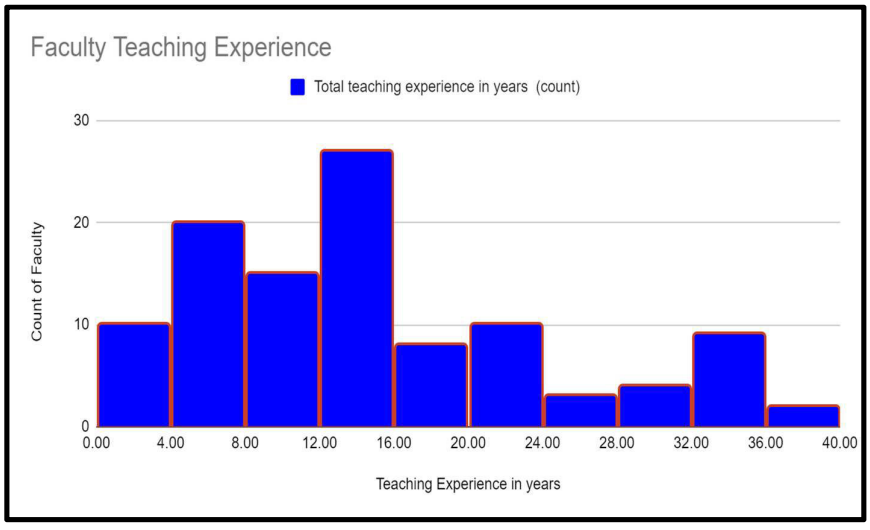
Concluding Remark: To provide proper shape for the Centre of Advanced Training which will be run under the umbrella of MITS Gwalior separate resources are to be allocated/ created like infrastructure, human resource collaboration and also identification of dedicated HR /mentors/experts across the country/globe.

Annexure-IV

Faculty Academic Profile



Faculty Teaching Experience



Cadre-wise teaching experience

Designation	MIN of Total teaching experience in years	AVERAGE of Total teaching experience in years	MAX of Total teaching experience in years
Assistant Professor	0.10	9.69	30.00
Associate Professor	20.00	26.75	37.00
Professor	16.00	27.45	39.00

Annexure-V

List of Students Awarded Ph.D. during Last Five Years (2017 to 2022)

S.No.	Enrolment No.	Name	Department	Topic	Supervisor	Year of Ph.D. Awarded
1	0901EE10PD08	Hari mohan Dubey	Electrical Engineering	Bio-Inspired Optimization Techniques for Economic Load Dispatch	Dr. Manjaree Pandit	2017
2	0901ME10PD12	Surendra Agarwal	Mechanical Engineering	Energy and Exergy Analysis of Solar Thermal Driven Multiple Output Thermodynamic Cycle.	Dr. Rajesh Kumar Dr. Pratesh Jayaswal	2017
3	0901EE09PD38	Vishnu Goyal	Electrical Engineering	Maximum Power Control of Grid Connected Cycloconverter Excited Induction machine for the wind Energy Conversion	Dr. Sulochana Wadhawani	2018
4	0901EL09PD16	Piyush Moghe	Electronics Engineering	Design of Broad Band Antennas with Enhanced Gain, based on Metamaterials	Dr. P.K. Singhal	2018
5	0901EE10PD09	Himmat Singh	Electrical Engineering	Evolutionary Computing Base Approach for Reactive Power Management in Power System	Dr. Laxmi Shrivastava	2019
6	0901AM10PD02	Jitendra Kumar	Applied Science (MAC)	Performance Analysis of Some Queuing models'	Dr. Vikas Shinde	2020
7	0901AR08PD15	Vijay Kumar	Architecture	Critical Appraisal and Analysis of Indian Urban Planning and Development	Dr. R.K. Pandit	2019

				Process for Regulating Architectural Controls and Infrastructural Development in Towns"		
8	0901AR11PD01	Soma Anil Mishra	Architecture	Urban Transformation and Sustainability Modeling Evaluation of Indore City'	Dr. R.K. Pandit Dr. G.V. Kulkarni	2020
9	0901CS09PD58	Kirti Jain	CSE	"Image Retrieval by Structural based Approach for Partial Matching"	Dr. Sarita Singh Bhadauria	2019
10	0901CA11PD05	Sadeep Kumar Singh Rathor	Computer Application	A novel approach for speech recognition using machine Learning'	Dr. R.S. Jadon	2020
11	0901CS10PD04	Archana Gupta	CSE	A novel System for mining incremental frequent item set without candidate generation'	Dr. Akhilesh Tiwari Dr. Sanjeev Jain	2021
12	0901EC10PD11	Asmita Rajawat	EC	Energy Harvesting From Mircrowave Power Transmission	Dr. P.K. Singhal	2021
13	0901EC10PD08	Sumant Kumar Kundu	EC	Patch Antennas Conformable to Planar and non planar surfaces	Dr. P.K. Singhal	2021
14	0901EC10PD07	Shashi Bhushan Kumar	EC	Planar Microstrip Patch Antennas with Fractal Geometry	Dr. P.K. Singhal	2021
15	0901CA11PD04	Parul Saxena	Computer Application	Semantic video Interpretation for Surveillance Using Machine Learning Technique.	Dr. R.S. Jadon	2021
16	0901ME11PD11	Pawan Agrawal	Mechanical Engineering	Development of Expert System for fault diagnosis and	Dr. Pratesh Jayaswal	2021

				prognosis of rolling element bearing using vibration signature analysis		
17	0901ME13PD02	Gaurav Saxena	Mechanical Engineering	Development and Performance evaluation of PVT Hybrid System	Dr. Manoj Kumar Gaur	2021
18	0901EI10PD10	Shalini Sahay	Electrical Engineering	"Computer Aided Interpretation of Bioelectric Signals"	Dr. A.K. Wadhwani Dr. Sarita Singh Bhadauria Dr. Sulochana Wadhwani	2021
19	0901EE10PD11	Pallavi Bondriya	Electrical Engineering	Optimal Location and Size of Distributed Generation Using Soft Computing Techniques	Dr. A.K. Wadhwani Dr. Yogendra Kumar	2022
20	0901IT13PD01	Kirti Raj Bhatele	CSE/IT	Design and Analysis of an automated Approach to detect Brain Disorders	Dr. Sarita Singh Bhadauria	2022
21	0901EC11PD19	Parul Pathak	Electronics	Design of Broadband Antennas for Wireless Applications	Dr. P.K. Singhal	2022
22	0901EE10PD13	Shilpi Sisodia	Electrical Engineering	Transmission System Planning Using Evolutionary Techniques	Dr. A.K. Wadhwani Dr. Yogendra Kumar	2022
23	0901EC11PD17	Keshav Mishra	Electronics Engineering	Performance Improvement of Resource Allocation Scheme for Cognitive Radio Networks	Dr. Rekha Gupta Dr. Aditya Trivedi	2022
24	0901EC13PD02	Gaurav Saxena	Electronics Engineering	Feature Extraction of Environmental Images	Dr. Sarita Singh Bhadauria	2022
25	0901EE17PD13	Nikhil Paliwal	Electrical Engineering	Power System Frequency and	Dr. Laxmi Srivastava	2022

				Voltage Control Using Intelligent Computational Techniques	Dr. Manjaree Pandit	
26	0901CS17PD20	Abhishek Dixit	CSE/IT	Swarm Intelligence Based Framework for Multilevel Hesitation Mining	Dr. Akhilesh Tiwari , Dr. R.K. Gupta	2022
27	0901IT10PD08	Punit Kumar Johari	CSE/IT	A novel approach for retrieving images using soft computing techniques'	Dr. R.K. Gupta	2022
28	0901EC11PD20	Rakesh Singh Rajput	Electronics Engineering	Spectrum Sensing Techniques using Energy and Eigenvalue based Algorithm.	Dr. Rekha Gupta Dr. Aditya Trivedi	2023

Annexure-VI

Best Practices

During the last five years, the IQAC has been initiating practices and processes for establishing quality culture in the institute. Many of them are now internalised. Gender warriors were appointed to maintain a gender neutral environment. The gender sensitization cell is very active and an annual action plan is prepared for conducting various events and activities in order to create awareness among faculty/staff and students. A unique online faculty feedback collection system is in place which has been continuously improved. The idea is to get frank responses from students for improving/modifying the teaching-learning practices by the faculty according to the stakeholder expectations. The prevailing system it now completely automated and it produces qualitative as well as quantitative reports, twice in a semester. Faculty feedback indices are calculated for each faculty, course-wise. Cumulative reports, including comments by the students, are also generated by the Information Management System (IMS).

The self-learning model developed by the institution five years ago, based on SWAYAM/NPTEL online courses, has been quite successful and the institute has excelled at national level. To ensure compliance of quality standards, the IQAC has identified many activities and set their timelines. The idea was to increase the effectiveness of teaching-learning-evaluation, timely completion of all planned routine activities such as curriculum development, alumni/industry connect, student counselling/mentoring, assessments, various feedbacks & their analysis, etc. In order to encourage timely completion of the above activities by various departments of the institute, a numeric 'Administrative Efficiency Index' (AEI) is computed, such as to reflect the performance of each department, for each of the activities, on a scale of 10. Then the overall AEI for the semester is computed. Use of MOODLE for a dynamic learning environment to facilitate student centric learning is one of the benchmarks that the institute has set. This was possible due to the practice of computing the MOODLE Working Index (MWI) on a monthly basis, for each department. The MWI periodically monitored the use of MOODLE by faculty for 10 different teaching-learning activities. Now, all faculty, students and staff are familiar with this tool and it is extensively being used.

(i) Establishment of a Modular Object-oriented Dynamic Learning Environment (MOODLE) for digital teaching-learning.

(ii) Integration of on-line courses in the curriculum: Model developed Using SWAYAM/NPTEL Platform

BEST PRACTICE -1

1. **Title: Establishment of a Modular Object-oriented Dynamic Learning Environment (MOODLE) for digital teaching-learning.**

2. **Objectives of the practice:** The idea was to establish an effective **learning management systems** (LMS) which supports digital learning, provides a student-centric teaching learning environment by permitting **'any-time, any-where'** format of learning. The major goals were:
   - To address the challenge of providing trustworthy and accurate content to the digital savvy new generation of students
   - To provide a digital interactive learning platform providing support for multiple academic activities
   - To facilitate all learners to learn as per their learning abilities and capacities of assimilation
   - To enable learners to learn at their own pace
   - To assist the faculty members in consolidating their courses at one digital space
   - To make available all academic data, conduction of all activities related to teaching-learning-evaluation

   With the above objectives, **The MITS-MOODLE** was **launched on 15th August 2017** for providing an e-learning environment for interactive teaching-learning-evaluation

3. **The Context:**
   - As students were getting more and more familiar with e-content, sometimes they referred to non-standard and non-authentic material
   - The institute decided to take an initiative for digitization and easy access of all academic learning material for the benefit all stakeholders
   - It was noticed that students were not able to take notes in the classes and therefore a lot of their valuable time was wasted in searching relevant content on the internet.
   - Need for a user friendly institutional learning management platform was felt for hassle free conduction of courses and for dissemination of learning material.

4. **The Practice:**
   - Numerous sessions were conducted for creating awareness about effectiveness of MOODLE in learning/blended teaching/flipped classes etc.
   - MOODLE coordinators were nominated to motivate their colleagues/peers for integrating MOODLE into their teaching.
   - However, in spite of this, many faculty members were still not making sufficient efforts.
   - In the present learner centric education, the students need flexibility of learning in their own time, at their own place. But without full faculty participation this objective was not being met completely.
   - **The Moodle Working Index (MWI)** was then launched to make faculty members more organized and better prepared for usage of new teaching aids and tools.
   - At the beginning of the semester the course mentors start their respective course pages, enter the course name(s) being taught, add the syllabus, Course Outcomes (COs) and other

learning material such as notes, question banks etc.

- Then the faculty members add the students for completing the academic interaction circle so that the course mentor gets connected with all students and vice versa through the MOODLE.
- Ten activities related to each course were identified for monitoring and computation of MWI. The activities are
    - To create the course page on MOODLE
    - To create course wise student groups & mark attendance
    - To enter Course Outcomes (COs) for all courses
    - To enter syllabus for all courses
    - To enter detailed lecture plan
    - To prepare and upload course wise Question Banks
    - To prepare & upload course files (consisting of PPT, Lecture Notes, tutorial questions, Study material, names of Reference Books etc)
    - To prepare and conduct on-line Quiz
    - To prepare & upload assignments/open ended questions
    - To collect on-line feedback for course outcomes for indirect assessment & course content for curriculum development exercise, before the Board of Studies meeting
- **The MWI is computed department wise by taking a weighted average of the performance in following 3 categories**
    - **Poor** (number of faculty using three or less out of the above listed ten features)
    - **Good** (number of faculty using more than three but less than eight out of the ten features) and
    - **Excellent** (number of faculty using more than five out of the ten features).
- **For computing MWI, the three categories, Poor, Good & Excellent were assigned weights of zero, five and ten respectively.**
- For example, if there are Z number of total faculty members in a department out of which A are in category 'Poor', B are in category 'Good' and C are in category 'Excellent', based on their usage of the ten MOODLE features, then the MWI can be calculated as

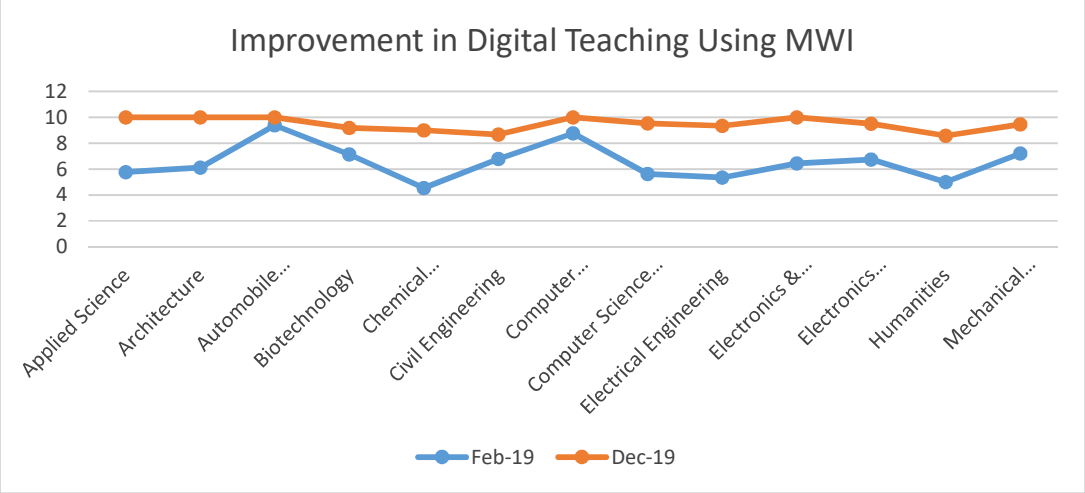
MWI= {(A x zero) + (B x 5) + (Cx10)}/Z.

- The MWI for each department is computed and circulated to the faculty/departments/HoDs/MOODLE coordinators three times in a semester.
- **The results are displayed and discussed in the meeting of the HoDs and also in the IQAC as shown in enclosures.**
- **The MWI is computed out of ten and is designed to reflect the comprehensive MOODLE usage for a department**.

5. Evidence of Success:

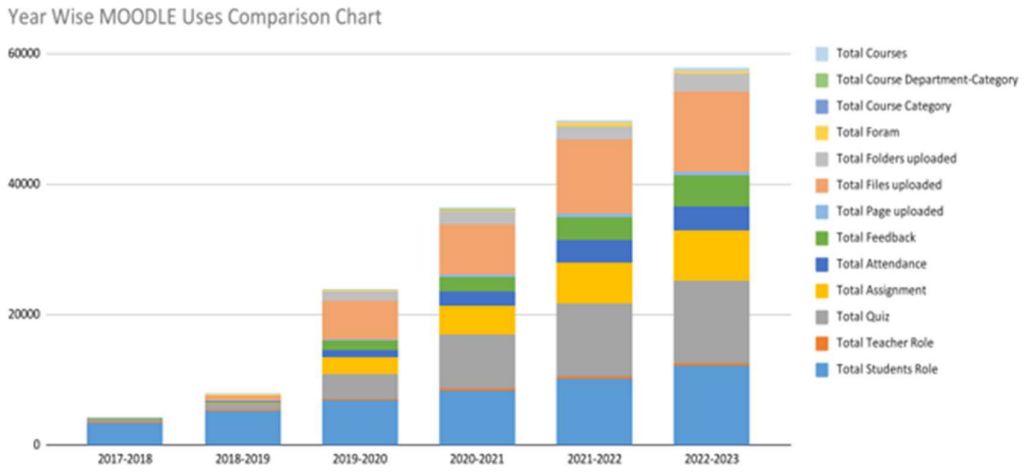
- **The circulation of the department wise MWI score thrice a semester was a huge success.**
- The MWI created a healthy competition between departments and previously non-active course mentors too realized that their non-performance was bringing down the MWI of their department.
- Once the initial hesitation was overcome, the faculty started enjoying this experience of e-teaching-learning.

- The students as well as faculty members welcomed this new digital learning platform in the institute for easy access, dissemination, delivery and evaluation.
- **The MWI was found to continuously rise for each department from beginning of the semester to the end as all faculty members strive to reach the 10/10 mark**.
- Except one or two departments, all are recording a near convergence to 10 as shown in the Figure below.
- **This practice produced results which turned out to be very helpful for all faculty/students/staff in maintaining the standards of teaching-learning-assessment, conduction of e-labs, sharing of lecture/lab session links during the challenging lockdown period.**
- **Thanks to MWI; MOODLE became an integral part of teaching at MITS by February 2020, as a result when COVID-19 pandemic struck, the institute was already well prepared for 'Digital Teaching-Learning-Evaluation'**
- **MOODLE proved to be backbone of Teaching-Learning during the COVID times.**
- **Thanks to MOODLE, the transition from off-line to on-line classes was very smooth for MITS.**
- **MOODLE was instrumental in the successful implementation of the "Digital Teaching-Learning Action Plan" of the institute, which was later formulated in July 2020.**
- **There are total 12178 active student users on MITS-MOODLE and 376 are faculty & staff members.**



Total Count of Activities and Resources

	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Total Students Role	3445	5322	6945	8425	10232	12178
Total Teacher Role	97	115	218	290	304	376
Total Quiz	340	930	3725	8224	11230	12729
Total Assignment	57	120	2650	4520	6321	7744
Total Attendance	89	145	1135	2136	3424	3624
Total Feedback	59	175	1356	2215	3545	4752
Total Page uploaded	12	27	232	436	511	536
Total Files uploaded	65	845	5942	7652	11326	12345
Total Folders uploaded	18	26	1354	1954	2112	2641
Total Forams	32	103	213	312	402	494
Total Course Category	4	5	7	7	7	7
Total Course Department-Category	9	11	11	15	17	17
Total Courses	102	106	198	315	412	435



6. Problems Encountered and Resources Required

- There were no problems encountered as the institute had prepared a proper action plan for making digital learning popular among the faculty members.
- The monitoring mechanism through MWI required hard work and regular efforts by the MOODLE administrator and team.
- **But these efforts paid off as there was a smooth transition from traditional face to face teaching**

to digital teaching for the institute faculty, students and staff who were all already well conversant with the MOODLE; so much so that now there is no need of computing MWI. MOODLE is now integral to teaching-learning-evaluation at MITS.

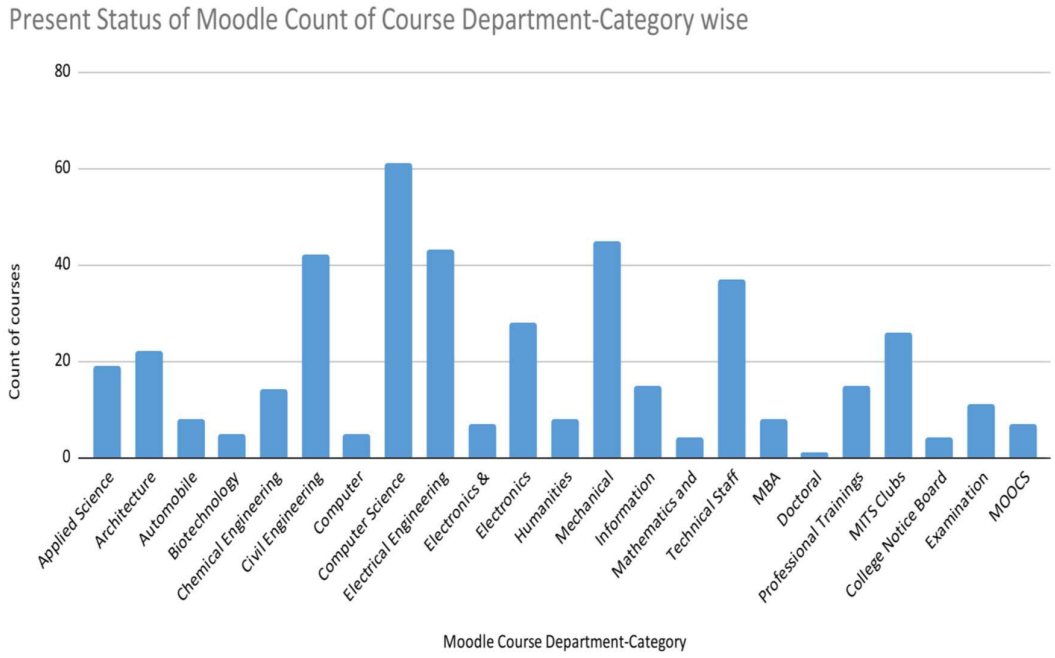
Table: The phenomenal growth of the MITS-MOODLE Initiative

Initiative/Activity	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
MOODLE launched on 15th August 2017	✓	---	---	---	---
Faculty and staff training	✓	---	✓	✓	✓
Workshop GIAN MITS (Sustainability in the Built Environment)	✓	---	---	---	---
General Enterprising Tendency Test	✓	---	---	---	---
Online Notice Board	---	✓	✓	✓	✓
General office Attendance System	---	---	✓	✓	✓
On-line quiz conduction	✓	✓	✓	✓	✓
OBE Training	✓	✓	✓	---	---
Direct/indirect assessment of course outcomes (COs)	✓	✓	✓	✓	✓
Direct/indirect attainment of programme outcomes (POs)	✓	✓	✓	✓	✓
Course-end CO Feedback and its analysis	✓	✓	✓	✓	✓
On-line assessment of assignments	✓	✓	✓	✓	✓
Uploading lecture notes / Assignments/ Tutorial Sheets / Question Banks	✓	✓	✓	✓	✓
Dissemination of any other academic information	✓	✓	✓	✓	✓

Examination Question Paper Feedback	---	✓	✓	✓	✓
Examination Question paper Solutions	---	✓	✓	✓	✓
A separate new Moodle launched for 2020 admitted students	---	--	✓	✓	✓
Best Practice: Computation of MOODLE WORKING INDEX(MWI)	---	✓	✓	**MWI converged to 10 for all departments meaning that so the practice of Using MOODLE for T-L-E is institutionalized**	
Covid Notice and vaccine status	---	---	✓	✓	✓
Initiative/Activity	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**
Online Central Library	---	---	✓	✓	✓
Mid-semester examination conduction	---	---	✓	✓	✓
End-semester examination conduction (MCQ based)	---	---	✓	✓	✓
Finishing School Program	---	---	✓	✓	✓
Administrative Staff Feedback	---	---	✓	✓	✓
In-house Interactive Virtual Workshop	---	---	---	✓	---
Students Induction programme	---	---	---	✓	✓
Faculty Induction programme	---	---	---	---	✓

Present Status of Total Count of Courses Department-Wise

Moodle Course Department-Category	Count of courses
Applied Science	19
Architecture	22
Automobile Engineering	8
Biotechnology	5
Chemical Engineering	14
Civil Engineering	42
Computer Applications	5
Computer Science and Engineering	61
Electrical Engineering	43
Electronics & Telecommunication	7
Electronics Engneering	28
Humanities	8
Mechanical Engineering	45
Information Technology	15
Mathematics and Computing	4
Technical Staff	37
MBA	8
Doctoral	1
Professional Trainings	15
MITS Clubs	26
College Notice Board	4
Examination	11
MOOCS	7
	435



Gradual Improvement in MOODLE Usage due to monitoring MWI

The Objective of the Practice: MOODLE Working Index (MWI) was computed to motivate the faculty members for using MOODLE.

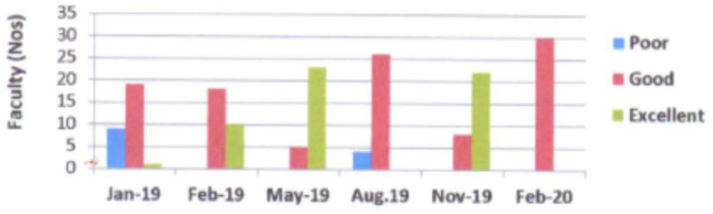
Ten basic activities were identified for computing the MWI as follows

1. *Starting the Course page by Faculty (Course code & name)*
2. *Adding students & marking attendance*
3. *Availability of the Course Outcomes (COs) on faculty page*
4. *Availability of the Syllabus*
5. *Availability of the Lecture Plan*
6. *Question Bank*
7. *Course files (PPT, Lecture Notes ,Study material, Reference books , Unit wise Quiz and Assignment) Unit -1 , Unit- 2,..... Unit -N*
8. *Conduction of Quiz*
9. *Giving & checking Assignments*
10. *Taking Feedback*

For MWI computation:

- Faculty members completing 10 to 6 activities are grouped under "Excellent
- Faculty members completing 5 to 1 activities are grouped under "Good"
- Faculty members who are not working on MOODLE are grouped under "Poor"

Civil Engineering

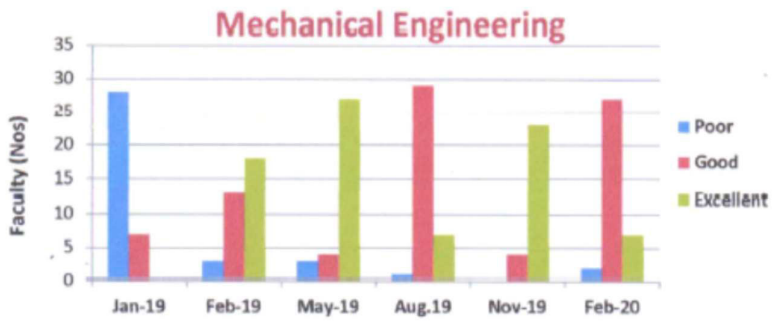


Civil Engineering

	Poor	Good	Excellent
Jan-19 (Semester Beginning)	9	19	1
Feb-19	0	18	10
May-19 (Semester End)	0	5	23
Aug.19 (Semester Beginning)	4	26	0
Nov-19	0	8	22
Feb-20 (Semester End)	0	30	0

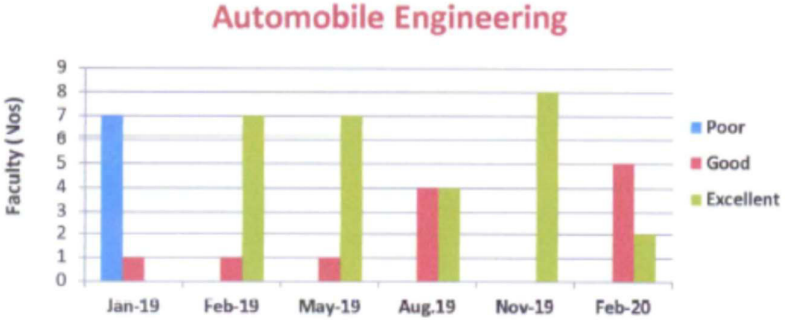
10/2/2021.
(Dr. M. Pandit)
Dean Academics.

Dr. R. K. Pandit
(Director)



Mechanical Engineering

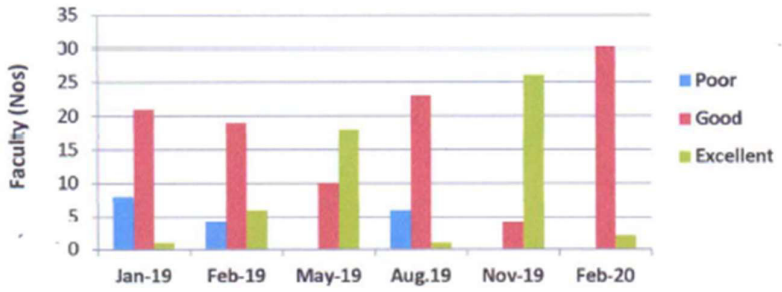
	Poor	Good	Excellent
Jan-19 (Semester Beginning)	28	7	0
Feb-19	3	13	18
May-19(Semester End)	3	4	27
Aug.19 (Semester Beginning)	1	29	7
Nov-19	0	4	23
Feb-20(Semester End)	2	27	7



Automobile Engineering

	Poor	Good	Excellent
Jan-19 (Semester Beginning)	7	1	0
Feb-19	0	1	7
May-19(Semester End)	0	1	7
Aug.19 (Semester Beginning)	0	4	4
Nov-19	0	0	8
Feb-20(Semester End)	0	5	2

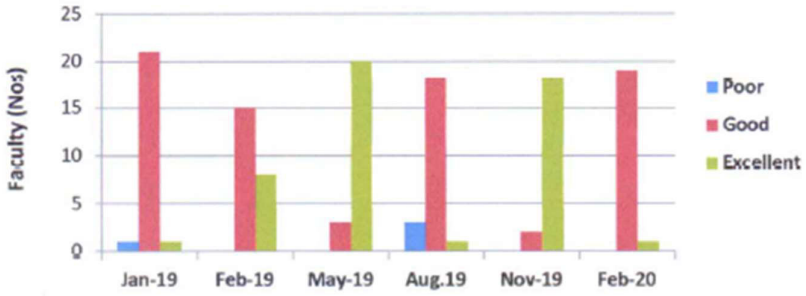
Electrical Engineering



Electrical Engineering

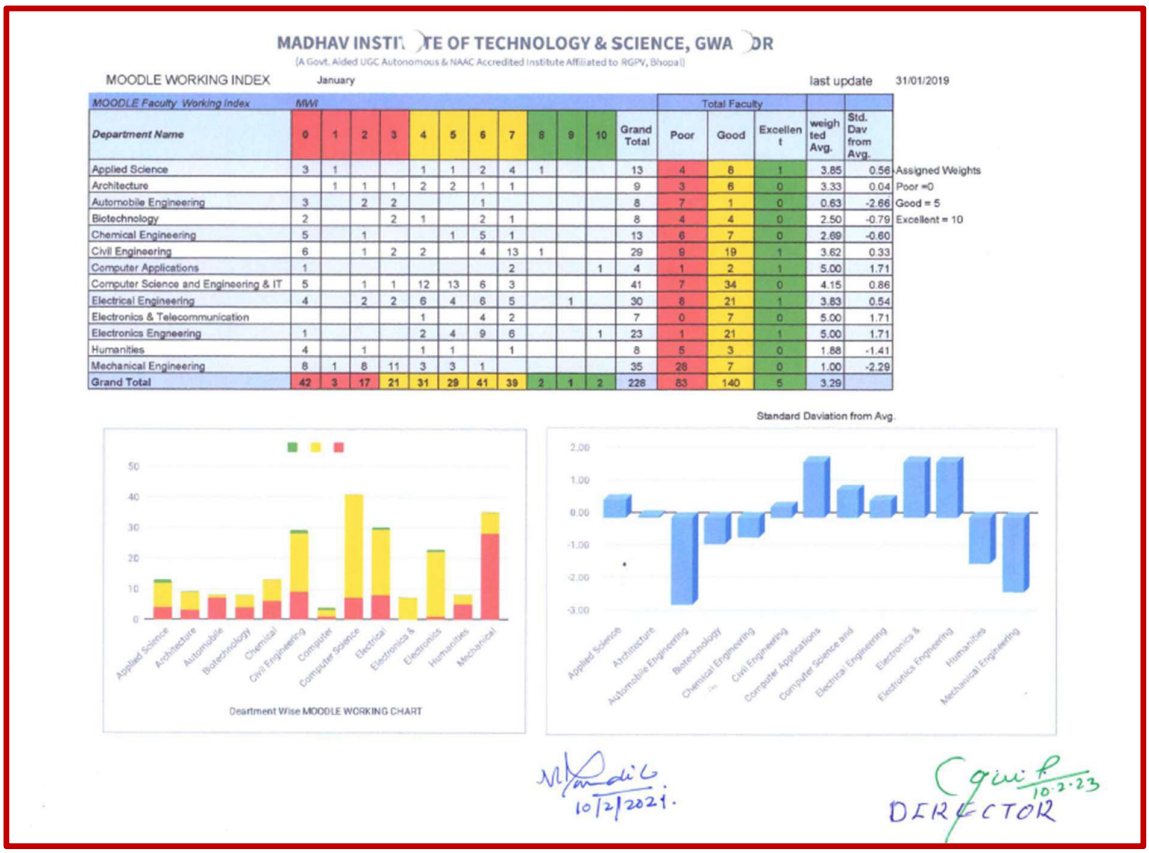
	Poor	Good	Excellent
Jan-19 (Semester Beginning)	8	21	1
Feb-19	4	19	6
May-19(Semester End)	0	10	18
Aug.19 (Semester Beginning)	6	23	1
Nov-19	0	4	26
Feb-20(Semester End)	0	30	2

Electronics Engineering



Electronics Engineering

	Poor	Good	Excellent
Jan-19 (Semester Beginning)	1	21	1
Feb 19	0	15	8
May-19(Semester End)	0	3	20
Aug.19 (Semester Beginning)	3	18	1
Nov-19	0	2	18
Feb-20(Semester End)	0	19	1



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

MOODLE WORKING INDEX — January — last update 31/01/2019

MOODLE Faculty Working Index	MWI												Total Faculty				
Department Name	0	1	2	3	4	5	6	7	8	9	10	Grand Total	Poor	Good	Excellent	weighted Avg.	Std. Dav from Avg.
Applied Science	3	1			1	1	2	4	1			13	4	8	1	3.85	0.56
Architecture		1	1	1	2	2	1	1				9	3	6	0	3.33	0.04
Automobile Engineering	3		2	2			1					8	7	1	0	0.63	-2.66
Biotechnology	2			2	1		2	1				8	4	4	0	2.50	-0.79
Chemical Engineering	5		1			1	5	1				13	6	7	0	2.69	-0.60
Civil Engineering	6		1	2	2		4	13	1			29	9	19	1	3.62	0.33
Computer Applications	1							2			1	4	1	2	1	5.00	1.71
Computer Science and Engineering & IT	5		1	1	12	13	6	3				41	7	34	0	4.15	0.86
Electrical Engineering	4		2	2	6	4	6	5		1		30	8	21	1	3.83	0.54
Electronics & Telecommunication					1		4	2				7	0	7	0	5.00	1.71
Electronics Engneering	1				2	4	9	6			1	23	1	21	1	5.00	1.71
Humanities	4		1		1	1		1				8	5	3	0	1.88	-1.41
Mechanical Engineering	8	1	8	11	3	3	1					35	28	7	0	1.00	-2.29
Grand Total	42	3	17	21	31	29	41	39	2	1	2	228	83	140	5	3.29	

Assigned Weights
Poor =0
Good = 5
Excellent = 10

Department Wise MOODLE WORKING CHART

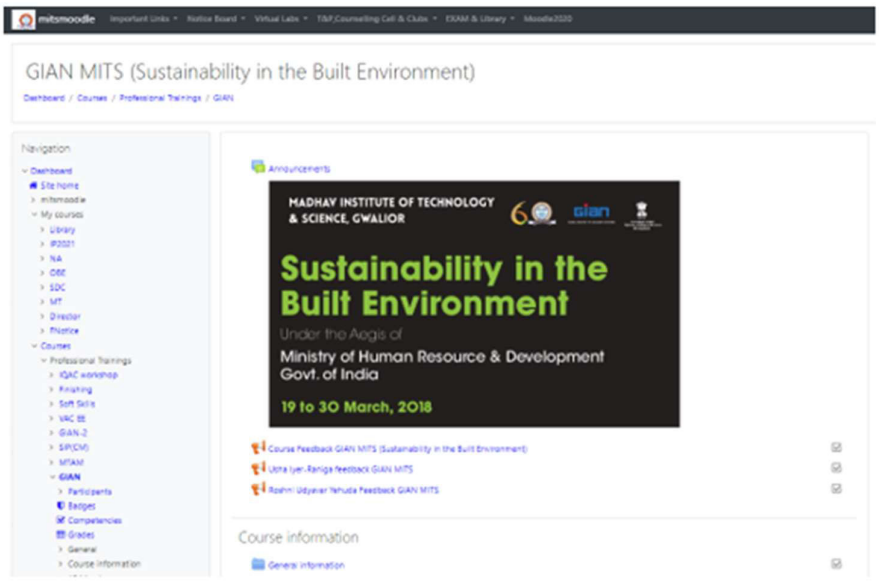
10/2/2021.

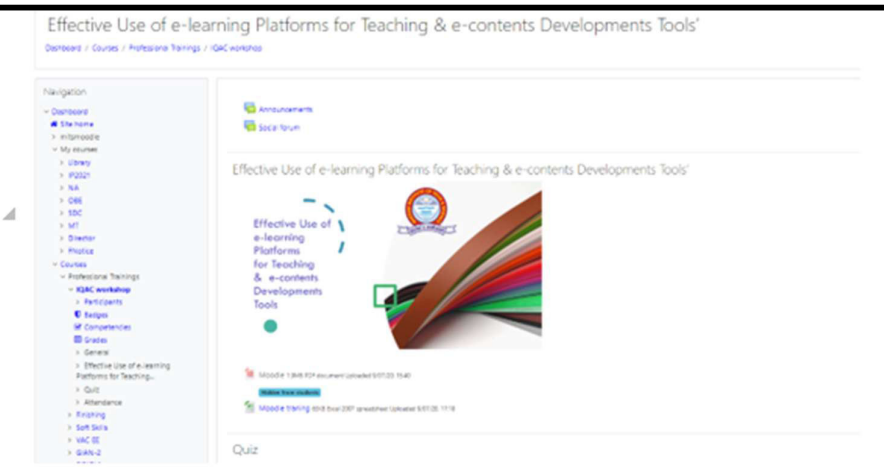
10.2.23
DIRECTOR

Samples of important activities conducted through MOODLE

(Detailed reports available on MOODLE webpage)

Workshop GIAN MITS (Sustainability in the Built Environment)





BEST PRACTICE-2

1. Title: Integration of on-line courses in the curriculum: Model developed Using SWAYAM/NPTEL Platform

2. Objectives of the practice

- To provide students with opportunities to acquire self-learning skill which is one of the most important qualities needed for a successful career, particularly in the present disruptive technological scenario
- To inculcate life-long learning skills among students so that they can update themselves throughout their career path
- To provision credit-transfer from online MOOCs
- To allow students to learn in their own time, at their own place and at their own pace
- To allow learning through mentors from premier institutes of the country/world
- To integrate choice and flexibility
- The objective was also to develop confidence in the students, encourage interactive group learning, generate team spirit, improve communication and presentation skills and at the same time equip them with latest knowledge available in the discipline.

3. The Context

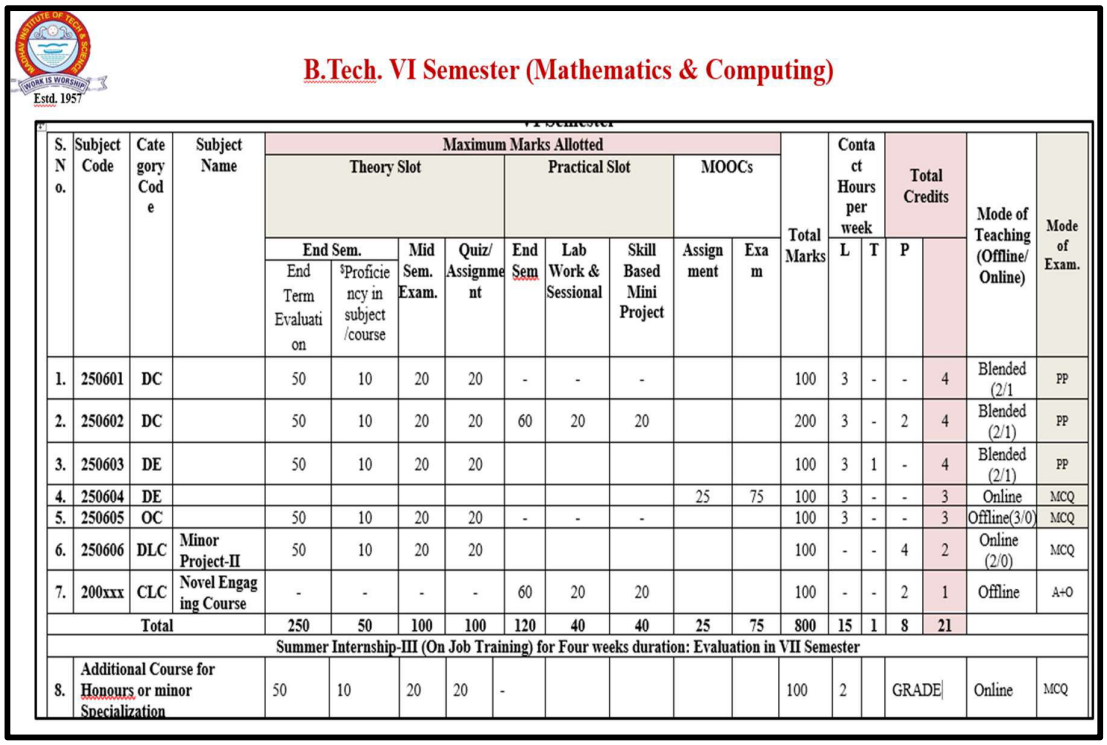
- Since the last few years, there is a complete paradigm shift in education, from the traditional teacher centric system to learner centric one.
- The ownership of education is with students now and the role of teacher has become that of a facilitator.
- Mentorship and interaction with students are now more important than the actual content delivery.
- The focus is on what is '*learnt*' rather than on what is '*taught*'.
- In this environment, it was vital that a more active role be assigned to the students to make them independent and active learners.
- The affiliating technical university of the institute had yet to come out with a policy for credit transfer through MOOCs.
- Therefore, MITS being autonomous, developed its own curricular model and guidelines for conducting the on-line courses.

- to accommodate self-learning through MOOCs for 5-elective courses, initially for the UG students, and later students of PG and Ph.D. course work were also provided with on-line courses.
- NPTEL platform was selected for this initiative due to its popularity, availability of large number of courses, ease of credit transfers to students' transcripts
- The NPTEL provision of a proctored end-term exam in locations all over India was also found to be attractive and credible as compared to some other platforms.
- Soon, the MITS-MOOCs will also join the pool of elective courses.

4. The Practice

- In September 2017, the Academic Council of the institute, approved in principal the proposal for introducing courses from on-line platforms with credit transfer provision.
- **Local Chapter of NPTEL was started in October 2017 in association with IIT BOMBAY for promoting e-learning through on-line Web and Video courses.**
- **Five elective courses, from VI semester onwards were provisioned in the curriculum from the NPTEL platform, for the students of 2017-2021 batch onwards.**
- **As a preparatory, a unique model was developed for the 'self-study component' of the curriculum. The idea was to induct our students into the on-line learning courses at the earliest.**
- Registration in 01 online course from the NPTEL platform was made mandatory for II & III year students.
- The idea was to prepare our students for MOOCs in advance so that by the time the modalities of the credit transfer (from MOOCs) policy are decided and implemented, our students are ready to take the best advantage of these courses for acquiring credits from on-line courses of their choice.
- For the effective conduction of these courses the institute appointed SWAYAM coordinators from each department and to monitor at institute level, the single point of contact (SPOC)of the NPTEL Chapter was appointed as SWAYAM manager.

- After discussion with students and faculty, the above SWAYAM team identified and finalized suitable courses, from the list available at NPTEL portal for the January-June 2018 session.
- The SWAYAM team motivated and registered students and faculty for the selected NPTEL courses; then institute faculty mentors were also appointed as course instructors for providing support.
- **A total of 2019 students and 60 faculty members (SMEs) were registered for 25 courses in 11 departments, during January-June 2018 session.**
- Each section was divided into 10-12 study groups for the session. Every week, one group was assigned the task to give a presentation on 'what was delivered during the week in their on-line course'.
- Assignments were also dealt with in this same manner. The course instructors also registered for courses and helped the students whenever they were stuck somewhere.
- This way, the MITS students were trained to become self-learners.
- When they reached VI semester they were ready to learn on their own, by registering in one of the on-line courses, based on their choice, from the courses approved by the Board of Studies.
- **A separate slot was created in the examination scheme from VI semester onwards, for the evaluation of MOOCs as shown below:**



B.Tech. VI Semester (Mathematics & Computing)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted									Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
				Theory Slot				Practical Slot			MOOCs			L	T	P			
				End Sem.		Mid Sem. Exam.	Quiz/ Assignment	End Sem	Lab Work & Sessional	Skill Based Mini Project	Assignment	Exam							
				End Term Evaluation	$Proficiency in subject /course														
1.	250601	DC		50	10	20	20	-	-	-			100	3	-	-	4	Blended (2/1	PP
2.	250602	DC		50	10	20	20	60	20	20			200	3	-	2	4	Blended (2/1)	PP
3.	250603	DE		50	10	20	20						100	3	1	-	4	Blended (2/1)	PP
4.	250604	DE									25	75	100	3	-	-	3	Online	MCQ
5.	250605	OC		50	10	20	20	-	-	-			100	3	-	-	3	Offline(3/0)	MCQ
6.	250606	DLC	Minor Project-II	50	10	20	20						100	-	-	4	2	Online (2/0)	MCQ
7.	200xxx	CLC	Novel Engaging Course	-	-	-	-	60	20	20			100	-	-	2	1	Offline	A+O
Total				250	50	100	100	120	40	40	25	75	800	15	1	8	21		
Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester																			
8.	Additional Course for Honours or minor Specialization			50	10	20	20	-					100	2		GRADE		Online	MCQ

5. Evidence of Success

—The initiative proved immensely successful. Most of the students developed an instant interest in this model of learning. They were also excited that they were being taught by renowned professors of IITs & NITs. They enjoyed the free learning experience and reversal of role, presenting the course to the class on their turn while the teacher (SME) was sitting and listening. The class was fun and students learned in a light and relaxed atmosphere.

—Though there was no compulsion, many students also opted and registered for the paid on-line examination conducted by NPTEL as they wanted to know their position at the all India level.

—Detailed session-wise reports are available on the MITS web-page (along with links to the NPTEL web page) and the summary of 5-year performance is enclosed below.

- **Due to the enthusiasm, efforts and good performance of the students and faculty in this initiative, the MITS NPTEL Local Chapter ranks among the top 100 local Chapters of the country. In January-June 2018 the Chapter got 87Th rank, in July-December 2018 session 25th rank, in January-June 2019 46th, in July-December 2019 31st, in January-December 2020 13th rank, January-December 2021 the chapter got 5th rank and then finally the performance peaked with 2nd rank in active chapters of the country in January-June 2022 session and 20123 credits have been transferred from NPTEL-MOOCs, till June 2022.**

Summary of performance of MITS-NPTEL Local Chapter
For the period 2017-2022

A Summary of NPTEL Local Chapter Since Establishment

When it comes to the overall development of students, Madhav Institute of Technology & Science leaves no stone unturned. The Institute has started NPTEL local Chapter on 30th Oct 2017 in association with IIT BOMBAY to provide e-learning through on line Web and Video courses in Engineering, Sciences, and Technology among students.

Points	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022	
Enrolment/Registration Details	July-Dec 2017	Jan-June 2018	July-Dec 2018	Jan-June 2019	July-Dec 2019	Jan-June 2020	July-Dec 2020	Jan-June 2021	July-Dec 2021	Jan-June 2022
Enrolment	Establishment of NPTEL Local Chapter on 30th October 2017	2019	2021	3380	6679	4975	7049	11080	7203	9763
Exam Registration		138	484	436	954	1294	1495	3000	1847	4272
Appeared in Exam		130	452	366	770	---	1439	2136	1745	4167
Achievements		Achievements								
Toppers		Not Applicable	Not Applicable	26	24	Due to Covid-19 Modified Pass Certificate (MPC) has been issued to students	60	138	89	275
Elite + Gold		03	10	25	14		22	61	13	128
Elite + Silver		Not Applicable	80	52	135		232	566	209	617
Elite		80	107	91	235		561	940	596	1486
Successfully Qualified		36	215	149	160		381	374	504	1082
Total Students Qualified		**119**	**412**	**317**	**544**		**1196**	**1941**	**1322**	**3313**
Credit Transfer										
Credits Earned Through MOOCS	**2017 Admitted**	Not Applicable					1470	1228	2664	12025
	2018 Admitted	Not Applicable					222	132	2382	
National Rank										
Among 5000+ Local Chapters across Country	----	**87th**	**25th**	**46th**	**31st**	**13th**		**5th**	**2nd**	
Web Link of Rank View		View	View	View	View	View		View	View	
National Rank in Special Category										
LC with Maximum number of NPTEL Star	Not applicable							2nd Click Here	1st Click Here	
Best Certified Count Improvement	Not applicable							3rd Click Here	---	

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(A GOVT. AIDED UGC AUTONOMOUS & NAAC ACCREDITED INSTITUTE AFFILIATED TO RGPV, BHOPAL)

MITS-NPTEL LOCAL CHAPTER SECURED 2ND RANK IN JANUARY -APRIL 2022 SESSION AMONG THE 100 ACTIVE LOCAL CHAPTERS OF NPTEL.

"CONGRATULATIONS TO ALL THE FACULTY, SWAYAM COORDINATORS AND STUDENTS OF MITS"

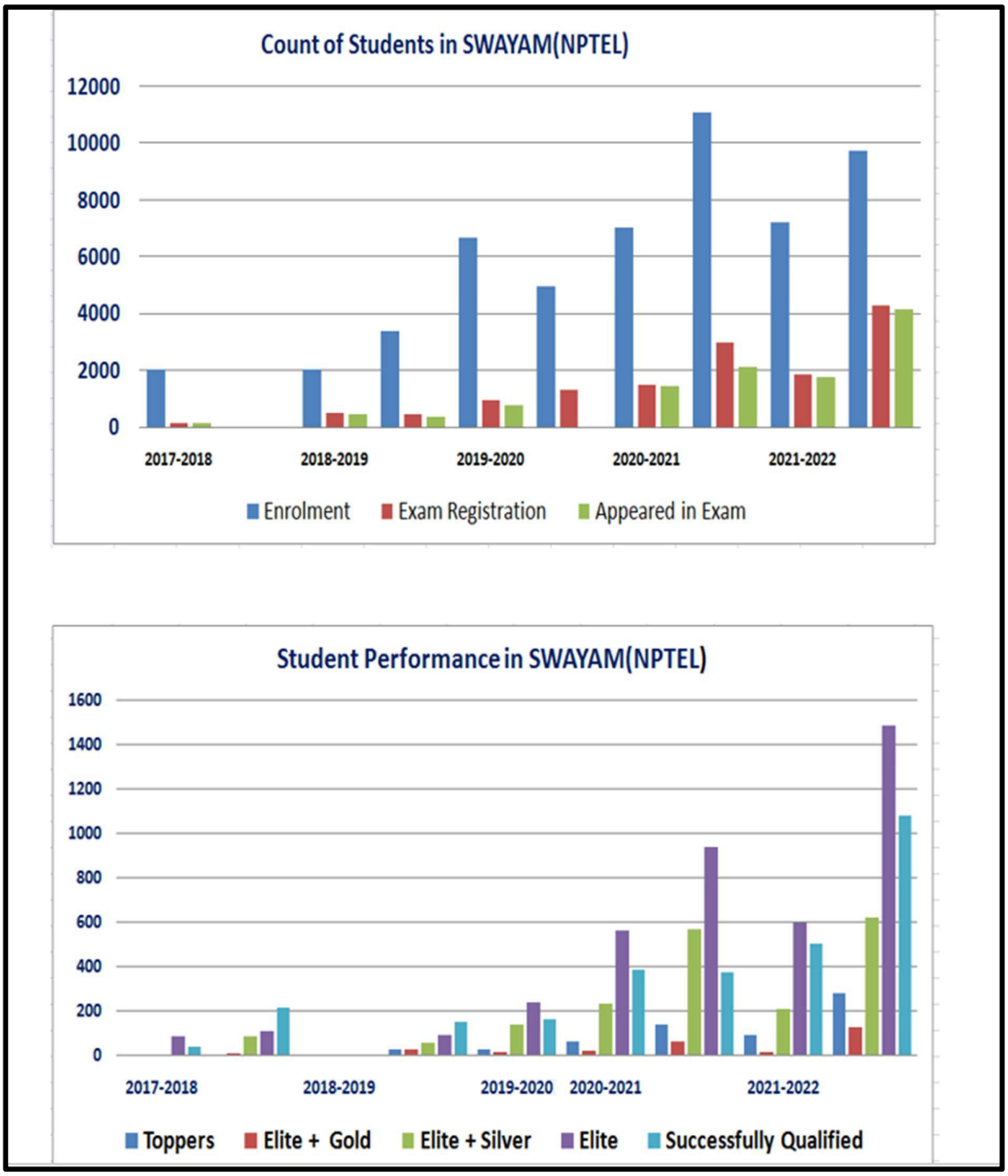
TOP 100 SWAYAM-NPTEL LOCAL CHAPTERS (JAN 2022)
TOP 100 LOCAL CHAPTERS WILL BE CONSIDERED AS ACTIVE LOCAL CHAPTERS

Criteria for ratings:
RATING POINTS, R =
{0.1*NUMBER OF LEARNERS PRESENT} (VALUE CAPPED TO 10)
+ {1* SUCCESSFULLY COMPLETED} (VALUE CAPPED TO 100)
+ {2*ELITE}+{5*SILVER}+{8*GOLD}+{10*TOPPERS}
BASED ON THE RATING POINTS CALCULATED USING THE ABOVE FORMULA:
THE TOP 10 LOCAL CHAPTERS (WITH MAXIMUM RATING POINTS) WILL BE AWARDED 'AAA' RATING
THE NEXT 40 LOCAL CHAPTERS (WITH MAXIMUM RATING POINTS) WILL BE AWARDED 'AA' RATING
THE NEXT 50 LOCAL CHAPTERS (WITH MAXIMUM RATING POINTS) WILL BE AWARDED 'A' RATING

Lc Id	College Name	City	State	Present	Elite	Silver	Gold	Successfully Completed	Toppers	Rating
4103	Netaji Subhas University Of Technology	Delhi	New Delhi	4160	1538	1269	654	494	458	AAA
1361	**Madhav Institute Of Technology & Science**	**Gwalior**	**Madhya Pradesh**	**4227**	**1506**	**636**	**133**	**1095**	**288**	AAA

Prof. Naveen Bansal
SPOC, Local Chapter

Evidence of Growth & Success of MITS-NPTEL Local Chapter


Count of Students in SWAYAM(NPTEL)
12000
10000
8000
6000
4000
2000
0
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
Enrolment
Exam Registration
Appeared in Exam
Student Performance in SWAYAM(NPTEL)
1600
1400
1200
1000
800
600
400
200
0
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
Toppers
Elite + Gold
Elite + Silver
Elite
Successfully Qualified

6. Problems Encountered and Resources Required

- As was expected, there was some resistance from faculty as well as students for registering in NPTEL courses. Some students felt that an additional burden was being put on them.
- Finalizing the list of courses to be run also required a lot of effort as the expertise available at the institute was to be mapped with the available courses on the portal first and then with diverse student interests.
- Another problem was that the students and faculty were tuned to the traditional model of teaching-learning where students are passive listeners most of the time. Therefore, students were reluctant at first to study from the NPTEL lectures on their own and then deliver/present it in class.
- Later, however they were quite happy with the 'learn at your own place, at your own time, at your own pace' model of NPTEL. Faculty instructors also realized the importance of the interactive model as they too got to learn many things from the students during the class.
- Motivating the students to register for the final on-line test was very challenging.
- Additional efforts were required for developing an alternate mechanism for students who either failed in the proctored examination or could not register due to some constraints.

Annexure-VII

Summary of No. of Credits Earned through MOOC

January-June 2022 & July-December 2022

BRANCH	June-22		December 2022	TOTAL
	VI Sem.	VIII Sem.	VII Sem	
Automobile Engineering	108	502	52	**662**
Biotechnology	0	90	0	**90**
Civil Engineering	364	965	254	**1583**
Chemical Engineering	144	654	96	**894**
Computer Science & Engineering	252	746	276	**1274**
Electronics Engineering	516	844	230	**1590**
Electrical Engineering	528	1075	240	**1843**
Electronics & Telecommunication	252	329	116	**697**
Information Technology	292	445	192	**929**
Mechanical Engineering	532	1308	260	**2100**
			TOTAL	**11662**

Annexure-VIII

Distinct Approach: Novel Engaging Courses (NEC)

- Conduction of 'Novel Engaging Courses'(NEC) for the holistic education using activity based learning is a unique and distinctive feature of the curriculum at MITS, Gwalior.
- An important step towards imparting 'Holistic, Multidisciplinary and Value Based Education, with Flexibility' was taken when the 'Academic development Cell' prepared an action plan March 2021.
- The idea was also presented in the meeting of all Professors, HoDs, Deans, Examination Controllers on 12th July 2021.
- In order to promote holistic education & informal knowledge, cross-disciplinary and interdisciplinary thinking and knowledge of many arts, it was proposed to introduce the provision of NEC as a part of regular curriculum for the UG students admitted in 2020-21 onwards.
- It was proposed that the course should be of 30-hours duration in a semester, mandatory for III to VI semester students and will have 01 credit per semester, making a total of 04 Credits.
- The above proposals for conduction of NEC were approved by the Academic Council in its meeting on 28th June 2021 and a mandatory credit provision for these courses was made.
- The Academic Council agreed that the NEC initiative will result in smooth integration of all branches of creative human endeavour in the curricula. It was decided that courses based on activities such as NSS, NCC, Languages, Literature, Music, Dance, Arts, Theatre, Culinary Arts, Public Speaking, Vedic Mathematics, Economics, Sports, Meditation, Yoga, Ayurveda, etc. would be credited under NEC as a part of curricula.
- The AC approved the conduction of these courses through in-house mentoring or need based external mentoring from other institutions.
- To facilitate, Holistic and Multidisciplinary Education, Knowledge of Many Arts" and "Liberal Arts", integration of all branches of Creative Human Endeavour, etc. the institute developed and offered 38 course modules out of which 33 were opted by 1138 students of the 2020-2021 admitted batch; the courses commenced from 1st September 2021.
- The 33 courses offered in July-December 2021 session included buckets such as *Performing arts, music, dance, physical health, health & hygiene, technology, programming skills, language & literature, etc.*
- Some modules were designed in two/four phases. Except NCC and NSS, all other modules have an upper limit of 50 students for registration.
- Sessions included online class, seminar, activity, quiz, assignment, etc. depending upon the course. Video link of sessions were shared by course mentors in Google drive.

- In the meeting of the IQAC on 8th October 2021, the status of implementation and action taken for offering Novel Engaging Courses (NEC) was reviewed vide Agenda Item No. 37.
- The IQAC regularly reviews the conduction mechanism of NEC, (i) the registration process, (ii) the feedback received from the students for each of the NECs and the (ii) evaluation mechanism.
- The NECs are monitored on a day to day basis by the Dean, Student Welfare.
- A Case Study is presented below for (i) July-December 2021(ii) January-June 2022 and (iii) July-December 2021

Growth of number of courses as reported in IQAC Meeting on 28.9.2022

Session	July-December 2021	January-June 2021	July-Dec 2022
Number of courses with registration	**33**	**44**	**72**
Number of courses offered	38	87	104

Table:1
The registration details of NEC conducted in July-December 2021

Name of Course/Code	No. of Registered Students
3D Printing (2000001)	50
Amateur Radio Communication (2000002)	14
Animation (2000009)	50
Artistry (2000044)	17
Career Guidance & Preparedness (2000053)	23
Coding Skills (2000060)	51
Data Analysis Skills (2000004)	50
Design Skills Using Simulation Software (2000003)	50
Digital Learning (2000010)	50
Elements of Photographic Skills (2000012)	51
Emerging Technologies in Computer Science (2000064)	50
English Literary Skills (2000048)	33
Environment Protection (2000013)	51
Food and Nutrition (2000052)	25
Games & Sports (2000032)	50
Hindi Language Skills (2000049)	6
Holistic Health (2000042)	9
Mentoring Skills (2000028)	24
National Cadet Corps (2000020)	28
National Service Scheme (2000016)	59
Organic Farming (2000024)	22
Performing Arts – Dance (2000030)	9
Performing Arts - Music (2000031)	29
Personality Development (2000056)	50
Physical Fitness (2000036)	50
Preliminary Journalism Skills (2000050)	14
Public Speaking (2000058)	50
Pythons of Programming (2000065)	50
Robotics (2000007)	50
Sculpture Making (2000046)	11
Short Story Writing (2000051)	10
Software Development (2000066)	52
Vehicular Skill Development (2000008)	40
Total No. of Registered Students	**1178**

Course feedback received from the students for NECs

Student feedback

Student feedback is taken at the end of teaching on 17th Dec. 2021. Students were asked to rate following questions on a 5-point scale:

- Q.1 Course Mentor clearly defines the goals at the beginning of the Novel Engaging Course
- Q.2 The course sequence was well planned
- Q.3 Behavior of course mentor is ethical and shows no gender bias
- Q.4 The course exposed to you about new knowledge and practices
- Q.5 The quality of lectures/PPT available through MOODLE, YouTube and other online platforms was good
- Q.6 The level of the Novel Engaging course is
- Q.7 Rate the Communication skills of the faculty
- Q.8 This course help me to grow professionally
- Q.9 I would recommend this Course to other students in future
- Q.10 Overall rating of the course

Table:2
The feedback responses (on a 5 point scale) from students for NEC conducted in July-December 2021

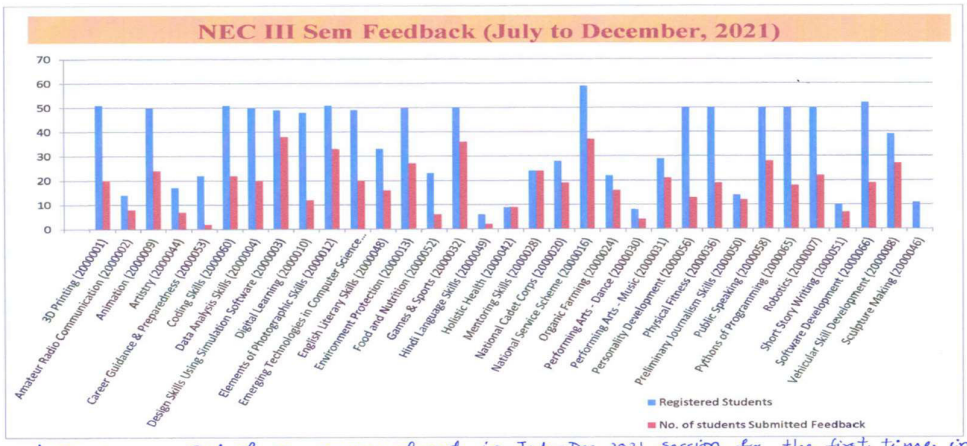
S. No.	Name of the Course	Feedback Questions Score on 5 Point Scale										Ave Index	N st S F
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	3D Printing (2000001)	4.5	4	4.5	4	4	4.2	4.3	4	4.2	4.1	**4.18**	
2	Amateur Radio Communication (2000002)	4.7	4.6	5	4.6	4.2	3.8	4.8	4.5	4.7	4.6	**4.55**	
3	Animation (2000009)	3.8	3.6	4.5	3.7	3.9	3.4	4	3.5	3.6	3.6	**3.76**	
4	Artistry (2000044)	4.6	4.1	5	4.7	4.6	4.1	4.6	4.6	4.1	4.4	**4.48**	
5	Career Guidance & Preparedness (2000053)	4	4.5	4.5	4.5	4	4	3.5	4.5	4.5	4	**4.2**	
6	Data Analysis Skills (2000004)	4.5	4.4	4.6	4.5	4.4	4.2	4.4	4.3	4.3	4.4	**4.4**	
7	Digital Learning (2000010)	4.5	4.5	4.7	4.5	4.4	4.2	4.6	4.2	4.4	4.5	**4.45**	
8	Elements of Photographic Skills (2000012)	4.4	4.3	4.6	4.5	4.1	4	4.3	4.3	4.3	4.3	**4.31**	
9	Emerging Technologies in Computer Science (2000064)	4.4	4.4	4.7	4.3	4.2	4	4.3	4.2	4.2	4.2	**4.29**	
10	English Literary Skills (2000048)	4.8	4.8	5	4.8	4.8	4.4	4.9	4.8	4.9	4.7	**4.79**	
11	Environment Protection(2000013)	4.7	4.6	4.7	4.6	4.4	4.2	4.5	4.9	4.5	4.5	**4.56**	
12	Food and Nutrition (2000052)	4.8	4.6	5	4.8	4.8	4.8	4.8	4.6	4.8	4.5	**4.75**	
13	Games & Sports (2000032)	4.7	4.4	4.8	4.4	4.3	4.2	4.6	4.5	4.6	4.4	**4.49**	
14	Hindi Language Skills (2000049)	5	5	5	5	5	5	5	5	5	5	**5**	
15	Holistic Health (2000042)	4.9	4.7	4.8	4.8	4.5	4.1	4.5	4.6	4.6	4.6	**4.61**	
16	Mentoring Skills (2000028)	4.7	4.6	4.8	4.8	4.8	4.4	4.7	4.6	4.6	4.6	**4.66**	
17	National Cadet Corps (2000020)	4.8	4.5	4.8	4.7	4	4.3	4.7	4.7	4.8	4.8	**4.61**	
18	National Service Scheme (2000016)	4.5	4.3	4.7	4.4	4.3	4.1	4.4	4.3	4.4	4.3	**4.37**	
19	Performing Arts Dance 2000030)	5	5	5	5	5	4	5	5	5	5	**4.9**	
20	Performing Arts - Music (2000031)	4.2	4	4.7	4.3	4	4	4.4	4	4.1	4.1	**4.18**	
21	Personality Development (2000056)	4.3	3.9	4.8	4.1	3.8	3.9	4.6	4	3.9	4	**4.13**	
22	Preliminary Journalism Skills (2000050)	5	4.8	5	4.8	4.8	4.5	4.9	4.7	4.7	4.7	**4.79**	
23	Public Speaking (2000058)	4.7	4.3	4.8	4.7	4.5	4.3	4.6	4.6	4.7	4.7	**4.59**	
24	Pythons of Programming (2000065)	4.4	4	4.6	4.2	4	3.9	4.4	4	4.3	4.1	**4.19**	
25	Robotics (2000007)	4.3	4.2	4.6	4.2	4.6	3.7	4.4	4	4	4	**4.2**	
26	Software Development (2000066)	4.4	4.4	4.7	4.2	4.2	3.9	4.5	4	4.2	4.4	**4.29**	
27	Vehicular Skill Development (2000008)	4.1	3.9	4.9	4.1	3.7	3.9	4.3	4	4	4.1	**4.1**	

- In meeting of IQAC on 30th December 2021, the report on conduction of the Novel and Engaging Courses (NEC) was presented by the Dean Student Welfare and the following Suggestions/Experiences, shared by NEC Mentors, were discussed.

Suggestions / Experiences shared by NEC Mentors after Pioneering Efforts in NEC

- ✓ Students are more interested in offline mode classes. (Due to COVID classes were online during july-Dec 2021 session)
- ✓ Difficulty in conducting online performance sessions (wherever applicable), due to constraint of internet facilities at student's end (performing requires continuous and consistent connectivity).
- ✓ Inaccessibility of students to active learning due to lack of trained faculty in some cases. External mentoring is required.
- ✓ Students need motivation for appearing in quiz, assignments and seminars.
- ✓ As this is a cross branch course, scheduling of sessions is sometimes difficult. Students complain that on weekends they give quiz and assignments and extra classes are there. On weekdays in evening remedial classes are there. It led to lesser participation of the students. Needs scheduling of class in time table – once in a week.
- ✓ There should be a group of faculty mentors to guide the students, instead of a single faculty coordinator in a course.

- As per the suggestions of students, it was decided to assign two hours (one credit) slot in the weekly Time-Table.



(Dean Academics) 11/3/2022

Out of 33 courses offered in July-Dec 2021 session for the first time in the NEC category 15 courses have received feedback response less than 50%.

Submitted for information

Director 11.3.22

The registration details of NEC conducted in January-June 2022

- A website/ web portal for 'Novel Engaging Course Registration' for IV Semester students (Jan-June 2022) is developed by the **Software Development Club** under the guidance of **Shri Atul Chauhan, Programmer.**
  - ✓ The Website is hosted in mitsweb.in.
  - ✓ An email is sent with credentials to students for registration on 13th January 2022 at 11:pm.
  - ✓ After that, a mock registration was conducted on 14th Jan from 9 AM to 3 PM and then an email reminder was sent for the registration.
  - ✓ Live registration started on 14th Jan at 5 PM. The re-registration was conducted from 18th Jan to 19th Jan till 4 PM
  - ✓ Total registrations done 1246 and Pending registrations 09
  - ✓ **Project front end: PHP, javascript, HTML5, Project Back end: MySQL**

Web portal features: System ensured that all the students are able to login smoothly. "Forget password" option was also available on this system

The registration was done under the following conditions.

- ✓ Course which was offered in the UG III semester, should not be selected again.
- ✓ Courses of more than 1 credit (i.e. any course of 2 or more credits) can only be selected by those students who had opted for Part-I of that course in the III semester.
- ✓ Only one entry was allowed per student.
- ✓ Registration in each course was on a First Come First Serve basis (FCFS).
- ✓ There were limited seats in each course.

Development team: Anurag Dubey, Amit Singh Rajawat and team

Registration Page

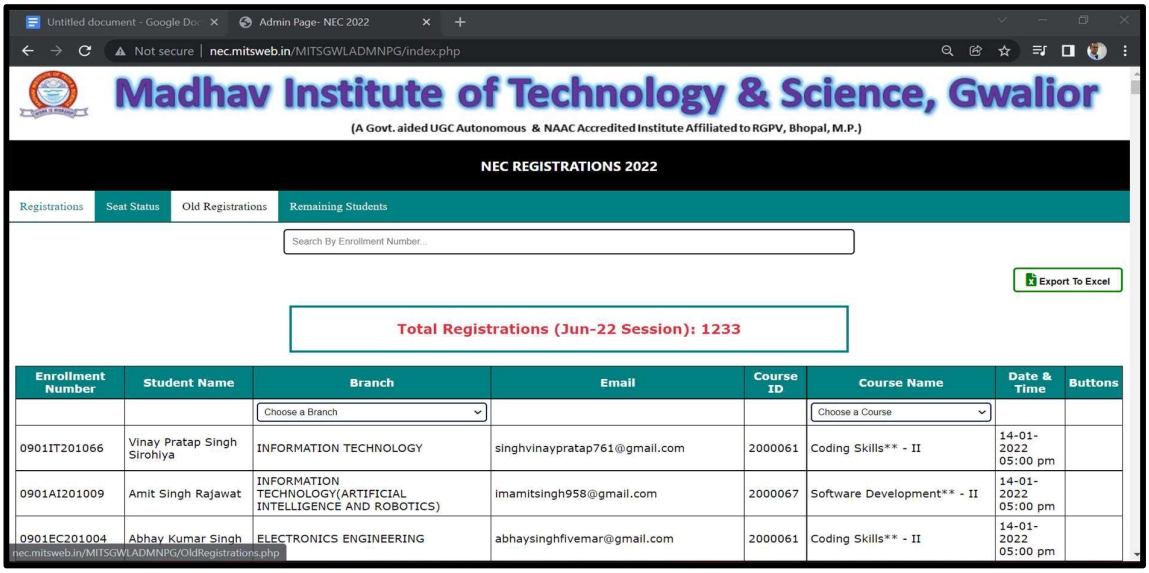


Table:3
REGISTRATION DETAILS (Jan-June 2022)

S.No.	Course Name	Mentor Name	Mentor Department	Filled Seats
1	3D Printing	Gavendra Norkey	Mechanical	20
2	Animation	Amit Kumar Manjhvar	CSE	50
3	Artistry* - II	Pooja Sahoo	Electronics	10
4	Basic and Advanced Excel	Abhilash Shukla	Civil	50
5	Basic Programming of Python using Google Colab	Hemant Choubey	Electronics	47
6	Basics of Campus Recruitment Training	Trilok Pratap Singh	MBA	46
7	Basics of MATLAB Programming	Sandeep Sharma	Electronics	20
8	Basics of Technical Analysis in Stocks	Ankit Kumar	Architecture	50
9	Cloud Computing: Techniques & Tools	Mir Shahnawaz Ahmad	CSE	50
10	Coding Skills** - II	Rajni Ranjan Singh	CSE	40
11	Creative thinking and problem solving	Harbhajan Ahirwar	Mechanical	26
12	Data Analysis Skills	D K Jain	Maths & Comp.	22
13	Design Skills Using Simulation Software	Sharad Agrawal	Mechanical	21
14	Digital Learning* - II	Punit Kumar Johari	IT	14
15	Elements of Photographic Skills	Deep Kishore Parsediya	Electronics	15
16	Emerging Technologies in Computer Science	Mahesh Parmar	CSE	18
17	English Literary Skills	Sanjeev Khanna	Humanities	12
18	Environment Protection* - II	Aditya K. Agarwal	Civil	28
19	Food and Nutrition	Anjula Gaur	Applied Science	28
20	Games & Sports** - II	B.P.S. Bhadoria	Sports	49
21	Graphic Design	Satyam Shukla	Architecture	50
22	Hindi Language Skills	Angad Singh Ojha	Maths & Comp.	17
23	Introduction to Entrepreneurship: Challenges and	Varun Sharma	Electronics	22

	Opportunities			
24	IT Tools	Abhishek Dixit	IT	9
25	Knowing Madhya Pradesh	Anjula Mehto	CSE	50
26	Mentoring Skills** - II	Sapna Kumari	Counselling Cell	18
27	Music - The Melody of Life	Shubhi Kansal	Electronics	11
28	National Cadet Corps** NCC - II	B.P.S. Bhadoria	NCC	20
29	National Service Scheme** NSS - II	Manish K. Sagar	NSS	33
30	Personality Development* - II	Anjali S Patil	Architecture	23
31	Photo Editing Software: Adobe Photoshop	Versha Sinha	Architecture	50
32	Physical Fitness* -II	Rajendra Prasad Kori	Mechanical	22
33	Public Speaking* - II	Manish Dixit & Ankita Sengar	CSE & Arch.	16
34	Python for Image processing applications using Open CV	Pawan Dubey	IT (AIR)	50
35	Renewable Energy Technology: Domestic load requirements	Rahul Sagwal	Electrical	18
36	Research Paper Writing	Dinesh Rano	Electronics	8
37	Robotics	Karuna Markam	Electronics	36
38	Science and Technology Around Us	Rakesh Kumar Dubey	Chemical	8
39	Shutter Up-Flash Me Photography	Shourabh S. Raghuwanshi	Chemical	15
40	Smart World Technology	Kalka Dubey	CSE	13
41	Software Development** - II	Atul Chauhan	Data Resource	28
42	Understanding Financial Markets	Saumil Maheshwari	IT	50
43	Vehicular Skill Development	Vedansh Chaturvedi	Mechanical	25
44	World Heritage Sites: A Brief Overview	Richa Mishra	Architecture	15
		Total		**1223**

Table:4

The feedback responses (on a 5 point scale) from students for NEC conducted in Jan-June 2022

Feedback of Novel Engaging Courses

(January-April 2022)

Sr.	Module	Mnetor Name	Registered Students	Feedback Given by	% Responses	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	FFI
1	3D Printing	Gavendra Norkey	20	20	100	4.6	4.6	4.6	4.5	4.3	4.4	4.3	4.3	4.4	**4.3**	4.43
2	Animation	Amit Kumar Manjhvar	50	33	66	4	4	4.2	4	4.1	4.1	4.2	4.1	4.2	**4.1**	4.1
3	Artistry* - II	Pooja Sahoo	10	9	90	4.4	4.6	4.9	4.4	4.6	4.2	4.6	4.6	4.4	**4.6**	4.53
4	Basic and Advanced Excel	Abhilash Shukla	50	39	78	4.5	4.4	4.6	4.5	4.3	4.2	4.6	4.4	4.4	**4.4**	4.43
5	Basic Programming of Python using Google Colab	Hemant Choubey	47	25	53	4.7	4.5	4.6	4.5	4.6	4.4	4.6	4.6	4.4	**4.4**	4.53
6	Basics of Campus Recruitment Training	Trilok Pratap Singh	46	29	63	4.4	4.4	4.5	4.4	4.5	4.3	4.5	4.6	4.5	**4.4**	4.45
7	Basics of MATLAB Programming	Sandeep Sharma	20	17	85	4.7	4.6	4.8	4.7	4.6	4.4	4.6	4.6	4.7	**4.7**	4.64
8	Basics of Technical Analysis in Stocks	Ankit Kumar	50	25	50	4.4	4.2	4.6	4.3	4.1	4.1	4.4	4.4	4.2	**4.4**	4.31
9	Cloud Computing: Techniques & Tools	Mir Shahnawaz Ahmad	50	36	72	4.6	4.5	4.8	4.6	4.5	4.5	4.7	4.5	4.6	**4.6**	4.59
10	Coding Skills** - II	Rajni Ranjan Singh	41	32	78	4.6	4.7	4.7	4.5	4.3	4.4	4.5	4.4	4.6	**4.4**	4.51
11	Creative thinking and problem solving	Harbhajan Ahirwar	26	13	50	4.8	4.5	4.8	4.6	4.5	4.4	4.5	4.5	4.7	**4.6**	4.59
12	Data Analysis Skills	D K Jain	22	16	73	4.7	4.4	5	4.2	4.4	4.3	4.8	4.3	4.3	**4.3**	4.47
13	Design Skills Using Simulation Software	Sharad Agrawal	21	14	67	4.3	4	4.6	4.2	4.3	4.4	4.4	4.4	4.4	**4.4**	4.34
14	Digital Learning* - II	Punit Kumar Johari	14	10	71	4.5	4.4	4.6	4.4	4.7	4.4	4.5	4.5	4.5	**4.4**	4.49
15	Elements of Photographic Skills	Deep Kishore Parsediya	15	12	80	4.6	4.7	4.7	4.6	4.6	4.8	4.6	4.7	4.7	**4.6**	4.66
16	Emerging Technologies in Computer Science	Mahesh Parmar	18	13	72	4.8	4.5	5	4.8	4.7	4.5	4.5	4.7	4.7	**4.7**	4.69
17	English Literary Skills	Sanjeev Khanna	12	6	50	4.5	4.7	4.7	4.3	4.3	4.5	4.5	4.5	4.7	**4.7**	4.54
18	Environment Protection* - II	Aditya K. Agarwal	28	20	71	4.3	4.1	4	4.3	4.1	4.2	4.3	4.4	4.4	**4.1**	4.22
19	Food and Nutrition	Anjula Gaur	28	19	68	4.8	4.6	4.9	4.7	4.6	4.4	4.7	4.6	4.8	**4.7**	4.68
20	Games & Sports** - II	B.P.S. Bhadoria	49	35	71	4.8	4.9	4.9	4.8	4.7	4.8	4.8	4.8	4.9	**4.8**	4.82
21	Graphic Design	Satyam Shukla	50	38	76	4.5	4.2	4.4	4.3	4.3	4.2	4.4	4.2	4.1	**4.3**	4.29
22	Hindi Language Skills	Angad Singh Ojha	17	17	100	4.8	4.5	4.8	5	4.6	4.8	4.8	4.6	4.5	**4.5**	4.69
23	Introduction to Entrepreneurship: Challenges and Opportunitie	Varun Sharma	22	11	50	4.8	4.8	4.9	4.7	4.6	4.6	4.8	4.5	4.7	**4.6**	4.7
24	IT Tools	Abhishek Dixit	9	6	66	4.8	5	5	4.7	4.7	4.8	4.7	5	4.8	**4.5**	4.8
25	Knowing Madhya Pradesh	Anjula Mehto	50	20	40	4.5	4.6	4.7	4.7	4.5	4.4	4.6	4.7	4.5	**4.6**	4.58
26	Mentoring Skills** - II	Sapna Kumari	19	14	74	4.9	4.8	4.9	4.7	4.6	4.8	4.7	4.7	4.9	**4.6**	4.76
27	Music - The Melody of Life	Shubhi Kansal	12	6	50	4.7	4.7	5	4.5	4.7	4.5	4.7	4.5	4.5	**4.7**	4.65
28	National Cadet Corps** NCC - II	B.P.S. Bhadoria	20	19	95	4.8	4.7	4.9	4.7	4.6	4.9	4.8	4.9	5	**4.9**	4.82
29	National Service Scheme** NSS - II	Manish K. Sagar	33	17	52	4.9	4.8	4.9	4.8	4.7	4.9	4.8	4.7	4.8	**4.9**	4.82
30	Personality Development* - II	Anjali S Patil	23	12	52	4.7	4.8	4.8	4.7	4.6	4.5	4.7	4.5	4.4	**4.6**	4.63
31	Photo Editing Software: Adobe Photoshop	Versha Sinha	50	28	56	4.8	4.6	4.8	4.7	4.6	4.5	4.5	4.6	4.6	**4.4**	4.61
32	Physical Fitness* -II	Rajendra Prasad Kori	22	19	86	4.7	4.6	4.7	4.6	4.5	4.3	4.6	4.6	4.4	**4.4**	4.54
33	Public Speaking* - II	Manish Dixit & Ankita Seng	16	8	50	4.6	4.6	4.9	4.8	4.3	4.5	4.8	4.6	4.6	**4.5**	4.62

LIST OF NOVEL ENGAGING COURSES JULY - DEC. 2022

Sr.	Course Name & Code	Mentor	Mentor Deptt.
1	3D Printing (2000001)	Gavendra Norkey	ME
2	Amateur Radio Communication (2000002)	Vandana Vikas Thakare	EE
3	Design Skills Using Simulation Software (2000003)	Sharad Agrawal	ME
4	Data Analysis Skills (2000004)	D K Jain	MAC.
5	Robotics (2000007)	Karuna Markam	EC
6	Vehicular Skill Development (2000008)	Vedansh Chaturvedi	ME
7	Animation (2000009)	Amit Manjhvar	CSE
8	Digital Learning* - I (2000010)	Punit Kumar Johari	IT
9	Elements of Photographic Skills (2000012)	D.K. Parsediya	EC
10	Environment Protection* - I (2000013)	Aditya K. Agarwal	CE
11	National Service Scheme** (NSS) - I (2000016)	Manish Sagar	NSS
12	National Service Scheme** (NSS) - III (2000018)	Manish Sagar	NSS
13	National Cadet Corps** (NCC) - I (2000020)	B.P.S. Bhadoria	NCC
14	National Cadet Corps** (NCC) – III (2000022)	B.P.S. Bhadoria	NCC
15	Organic Farming (2000028)	Archana Tiwari	CE
16	Games & Sports** - I (2000032)	B.P.S. Bhadoria	Sports
17	Games & Sports** - III, (2000034)	B.P.S. Bhadoria	Sports
18	Alternative Therepies** - I (2000038)	Sunita Sharma	BT
19	Holistic Health* - I (2000042)	Vishal Chaudhary	EE
20	Sculpture Making* - I (2000046)	Pranshi Jain	Arch.
21	English Literary Skills (2000048)	Sanjeev Khanna	Humanities
22	Hindi Language Skills (2000049)	A.S. Ojha	MAC
23	Preliminary Journalism Skills (2000050)	Anish P. Jacob	CM
24	Food and Nutrition (2000052)	Anjula Gaur	App. Sc.
25	Career Guidance & Preparedness (2000053)	Praveen Bansal & Swati Gupta	EE & CM.
26	Public Speaking* - I (2000058)	Manish Dixit & Ankita Sengar	CSE & Arch.
27	Coding Skills** - I (2000060)	Rajni Ranjan Singh	CSE
28	Coding Skills** - III (2000062)	Rajni Ranjan Singh	CSE
29	Emerging Technologies in Computer Science (2000064)	Mahesh Parmar	CSE
30	Software Development** - I (2000066)	Atul Chauhan	Data Resource
31	Software Development** - III (2000068)	Atul Chauhan	Data Resource
32	Photo Editing Software: Adobe Photoshop (2000070)	Versha Sinha	Arch.
33	Basics of Technical Analysis in Stocks (2000071)	Ankit Kumar	Arch.
34	Graphic Design (2000072)	Satyam Shukla	Arch.
35	World Heritage Sites: A Brief Overview (2000073)	Richa Mishra	Arch.
36	Basic and Advanced Excel (2000074)	Abhilash Shukla	CE
37	Shilpa Samhita : Philosophy of Indian Ancient Geotechnical Engineering (2000075)	Chayan Gupta	CE
38	Fire Safety and Regulation in Building (2000076)	Hemant Shrivastava	CE
39	Developments in Pavement Construction: Past to Future (2000077)	Jayvant Choudhary	CE
40	SPSS For Data Analysis (2000078)	Prachi Singh	CE
41	Shutter Up-Flash Me Photography (2000080)	Shourabh Raghuwanshi	CM
42	Science and Technology Around Us (2000081)	Rakesh Dubey	CM
43	Cloud Computing: Techniques & Tools (2000083)	Mir Shahnawaz Ahmad	CSE
44	Role of MATLAB in Computations (2000084)	Ranjeet Kumar Singh	CSE
45	Demystifying Online Social networks (2000085)	Arun Kumar	CSE

46	Gender Sensitization (2000088)	Anshu Chaturvedi	CSE
47	IT Tools (2000089)	Abhishek Dixit	IT
48	Understanding Financial Markets (2000090)	Saumil Maheshwari	IT
49	Intellectual Property : Rules, Drafting and Processing (2000091)	Vikram Rajpoot	IT
50	Modern techniques for business correspondence (2000093)	Namrata Agrawal	IT
51	Integrating Engineering and Literacy (2000094)	Tej Singh	IT (AIR)
52	Imbalance Learning (2000095)	Bhagat Singh Raghuwanshi	IT (AIR)
53	Python for Image processing applications using Open CV (2000096)	Pawan Dubey	IT (AIR)
54	MATLAB: Applications in Mathematical Biology (2000098)	Divya Chaturvedi	MAC
55	Basics and Applications of Mathematica (2000099)	Atul Kumar Ray	MAC
56	Technical Report Writing for Engineers (2000100)	Minakshi	MAC
57	Proficiency in Microsoft Excel (2000101)	Nikhil Paliwal	EE
58	Fundamentals of Electronics Devices (2000102)	Manoj Kumar	EE
59	Microsoft Visio: Scratch to Advance (2000103)	Bhavna Rathore	EE
60	Renewable Energy Technology: Domestic load requirements (2000106)	Rahul Sagwal	EE
61	Electrical Wiring, hazards & safety (2000107)	Saurabh Rajput	EE
62	Basics of MATLAB Programming (2000108)	Sandeep Sharma	EC
63	Basic Programming of Python using Google Colab (2000109)	Hemant Choubey	EC
64	LT Spice Tutorial for Circuit Simulation (2000110)	Vikas Mahor	EC
65	Research Paper Writing (2000111)	Dinesh Rano	EC
66	Understanding Logic Gates (2000114)	Rahul Dubey	EC
67	MATLAB Simulink (2000115)	Deepak Batham	EC
68	CFD Foundation Course using ANSYS FLUENT (2000117)	Subash Chand Pal	ME
69	Solar Applications (2000118)	Ravi Kant Ranjan	ME
70	Computational Methods for Engineers using MATLAB (2000119)	Nitin Upadhyay	ME
71	Role of Non-Destructive Testing (NDT) in modern inspection technology (2000120)	Surendra Chourasiya	ME
72	Creative thinking and problem solving (2000121)	Harbhajan Ahirwar	ME
73	Material Characterization Techniques for Engineering Applications (2000122)	Dinesh Rathore	ME
74	System Dynamics: Using Bond Graph Approach (2000123)	Neeraj Mishra	ME
75	Basics of Campus Recruitment Training (2000124)	Trilok Pratap Singh	MBA
76	Corporate Governance (2000125)	Namrata Gupta	MBA
77	Professional Networking & CSR (2000126)	Monica Chauhan Bhadoriya	MBA
78	Craft practices in India (2000127)	Gautam Bhadoriya	CE
79	Design of Heat Exchangers (2000128)	Ashish Agrawal	ME
80	Smart Grid (2000129)	Himmat Singh	EE
81	Study of Historical Monuments of Gwalior (2000130)	Jaimala Jha	CSE
82	An Introduction to Queueing Systems and its Applications (2000131)	J.K. Muthele	MAC
83	Image processing using MATLAB (2000132)	Khushboo Agarwal	CSE
84	Digital Circuit Design (2000133)	Kuldeep Swarnkar	EE
85	Practical Electronics for Inventors (2000134)	Madhav Singh	EC
86	Research Paper Preparation and Publication -Basics (2000135)	Rakesh Narvey	EE
87	Basics of Control Systems for Engineers (2000136)	R. P. Narwaria	EC
88	Computational Thinking for Problem Solving (2000137)	Sanjiv Sharma	IT
89	Introduction to Auto CAD for Engineers (2000138)	Utkarsh Srivastava	ME
90	Smart Home Technologies (2000139)	Vikas Shejwar	IT
91	OrCAD PSpice (2000140)	Yashwant Sawle	EE

Registration Note

(i) Courses marked with * are of two parts (Part –I & II will run in two semesters). One credit for each part.

(ii) Courses marked with ** are of four parts (Part – I, II, III & IV will run in four semesters). One credit for each part.

(iii) Remaining all courses are of one credit each.

(iv) Course 2000151 is for III Semester students only.

(v) Course 2000155 is for V Semester students only.

(vi) All courses are open for both III & V Semester students except 2000151 & 2000155 (subject to the condition that the courses studied earlier during session 2021-22 by 2020 admitted batch cannot be taken again).

Table-5

The feedback responses (on a 5-point scale) from students for NEC conducted in July-December 2022

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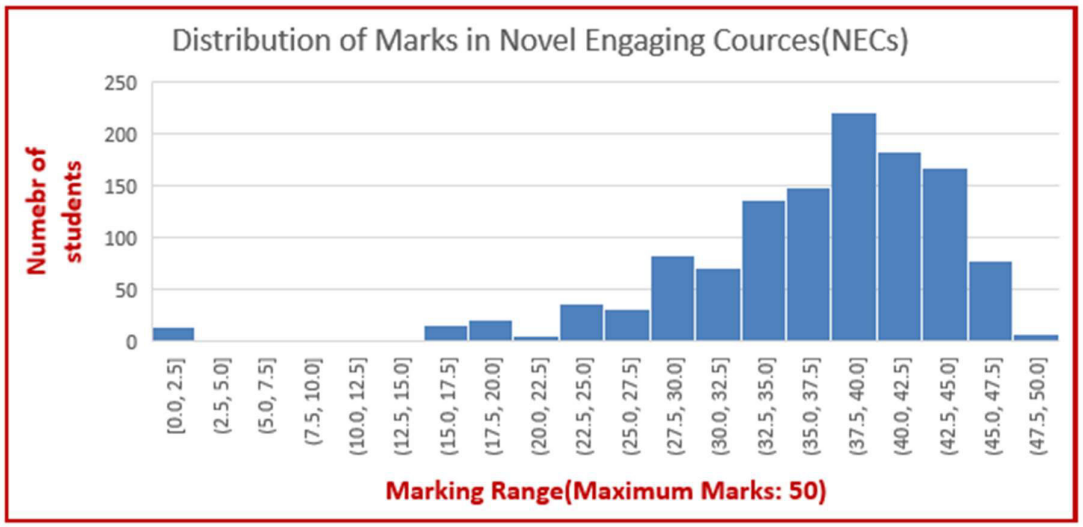
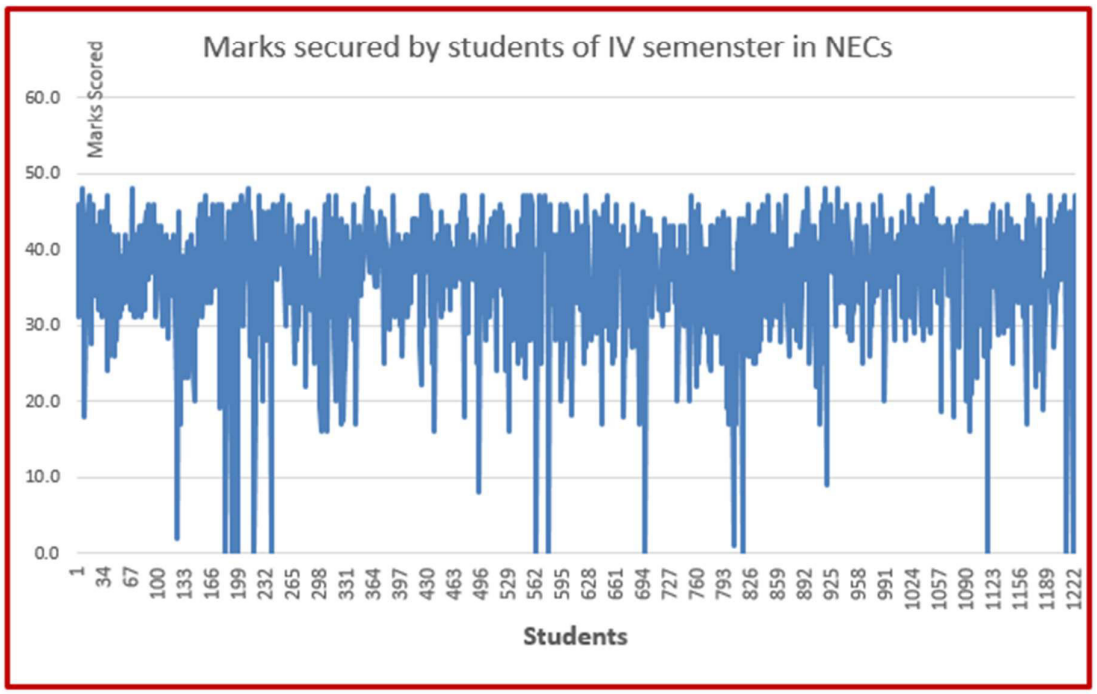
NEC STUDENT FEEDBACK (AUGUST-NOVEMBER 2022 SESSION)

Sr.	Name of the Course	Mentor Name	Registered Students	No. of students Submitted Feedback	% response	Feedback Questions Score on 5 Point Scale										Average Score
						Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
1	2000001 3D Printing	Dr Gavendra Norkey	50	24	48.00	4	4	4	4	4	4	4	4	4	4	4
2	2000003 Design Skills Using Simulation Software	Prof. Sharad Agrawal	23	14	60.87	4	5	5	5	5	5	5	5	5	5	4.9
3	2000004 Data Analysis Skills	Dr. D.K. Jain	50	16	32.00	5	5	5	5	5	5	5	4	4	5	4.8
4	2000007 Robotics	Dr. Karuna Markam	50	41	82.00	4	4	5	4	4	4	4	4	4	4	4.1
5	2000008 Vehicular Skill Development	Prof. Vedansh Chaturvedi &Ajay Rajput	15	4	26.67	5	5	5	5	5	5	5	5	5	5	5
6	2000009 Animation	Prof. Amit Manjhwar	50	29	58.00	4	4	5	5	4	4	5	4	5	5	4.5
7	2000010 Digital Learning* - I	Dr. Punit Kumar Johari	30	9	30.00	5	5	5	4	5	5	5	5	5	4	4.8
8	2000012 Elements of Photographic Skills	Prof. Deep Kishore Parsediya	50	30	60.00	4	4	5	5	4	4	4	4	4	4	4.2
9	2000013 Environment Protection* - I	Prof. Aditya K Agarwal	50	17	34.00	5	5	5	5	5	5	5	5	5	5	5
10	2000016 National Service Scheme** (NSS) - I	Dr. Manish Sagar	49	16	32.65	4	4	5	5	4	4	4	5	4	4	4.3
11	2000018 National Service Scheme** (NSS) - III	Dr. Manish Sagar	18	5	27.78	5	5	5	5	4	5	5	5	4	5	4.8
12	2000020 National Cadet Corps** (NCC) - I	Dr. BPS Bhadoria	50	34	68.00	4	4	4	4	4	4	4	4	4	4	4
13	2000022 National Cadet Corps** (NCC) - III	Dr. BPS Bhadoria	12	1	8.33	5	5	5	5	5	5	5	5	5	5	5
14	2000028 Organic Farming	Dr. Archana Tiwari	20	7	35.00	5	5	5	5	5	4	5	5	5	5	4.9
15	2000032 Games & Sports** - I	Dr. BPS Bhadoria	50	33	66.00	5	5	5	5	5	5	5	5	5	5	5
16	2000034 Games & Sports** - III	Dr. BPS Bhadoria	40	29	72.50	5	5	5	5	5	5	5	5	5	5	5
17	2000042 Holistic Health* - I	Prof. Vishal Choudhary	11	4	36.36	5	5	5	5	5	5	5	5	5	5	5
18	2000046 Sculpture Making* - I	Dr. Pranshi Jain	9	7	77.78	4	4	5	5	4	4	5	5	5	5	4.6
19	2000048 English Literary Skills	Dr. Sanjeev Khanna	18	5	27.78	5	5	5	5	5	5	5	5	5	5	5
20	2000049 Hindi Literary Skills	Prof. A.S. Ojha	24	14	58.33	5	5	5	5	5	5	5	5	5	5	5
21	2000050 Preliminary Journalism Skills	Prof. Anish P. Jacob	10	1	10.00	5	5	5	5	5	5	5	5	5	5	5
22	2000052 Food and Nutrition	Dr. Anjula Gaur	25	11	44.00	4	4	5	4	4	4	5	4	4	4	4.2
23	2000053 Career Guidance & Preparedness	Dr. Praveen Bansal/Dr. Swati Gupta	50	29	58.00	5	5	5	5	5	4	5	5	5	5	4.9
24	2000058 Public Speaking* - I	Dr. Manish Dixit & Ankita Sengar	50	35	70.00	5	5	5	5	4	5	5	5	5	5	4.9
25	2000060 Coding Skills** - I	Dr. Rajni Ranjan Makwana	50	17	34.00	4	4	4	4	4	4	4	4	4	4	4
26	2000062 Coding Skills** - III	Dr. Rajni Ranjan Makwana/Jigyasa Mishra	25	11	44.00	5	5	5	5	5	5	5	5	5	5	5
27	2000064 Emerging Technologies in Computer Science	Prof. Mahesh Parmar	50	41	82.00	4	4	5	4	4	4	4	4	4	4	4.1
28	2000066 Software Development** - I	Mr. Atul Chouhan	50	19	38.00	4	4	5	4	4	4	4	4	4	4	4.1
29	2000068 Software Development** - III	Mr. Atul Chouhan	18	11	61.11	5	5	5	5	5	5	5	5	5	5	5
30	2000070 Photo Editing Software: Adobe Photoshop	Ms. Versha Sinha	50	45	90.00	5	5	5	5	4	5	5	5	5	5	4.9
31	2000071 Basics of Technical Analysis in Stocks	Mr. Ankit Kumar	50	21	42.00	5	5	5	5	5	5	5	5	5	5	5
32	2000072 Graphic Design	Mr. Satyam Shukla	50	46	92.00	4	4	5	5	4	4	5	5	4	5	4.5
33	2000073 World Heritage Sites: A Brief Overview	Ms. Richa Mishra	46	34	73.91	5	5	5	5	5	5	5	5	5	5	5
34	2000074 Basic and Advanced Excel	Prof. Abhilash Shukla	50	16	32.00	5	5	5	5	5	4	5	5	5	5	4.9
35	2000076 Fire Safety and Regulation in Building	Prof. Hemant Shrivastava	24	8	33.33	5	5	5	5	4	5	5	5	4	5	4.8
36	2000077 Developments in Pavement Construction: Past	Prof. Jayvant Choudhary	12	8	66.67	5	5	5	5	5	4	5	5	4	5	4.8
37	2000080 Shutter Up-Flash Me Photography	Prof. Shourabh Raghuwanshi	50	20	40.00	4	4	5	4	4	5	5	5	4	4	4.4
38	2000081 Science and Technology Around Us	Prof. Rakesh Dubey	19	11	57.89	4	4	5	5	4	4	5	4	4	4	4.3
39	2000083 Cloud Computing: Techniques & Tools	Prof. Mir Shahnawaz Ahmad	50	45	90.00	5	5	5	5	5	5	5	5	5	5	5

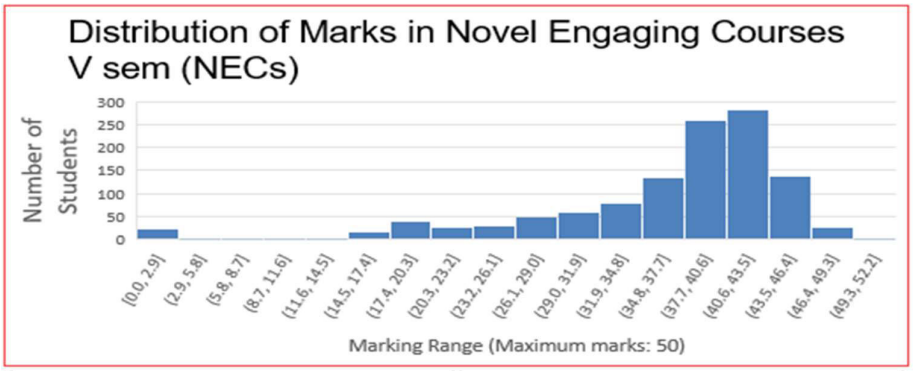
Item 35: Review of evaluation of NEC offered in July-December 2022

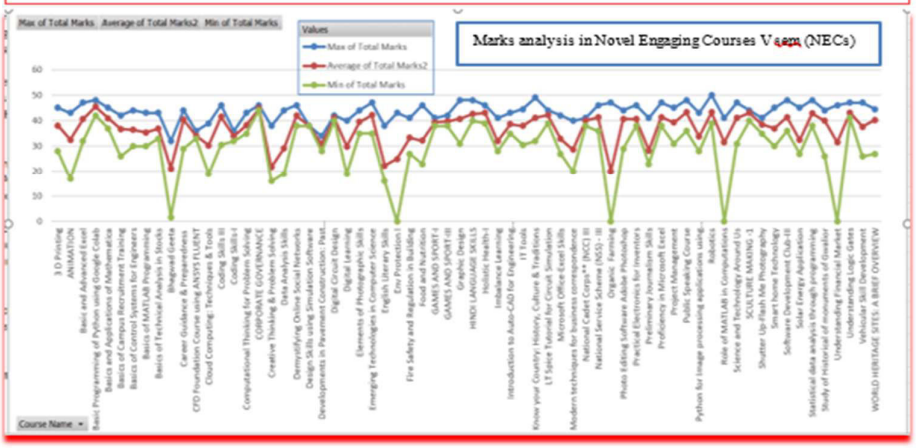




Item 8: To review the evaluation of Novel Engaging Courses offered for the III and V semester students (July-November 2022)

- The IQAC reviewed the evaluation mechanism of NEC for the July-Dec 2022 semester.
- It was found that highest number of V semester students were scoring in the range 40.6. to 43.5 out of 50 and III semester students scoring 36.4 to 39.0 out of 50. The distribution of marks is drawn below.
- The distribution is close to normal distribution, which is acceptable.
- The list of courses for the coming semester, Jan-June 2023 was also presented.
- Distribution of Marks in Novel Engaging Courses (NECs)





Item. 6 Feedback Report on conduction of the Novel and Engaging Courses (NEC) (Jan-April 2022) & (July-November 2022)

- The NEC are conducted for the holistic development of the students.
- Four (04) credits are assigned to NEC, 01 each in III, IV, V and VI semester.

Session	Number of student Registered	Number of student given Feedback	% of Students
Jan-April 22	1226	836	68%
July-Nov 22	2546	1458	57.27

Conclusion of IQAC Review of NEC Evaluation

- The IQAC reviews the evaluation mechanism of NEC on a routine basis.
- It was found that the highest number of V semester students were scoring in the range 40.6. to 43.5 out of 50 and III semester students scoring 36.4 to 39.0 out of 50. The distribution of marks is drawn below.
- The distribution is close to normal distribution, which is acceptable.

Annexure-IX

Research Publication 2017-2022

Last Five-year publication and citation status

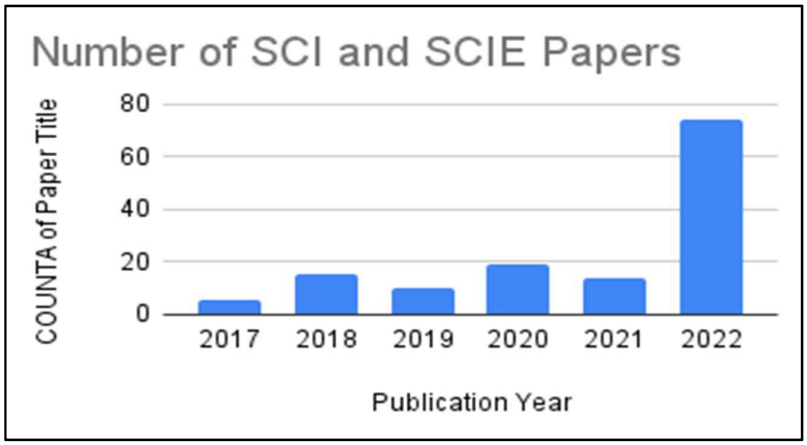
Source	Number of publications	Number of citations	H-Index
Scopus	401	2093	20
Web of science	308	1565	19

Year-wise SCOPUS papers

Year	2017	2018	2019	2020	2021
Number of papers	35	60	79	68	67
Citations/year	11	68	225	367	614

SCI and SCIE publications in Last Five-years

Publication Year	Number of SCI & SCIE papers
2017	5
2018	15
2019	10
2020	19
2021	14
2022	74
Grand Total	**137**



SCI & SCIE Publications of Last 5 years (2017-2022)

Faculty Name	Names of all authors	Paper Title	Journal Name	Paper Volu	Paper Issue	Page Numbe	Publicati on Year
Deepak Batham	Deepak Batham, Dharmendra Singh Yadav, Shashi Prakash	Efficient resource provisioning using traffic balancing in	International Journal of Communication Systems	30	9	1-14	2017
Deepak Batham	Deepak Batham, Dharmendra Singh Yadav, Shashi Prakash	Least loaded and route fragmentation aware RSA strategies for elastic	Optical Fiber Technology	39		95-108	2017
Dr. Chandra Shekhar Malvi	C. S. Malvi, Arpit Gupta, M. K. Gaur, R. Crook, D. W.	Experimental investigation of heat removal factor in solar flat plate collector for	International Journal of Green	14	4	442–448	2017
Dr. Vikas Mahor	Vikas Mahor, Manisha	An Aging-Aware Reliable FinFET-Based Low-Power 32-Word × 32-bit Register File	Circuits, Systems, and Signal	36	12	4789-4808	2017
Rakesh Kumar Dubey	R.K. Dubey, G. Singh, A.K. Majumder	Roping: Is it an optimum dewatering performance	Powder Technology	32		218-231	2017
Deepak Batham	Deepak Batham, Dharmendra Singh Yadav, Shashi Prakash	Survivability using traffic balancing and backup resource reservation in	International Journal of Communication Systems	31	15	1-21	2018
Dr. Alok Sharma	Vivek Garg 1, Dr. Alok Sharma 2	Urban sprawl Analysis Using	IRJET	5	5	4171-4176	2018
Dr. Nirlipta Saha	S. Dutta Gupta N. Saha	Promotion of shoot regeneration of Swertia chirata by biosynthesized silver nanoparticles and their	Plant Cell Tissue and Organ Culture	13	2	289-300	2018
Dr. Sharad Verma	Sharad Verma, Sukriti Goyal, Anchala Kumari, Aditi Singh, Salma Jamal, Abhinav Grover	Structural investigations on mechanism of lapatinib resistance caused by HER-2	Plos one	13	2	e0190942	2018
Dr. Sharad Verma	Sharad Verma, Aditi Singh, Anchala Kumari, Bharati Pandey, Salma Jamal, Sukriti Goyal, Siddharth	Insight into the inhibitor discrimination by FLT3	Chemical Biology and Drug Design	91	5	1056-1064	2018
Dr. Vikas Mahor	Vikas Mahor, Manisha	A state-of-the-art current mirror-based reliable wide fan-in FinFET domino OR gate design	Circuits, Systems, and Signal	37	2	475-499	2018
Dr.Alok Sharma	Avinesh Bhadouria 1 Dr. Alok Sharma 2	Transit Oriented	IJIRMPS	6	4	337-339	2018
Hari Mohan Dubey	Hari Mohan Dubey, Manjaree Pandit, Bijaya	An overview and comparative analysis of recent bio-inspired optimization techniques for	Swarm and Evolutionary	38	February	12-34	2018
Sachin Rameshrao	S.R. Geed, Sachin Prasad, M.K. Kureel, R.S. Singh, B.N. Rai	Biodegradation of wastewater in alternating aerobic-anoxic lab scale	Journal of Environmental	21		408-415	2018
Sonu Lamba	Sonu Lamba, Neeta Nain	A texture based mani-fold approach for crowd density estimation using	Multimedia Tools and	77	305	1-20	2018
Shri Anish P. Jacob	Harshika Suman, Anish P. Jacob, Dr. C. S. Malvi	Graphene in nanosolar cell	International Journal of Advanced Engineering Science and Technological	6	4	115-118	2018
Dr. Alok Sharma	author-2	Energy Efficient Buildings	IJIRMPS	VOLU ME 6,	ISSUE 04	340-345	2018
Dr. Alok Sharma	Dr. Alok Sharma 1 Ashish Choudhary	URBAN PLANNING STRATEGIES FOR SOCIAL AND RELIGIOUS	JOURNAL OF ADVANCED RESEARCH IN CONSTRUCTION	3	3	1-5	2018

DR. SARTHAK	S. Singhal	Octagonal Sierpinski Band Notched Super Wideband Antenna With Defected Ground	Journal of Computational	Vol. 17	3	1071–1081	2018
Dr. Akhilesh Tiwari	Uday Pratap Singh, Sanjeev Jain, Akhilesh Tiwari, Rajeev Kumar	Gradient evolution-based counter propagation network for	Soft Computing	20	2018	20	2018
Mr. Deobrat NPIU	Deobrat Singh, Supriya	Emergent D-Instanton as a	Brazilian Journal of	49	2	249-255	2019
Mr. Deobrat NPIU	R. Nitish, Deobrat Singh, Supriya Kar	CFT6 Bulk/Boundary AdSQ5	Physica Scripta	94	7	075301	2019
Mr. NARESH KUMAR	Raghuwanshi N.K.,	A new technique of gear mesh stiffness measurement using	Journal of Vibration and	1		021018-1-	2019
Mr. Kulbhushan Samal NPIU	Sachin RameshraoGeed, AnkitaTagade,	Development of adsorption-biodegradation hybrid process for removal of	Journal of Environmental	7	6	1034	2019
Ms. APRAJITA KUMARI NPIU	Aprajita Kumari,J.Patra,N.Pal,N.k uma r	Impact of Solar Panel on the Transformer	Iranian Journal of Science and Technology, Transactions of	44	3	1197-1206	2019
Dr. Vandana Vikas	Sweety Jain, Pankaj K. Mishra, Vandana	"Design of microstrip moisture sensor for determination of	Microwave and optical technology	Vol. 61	Issue 7	pp 1764-1768	2019
Dr. Amit Aherwar	Amit Aherwar, Tej Singh, Amit Singh, Amar Patnaik,	Optimum selection of novel developed implant material using	Material Science & Engineering Technology,	50	10	1232-1241	2019
Mr. CHETAN SHARMA NPIU	Sharma, C., Ojha, C.S.P., Shukla, A.K.S., Pham, Q.B.,	Modified approach to reduce GCM bias in downscaled precipitation:	Water	11	10	-	2019
Mr. CHETAN SHARMA NPIU	Sharma, C., Ojha, C.S.P.	Changes of Annual Precipitation and probability	Water	11	10	-	2019
Dr. Amit Aherwar	Amit Aherwar, Amar Patnaik, Marjan	Effect of Molybdenum Content on	Journal of Materials Engineering	28		6340–6353	2019
Dr. Akhilesh Tiwari	Singh, S., Verma, S. K., & Tiwari, A.	A novel approach for finding crucial node	International Journal of	34	09	20500	2020
Dr. Manoj Kumar	Pushpendra Singh, Manoj Kumar Gaur	Review on development, recent advancement and applications of various	Energy Sources, Part A: Recovery, Utilization, and			1-21	2020
Dr. Sandeep Sharma	Sandeep Sharma, Jaiprakash Nagar	Intrusion Detection in Mobile Sensor Networks: A Case	Wireless Personal Communications,	115		2569–2589	2020
Dr. Ravindra Pratap	Shruti Dixit, Deepak Batham,	"Cost function based class of service provisioning strategy	International Journal of Communication	33	18	e4634	2020
Mr. DEEPAK	Deepak Batham, Shailendra Kumar Pathak, Dharmendra	A traffic scheduling strategy based on cost function for	Optical Fiber	60		1023	2020
Mr. DEEPAK	Shruti Dixit, Deepak Batham, Ravindra	Cost function-based class of service provisioning strategy	International Journal of	33	18	e4634	2020

Shri Anish P. Jacob	Harshika Suman, Reena Srivastava, Sadhna Shrivastava, Anurag Shrivastava, A. P. Jacob, C.	DFT analysis of H2S adsorbed zigzag and	Chemical Physics	7	1372	1 - 9	2020
Dr. Amit Aherwar	Santosh Kumar Razak, Amit Aherwar,	Mechanical and tribological properties of composite made of	Materials Research	7	1	016543	2020
Dr. Akhilesh Tiwari	Singh, S., Verma, S. K., & Tiwari, A.	A novel method for destabilization of	Modern Physics	Not assigned yet (Online		Not assigned	2020
Dr. Amit Aherwar	Vishesh Kumar Anand, Amit Aherwar, Mozammel Mia, Omer	Influence of silicon carbide and porcelain on tribological	Tribology International	1		1065	2020
Dr. Akhilesh Tiwari	Pandit, S., Shukla, P. K., Tiwari, A., Shukla, P. K., Maheshwari, M., &	Review of video compression techniques based on fractal	International Journal of	34	08	20500	2020
Dr. Deepak Kumar	Asifa Tassaddiq, Altaf Ahmad Bhat , D. K. Jain and Farhad Ali	On (p, q)-Sumudu and (p, q)-Laplace Transforms of the	Symmetry	12	3(390)	1-18	2020
Mr. CHETAN SHARMA NPIU	Sharma, C., Ojha, C.S.P.	Modified Signal to Noise ratio method for early	ASCE- Journal of Hydrologic	25	8	-	2020
Dr. Akhilesh Tiwari	Pathak, Y., Shukla, P. K., Tiwari, A., Stalin, S., & Singh, S	Deep Transfer Learning Based Classification	Innovation and Research in Biomedical	Online Publish		not assigned yet (online	2020
Dr. Sandeep Sharma	J. Amutha, Jaiprakash Nagar	A Distributed Border Surveillance (DBS) System for Rectangular and Circular Region of	Wireless Personal Communications, Springer	117		2135–2155	2020
Dr. Sandeep Sharma	Abhilash Singh, Vaibhav Kotiyal, Sandeep Sharma, Jaiprakash Nagar, Cheng-Chi Lee	A Machine Learning Approach to Predict the Average Localization	IEEE Access	08		208253 - 208263	2020
Mr. DEEPAK	Deepak Batham, Dharmendra Singh	HPDST: Holding pathlength domain scheduled traffic	Optik	2		1651	2020
Dr. Hemant Choubey	Hemant Choubey and Alpana Pandey	A combination of statistical parameters for the detection of epilepsy and EEG	Signal,Image and Video	15		475-483	2020
Dr. Sanyam Bahga	Sanyam Bahga, Gaurav Raheja	Complexities of practicing architectural	Frontiers of Architectural	9	3	568-578	2020
Dr. Sandeep Sharma	Abhilash Singh, Sandeep Sharma,	Nature-inspired algorithms for Wireless Sensor Networks: A	Computer Science Review, Elsevier	39		1003	2021
Mr. Praveen Bansal	Praveen Bansal.Alka	Multilevel Inverter Based Power Quality Enhancement Using	International Journal of Electronics,				2021
Dr. Laxmi Srivastava	B. Rathore, S. Chakrabarti, L.	ARI and ARID control of virtual synchronous	IET Renewable Power				2021
Dr. Manjaree Pandit	Sunita Shukla, Manjaree Pandit	Multi-objective fuzzy rank based scheduling of utility connected microgrid with high renewable energy using	International Transactions on Electrical Energy Systems				2021
Dr. Laxmi Srivastava	Saket Gupta, Narendra Kumar,	An efficient Jaya algorithm with Powell's Pattern Search for	Energy Sources, Part B: Economics, Planning, and				2021

Dr. Sandeep Sharma	Abhilash Singh, Jaiprakash Nagar, Sandeep Sharma,	A Gaussian process regression approach to predict the k-barrier coverage probability for	Expert Systems with	1		1146	2021
Dr. Sandeep Sharma	Jitendra Singh, Akanksha Chaturvedi,	A novel model to eliminate the doubly near-far problem in	IET Communications	15	12	1539-1547	2021
Dr. Sulochana	Rinisha Bagaria, Sulochana Wadhwani, Arun Kumar	A Wavelet Transform and Neural Network Based Segmentation &	International Journal for Light and Electron	Volume 236, June		1666	2021
Dr. Laxmi Srivastava	Nikhil Paliwal, Laxmi Srivastava, Manjaree	Equilibrium optimizer tuned novel FOPID-DN	International Transactions on Electrical Energy				2021
Dr. Laxmi Srivastava	Saket Gupta, Narendra Kumar, Laxmi Srivastava, Hasmat Malik, Alberto Pliego Marugán, Fausto Pedro	A Hybrid Jaya–Powell's Pattern Search Algorithm for Multi-Objective Optimal	A Hybrid Jaya–Powell's Pattern Search Algorithm for Multi-Objective Optimal Power Flow	14	10	1-24 [4]	2021
Dr. Manjaree Pandit	Nikhil Paliwal, Laxmi Srivastava, Manjaree	Octagonal Sierpinski Band Notched Super Wideband Antenna With Defected Ground	International Transactions on Electrical Energy				2021
Dr. Sandeep Sharma	Vaibhav Kotiyal, Abhilash Singh, Sandeep Sharma, Jaiprakash Nagar,	ECS-NL: An Enhanced Cuckoo Search Algorithm for Node	Sensors	21	11	35	2021
Dr. Sandeep Sharma	J.Amutha, Sandeep Sharma, Sanjay	Strategies based on various aspects of clustering in wireless sensor networks using classical, optimization and machine learning	Computer Science Review Elsevier	40		1003	2021
Mr. Praveen Bansal	Praveen Bansal, Alka	Nonlinear adaptive normalized least mean absolute third algorithm for the	International Journal of Circuit Theory			1-25	2021
Dr. Abhishek Dixit	Vikram Rajpoot, Rahul Dubey, Safdar Sardar Khan, Saumil Maheshwari, Abhishek Dixit, Arpit	Orchard Boumans algorithm and MRF approach based on	Traitement du Signal	39	2	737-744	2022
Dr. Hemant Choubey	Hemant CHoubey,Sandeep Sharma,Rajendra	HFD and MCFET Based Feature Extraction Technique	Traitement du Signal	39	2	695-700	2022
Dr. Manish Dixit	Devanshu Tiwari, Manish Dixit,	Breast cancer-caps: a breast cancer screening system based on capsule	Turkish Journal of Electrical Engineering and	30	5	1804-1820	2022
Dr. Manoj Kumar	9. Shah R., Pandit R.K., Gaur M.K.	Urban physics and outdoor thermal comfort for sustainable street	, Alexandria Engineering	61,	-12	10871-	2022
Dr. Rahul Dubey	Vikram Rajpoot Rahul Dubey Praveen Kumar Mannepalli Parcha Kalyani	Mango Plant Disease Detection System	Traitment du Signal				2022
Dr. Rahul Dubey	Vikram Rajpoot Rahul Dubey Safdar Sardar Khan Saumil Maheshwari	Orchard Boumans Algorithm and MRF Approach Based on Full Threshold	Traitment du signal				2022

Dr. Vikram Rajpoot	Vikram Rajpoot, Rahul Dubey , Safdar Sardar Khan, Saumil Maheshwari ,	Orchard Boumans Algorithm and MRF Approach Based on	Traitement du Signal	39	2	737-744	2022
Ms. Smita Parte	Smita Athanere Parte and Ramesh	Blockchain based Hierarchical Semi-Decentralized	Journal of King Saud University - Computer and	34	4	1523-1534	2022
Dr. Dhananjay Bisen	Deepak Kumar Jain, Tarishi Singh,Praneet Saurabh, Dhananjay Bisen, Neeraj Sahu, Jayant Mishra, Habibur	Deep Learning-Aided Automated Pneumonia Detection and	Computational Intelligence and	20	74743		2022
Dr. Manish Dixit	Sanjay Patsariya and Manish Dixit	A new block based non-blind hybrid color image watermarking approach using lifting scheme and	Traitment du Signal	39	4	1159-1168	2022
Dr. Manish Dixit	Shradha Dubey, Manish	A comprehensive survey on human pose	Multimedia Systems	29	1 [6]	167-195 [7]	2022
Mr. Saurabh Kumar	Saurabh Kumar Rajput, Dharmendra	Impact of Solar Intensity on Photovoltaic-Generated Current Harmonics and Transformer Life: A	ASME Journal of Solar Energy Engineering - Including Wind Energy and Building	1	2	021006	2022
Dr. Bhagat Singh	Bhagat Singh	Class-specific extreme learning machine based on overall distribution for	Soft Computing			1-18	2022
Dr. Pratesh Jayaswal	Tomar, Arvind Singh;	A Hybrid Fault Diagnosis Method Using Translation Invariant Wavelet Denoising,	Traitement du Signal	39	6	2041-2053	2022
Dr. Amit Aherwar	Amit Aherwar, Catalin I. Pruncu,	Optimal Design Based on Fabricated SiC/B4C/Porcelain Filled Aluminium Alloy Matrix	Silicon	14		603-615	2022
Dr. Arun Kumar	Ojha, M.K., Wadhwani, S.,	Automatic detection of arrhythmias from an ECG signal using an	Physical and Engineering Sciences in		45	665–674	2022
Dr. Arun Kumar	Ojha, M.K., Wadhwani, S.,	Automatic detection of arrhythmias from an ECG signal using an	Physical and Engineering		45	665–674	2022
Dr. Atul Kumar Ray	Atul Kumar Ray, B. Vasu, P. V. S. N. Murthy, O. Anwar Bég, R. S.	Convective Flow of Non-homogeneous Fluid Conveying Nano-Sized Particles with	Arabian Journal for Science and	47		6559–6576	2022
Dr. Atul Kumar Ray	Dig Vijay Tanwar, Atul Kumar Ray & Anand	Lie Symmetries and Dynamical Behavior of	Qualitative Theory of	21		24	2022
Dr. Gagandeep Kaur	Gagandeep Kaur, Prasenjit Chanak	An Energy Aware Intelligent Fault Detection	IEEE Sensors Journal	22	5	4722-4731	2022
Dr. Manoj Kumar	11. Shrivastava A, Gaur M.K., Singh P	Mango leather (Aam Papad) drying in hybrid greenhouse solar dryer with evacuated tube	Energy Sources, Part A: Recovery, Utilization, and			1-18	2022
Dr. Manoj Kumar	Gaur M.K., Thakur V.K.	Experimental Analysis of Sustainability of Passive Solar Still with Nanoparticles Operating	Energy Sources, Part A: Recovery, Utilization, and	44	2	5227-5245	2022
Dr. Rajendra Kumar	Rajeev Kumar Singh, Akhilesh Tiwari, Rajendra	Deep transfer modeling for classification of	Multimed Tools				2022
Dr. Sulochana	Ojha, M.K., Wadhwani, S.,	Automatic detection of arrhythmias from an ECG signal using an	Physical and Engineering Sciences in		45	665–674	2022
Dr. Bhagat Singh	Bhagat Singh Raghuwanshi, Akansha Mangal,	"Universum based kernelized weighted extreme learning	International Journal of Machine	13	11	3387–3408	2022
Dr. Dhananjay Bisen	Tarishi Singh, Praneet Saurabh, Dhananjay Bisen, Lalit Kane, Mayank Pathak,	Ftl-CoV19: A Transfer Learning Approach to	Computational Intelligence and	20	19539		2022

Dr. Hemant Choubey	VIVEK ARYA , HEMANT CHOUBEY, SANDEEP	Image Enhancement and Features Extraction of	IEEE Access	10		76742-	2022
Dr. Vandana Vikas	Agarwal, A.,Singhal,	Design of miniaturized dual-polarized dipole antenna for 4G &	Frequenz				2022
Mr. Nikhil Paliwal	Nikhil Paliwal, Laxmi Srivastava, Manjaree	Rao algorithm based optimal Multi-term FOPID controller for	Optimal Control Applications and	43	6	1707-1734	2022
Dr. Abhishek Dixit	Vikram Rajpoot, Rahul Dubey, Praveen Kumar Mannepalli, Parcha Kalyani, Saumil Maheshwari, Abhishek Dixit, Akash	Mango plant disease detection system	Traitement du Signal	39	3	1071-1078	2022
Dr. Amit Aherwar	Tej Singh, Punyasloka Pattnaik, Amit Aherwar, Lalit Ranakoti, Gábor	Optimal Design of WoodRice Husk-Waste-Filled PLA Biocomposites Using	Polymer	14	13	2603	2022
Dr. Nitin Upadhyay	Nitin Upadhyay, Surendra Kumar	Extreme learning machine and ensemble techniques for	Life Cycle Reliability and	11		189-201	2022
Dr. Pawan Dubey	Pawan Dubey, Tirupathiraju	Optimal directional texture codes using multiscale bit crossover	Multimedia Tools and	81	14	20291-	2022
Dr. Pramod Kumar	Agarwal, A.; Singhal, P.K.; Thakare, V.V.	Design of miniaturized dual-polarized dipole antenna for 4G &	Frequenz	76	5	309-315	2022
Dr. Rahul Dubey	Jayaprakash Venugopala Rahul Dubey Vikas Mahor G. Ramkumar Ajay Singh Yadav Vikas Tripathi Ranjith	Analysis and performance enhancement of newly designed solar based heat pump for water	Energy Reports				2022
Dr. Rahul Dubey	Suchi Mishra, Rahul Dubey, Preety D.	Fault Size Estimation of Bearings Using Multiple Decomposition	Scientific Programming,				2022
Dr. Sulochana	Rajni Maurya, Sulochana	An Efficient Method for Brain Image Preprocessing with	Optik	2		1694	2022
Dr. Tej Singh	Tej Singh, Ranjeet Kumar Singh, Ganesh Gupta, Kalka Dubey,	Circulate Matrix and Compression Sensing Based	Traitement du Signal	39	3	853-862	2022
Dr. Vikram Rajpoot	Vikram Rajpoot* Rahul Dubey Praveen Kumar Mannepalli Parcha Kalyani Saumil Maheshwari	Mango Plant Disease Detection System	Traitement du Signal	39	3	1071-1078	2022
Mr. Ranjeet Kumar	Ranjeet Kumar Singh* , Ganesh Gupta , Tej Singh,	Circulate Matrix and Compression Sensing Based	Traitement du Signal	39	03	853-862	2022
Dr. Arun Kumar	Amhia, H., & Wadhwani, A. K. (2022)	ECG signal PQRS detection and	International Journal of	6	(S2)	10858–1087	2022
Dr. Dhananjay Bisen	Dhananjay Bisen, Rishabh Shukla, Narendra Rajpoot, Praphull Maurya, Atul	Responsive human-computer interaction model based on recognition of facial	Multimedia Tools and	81		18011–	2022

Dr. Manoj Kumar	Anand Kushwah, Anil Kumar, Manoj Kumar	Drying kinetics, performance, and quality assessment for banana	Journal of Food Process	Volume	, Issue 3	1-10	2022
Dr. Chandra Shekhar	Deepak, C. S. Malvi	Experimental investigation of Effect of Dust Accumulation and	Energy Sources, Part A: Recovery, Utilization, and	44	2	4427-4441	2022
Dr. Chandra Shekhar	Pushpendra Singh, M. K. Gaur , Chandra Shekhar	Effect of Drying Area on Heat Transfer Coefficient and Drying Kinetics of High	Heat Transfer	53	11	79-97	2022
Dr. Gagandeep Kaur	Gagandeep Kaur, Prasenjit Chanak,	A Green Hybrid Congestion Management	IEEE Transactions on Green Communications and	6	4	2144-2155	2022
Dr. Hemant Choubey	Tanya Sood,Satyartha Prakash,Sandeep Sharma,Abhilash	Intrusion Detection System in Wireless Sensor Network Using	Wireless Personal	1		911–931	2022
Dr. Manish Dixit	Priyanka Gupta, Manish	Image based Crack Detection	Multimedia Tools and				2022
Dr. Nidhi Saxena	Nidhi Saxena, Gaurav Saxena, Neelu Khare, Md	Pansharpening scheme using spatial detail injection–	IET Image Processing	16	9	2297-2307	2022
Dr. Rakesh Singh	Nitin Paharia, R.S. Jadon,	Feature selection using improved multiobjective and opposition-based competitive binary gray	Journal of Electronic	31	3	033039-0330	2022
Mr. Gavendra Norkey	Akanksha Prajapati, Gavendra Norkey (Corresponding), Girish Dutt Gautam	Optimization of heat affected zone in laser cutting of Kevlar-29 fiber composite using hybrid response surface based	Proc IMechE Part C: J Mechanical Engineering Science,	2	17	9622– 9638	2022
Dr. Abhishek Dixit	Rahul Dubey, Vikram Rajpoot, Ankur Chaturvedi, Abhishek Dixit,	Ball-Bearing Fault Classification Using Comparative Analysis of Wavelet Coefficient	IETE Journal of			1-11	2022
Dr. Akhilesh Tiwari	Sanjay Patsariya and Manish Dixit	Entropy bases secured and robust image watermarking using lifting wavelet transform and	Traitment du Signal	30		1751-1759	2022
Dr. Manish Dixit	Ruchi Jayaswal and Manish Dixit	A face mask detection system: An approach to	Concurrency and Computation: Practice and	34	28		2022
Dr. Manoj Kumar	Vedansh Chaturvedi, Manoj Kumar Gaur*	Application of entropy GRA – DoE approach in performance assessment of single	Desalination and Water Treatment	2		1-20	2022
Dr. Minakshi	Sampath Kumar, Minakshi Poonia, Rahul Kumar, Gaurav Sharma and Somesh	Design and Implementation of Low Power, High-	Journal of Circuits, Systems, and	31	17	22502	2022
Dr. Rahul Dubey	"Rahul Dubey, Vikram Rajpoot, Ankur Chaturvedi, Abhishek Dixit,Saumil Maheshwari"	Ball-Bearing Fault Classification Using Comparative Analysis of Wavelet Coefficient based on Entropy	IETE Journal of				2022
Dr. Sanjiv Sharma	Prakash Chandra Sharma, Rohit Raja, Santosh Kumar Vishwakarma,Sanjiv Sharma, Pankaj Kumar	Analysis of brain signal processing and real-	Springer Multimedia Tools	81	28	41013-	2022
Dr. Vikas Mahor	Vikas Mahor, Ranjeet Yadav, Karthikeyan	Vibration compensation for railway track displacement	IET The Journal of	20	11	1076-1085	2022

Dr. Vikas Mahor	Jayaprakash Venugopal a, Rahul Dubey b, Vikas Mahor b, G. Ramkumar c, Ajay	Analysis and performance enhancement of newly designed solar based	Elesevier Energy	8	11	302-312	2022
Dr. Vikram Rajpoot	Rahul Dubey , Vikram Rajpoot, Ankur Chaturvedi, Abhishek Dixit	Ball-Bearing Fault Classification Using Comparative Analysis of Wavelet Coefficient	IETE Journal of	68	5	1-15	2022
Mr. Saurabh Kumar	Saurabh Kumar Rajput, Dharmendra	Forecasting power-factor reductions in rooftop PV-integrated industrial power	ELSEVIER Sustainable Energy,	33		1009	2022
Shri Vedansh	Vedansh Chaturvedi, Manoj Kumar Gaur	Application of entropy GRA – DoE approach in performance	Desalination and Water Treatment	2	November 2022	1-20	2022
Dr. Manoj Kumar	Koli, C. S., Gaur M.K., Singh P	Energy and exergy assessment of a novel parabolic hybrid active	Solar Energy	245,		211-223	2022
Dr. Manoj Kumar	10. Singh P., Gaur M.K, Malvi C.S.	Effect of Drying Area on Heat Transfer Coefficient and Drying Kinetics of High	Heat Transfer	53	(11),	79–97	2022
Dr. Manoj Kumar	7. Thakur V.K., Gaur	Energy and Exergy Analyses of Passive	International Journal of	Vol. 39,	No. 4,	339-360,	2022
Dr. Manoj Kumar	5. Kushwah A., Kumar A., Gaur	Performance analysis of heat exchanger-evacuated tube assisted	Sustainable Energy Technologies	53	part B		2022
Dr. Pawan Dubey	Agarwal, Anshul, Kumar, Nitish,	Machine Learning Based Maximum Power	Indian Journal of Pure & Applied	60	10	892-898	2022
Dr. Rakesh Singh	Amita Shrama, R.S.	Characterization of Indian Visual Arts Architecture Ages and	Multimedia Tools and	81	24	1-21	2022
Dr. Gagandeep Kaur	Gagandeep Kaur, Prasenjit Chanak	An Intelligent Fault Tolerant Data Routing Scheme for Wireless Sensor	IEEE Transactions		[11]	1 - 11	2022
Dr. Manish Dixit	Shradha Dubey and Manish Dixit	Recent developments on computer aided systems for diagnosis of diabetic	Multimedia Tools and			1-55	2022
Dr. Manish Dixit	Ruchi Jayaswal and Manish Dixit	AI-based face mask detection system: a straightforward	Multimedia Tools and			1-33	2022
Dr. Manoj Kumar	Rakesh Gupta and Manoj Kumar	AEHO: Apriori-Based Optimized Model for Building Construction	IEEE Access	10		103852-1038	2022
Dr. Vikram Rajpoot	Abhishek Singh Rathore, Siddhartha Kumar Arjaria, Manish Gupta, Gyanendra	Erythemato-Squamous Diseases	IETE Journal of	68	4	21-42	2022
Dr. Manjaree Pandit	Poonam Singh, Manjaree Pandit, Laxmi Srivastava	Techno-socio-economic-environmental estimation of hybrid renewable energy system using two-phase swarm-evolutionary algorithm	Sustainable Energy Technologies and Assessments	53		102483	2022

SCOPUS PUBLICATIONS DURING YEAR 2022						
S.No.	**Authors**	**Title**	**Source title**	**Vol**	**Issue**	**DOI**
1	Tomar A.S., Jayaswal P.	A Hybrid Fault Diagnosis Method Using Translation Invariant Wavelet Denoising, Hierarchical Entropy, and Support Vector Machine with PSO Algorithm	Traitement du Signal	39	6	10.18280/ts.39061 6
2	Choudhary J., Sukhija M., Gupta A.	A comparative analysis of engineering and economical suitability of bituminous mastics containing waste fillers	Case Studies in Construction Materials	17		10.1016/j.cscm.202 2.e01640
3	Tiwari V., Dubey H.M., Pandit M.	Assessment of Optimal Size and Location of DG/CB in Distribution Systems using Coulomb–Franklin's Algorithm	Journal of The Institution of Engineers (India): Series B	103	6	10.1007/s40031- 022-00811-w
4	Ojha S.S., Singhal P.K., Thakare V.V.	Dual-band rectenna system for biomedical wireless applications	Measurement : Sensors	24		10.1016/j.measen.2 022.100532
5	Singh A., Amutha J., Nagar J., Sharma S., Lee C.-C.	AutoML-ID: automated machine learning model for intrusion detection using wireless sensor network	Scientific Reports	12	1	10.1038/s41598- 022-13061-z
6	Shah R., Pandit R.K., Gaur M.K.	Urban physics and outdoor thermal comfort for sustainable street canyons using ANN models for composite climate	Alexandria Engineering Journal	61	12	10.1016/j.aej.2022. 04.024
7	Kumar S., Poonia M., Kumar R., Sharma G., Kumar S.	Design and Implementation of Low Power, High- Speed Configurable Approximation 8-Bit Booth Multiplier	Journal of Circuits, Systems and Computers	31	17	10.1142/S0218126 622502966
8	Srivastava S., Srivastava A., Jain S., Kumar N., Malvi C.S.	Performance analysis of PCM curtain for thermal comfort	Research Journal of Textile and Apparel	26	4	10.1108/RJTA-05- 2021-0066
9	Chaturvedi V., Gaur M.K.	Application of entropy GRA – DoE approach in performance assessment of single slope passive solar still in various environmental	Desalination and Water Treatment	277		10.5004/dwt.2022. 28918

		conditions				
10	Raghuwanshi B.S., Mangal A., Shukla S.	Universum based kernelized weighted extreme learning machine for imbalanced datasets	International Journal of Machine Learning and Cybernetics	13	11	10.1007/s13042-022-01601-y
11	Venugopal J., Dubey R., Mahor V., Ramkumar G., Yadav A.S., Tripathi V., Ranjith Kumar V., Mohanavel V., Sathyamurthy R.	Analysis and performance enhancement of newly designed solar based heat pump for water heating application	Energy Reports	8		10.1016/j.egyr.2022.06.112
12	Sharma P.C., Raja R., Vishwakarma S.K., Sharma S., Mishra P.K., Kushwah V.S.	Analysis of brain signal processing and real-time EEG signal enhancement	Multimedia Tools and Applications	81	28	10.1007/s11042-022-12887-z
13	Koli C.S., Gaur M.K., Singh P.	Energy and exergy assessment of a novel parabolic hybrid active greenhouse solar dryer	Solar Energy	245		10.1016/j.solener.2022.09.021
14	Kushwah A., Kumar A., Kumar Gaur M., Pal A.	Performance analysis of heat exchanger-evacuated tube assisted drying system (HE-ETADS) under unload condition	Sustainable Energy Technologies and Assessments	53		10.1016/j.seta.2022.102589
15	Singh P., Pandit M., Srivastava L.	Techno-socio-economic-environmental estimation of hybrid renewable energy system using two-phase swarm-evolutionary algorithm	Sustainable Energy Technologies and Assessments	53		10.1016/j.seta.2022.102483
16	Amutha J., Sharma S., Sharma S.K.	An energy efficient cluster based hybrid optimization algorithm with static sink and mobile sink node for Wireless Sensor Networks	Expert Systems with Applications	203		10.1016/j.eswa.2022.117334
17	Tiwari R., Sharma R., Dubey R.	Microstrip Patch Antenna Parameter Optimization Prediction Model using Machine Learning Techniques	International Journal on Recent and Innovation Trends in Computing and Communicati	10	9	10.17762/ijritc.v10i9.5691

			on			
18	Maurya R., Wadhwani S.	An Efficient Method for Brain Image Preprocessing with Anisotropic Diffusion Filter & Tumor Segmentation	Optik	265		10.1016/j.ijleo.202 2.169474
19	Sood T., Prakash S., Sharma S., Singh A., Choubey H.	Intrusion Detection System in Wireless Sensor Network Using Conditional Generative Adversarial Network	Wireless Personal Communications	126	1	10.1007/s11277-022-09776-x
20	Prajapati A., Norkey G., Gautam G.D.	Optimization of heat affected zone in laser cutting of Kevlar-29 fiber composite using hybrid response surface based grey wolf optimization (RSGWO) algorithm	Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science	236	17	10.1177/0954406221096557
21	Dubey S.M., Dubey H.M., Salkuti S.R.	Modified Quasi-Opposition-Based Grey Wolf Optimization for Mathematical and Electrical Benchmark Problems	Energies	15	15	10.3390/en15155704
22	Singh T., Pattnaik P., Aherwar A., Ranakoti L., Dogossy G., Lendvai L.	Optimal Design of Wood/Rice Husk-waste-Filled PLA Biocomposites Using Integrated CRITIC–MABAC-Based Decision-Making Algorithm	Polymers	14	13	10.3390/polym141 32603
23	Rout P.K., Roy S., Ganguly S., Rathore D.K.	A review on properties of magnesium-based alloys for biomedical applications	Biomedical Physics and Engineering Express	8	4	10.1088/2057-1976/ac6d81
24	Saxena N., Saxena G., Khare N., Rahman M.H.	Pansharpening scheme using spatial detail injection– based convolutional neural networks	IET Image Processing	16	9	10.1049/ipr2.12384

25	Singh R.K., Gupta G., Singh T., Dubey K., Mehto A.	Circulate Matrix and Compression Sensing Based Multi-Level Image Encryption	Traitement du Signal	39	3	10.18280/ts.39031 0
26	Rajpoot V., Dubey R., Mannepalli P.K., Kalyani P., Maheshwari S., Dixit A., Saxena A.	Mango Plant Disease Detection System Using Hybrid BBHE and CNN Approach	Traitement du Signal	39	3	10.18280/ts.39033 4
27	Ojha M.K., Wadhwani S., Wadhwani A.K., Shukla A.	Automatic detection of arrhythmias from an ECG signal using an auto-encoder and SVM classifier	Physical and Engineering Sciences in Medicine	45	2	10.1007/s13246- 022-01119-1
28	Dubey P., Kanumuri T., Vyas R.	Optimal directional texture codes using multiscale bit crossover count planes for palmprint recognition	Multimedia Tools and Applications	81	14	10.1007/s11042- 022-12580-1
29	Agarwal A., Singhal P.K., Thakare V.V.	Design of miniaturized dual-polarized dipole antenna for 4G & sub-6 GHz 5G applications	Frequenz	76	5	10.1515/freq-2021- 0182
30	Bisen D., Shukla R., Rajpoot N., Maurya P., Uttam A.K., Arjaria S.	Responsive human-computer interaction model based on recognition of facial landmarks using machine learning algorithms	Multimedia Tools and Applications	81	13	10.1007/s11042- 022-12775-6
31	Ray A.K., Vasu B., Murthy P.V.S.N., Anwar Bég O., Gorla R.S.R., Kumar B.	Convective Flow of Non-homogeneous Fluid Conveying Nano-Sized Particles with Non-Fourier Thermal Relaxation: Application in Polymer Coating	Arabian Journal for Science and Engineering	47	5	10.1007/s13369- 021-06467-w
32	Rajpoot V., Dubey R., Khan S.S., Maheshwari S., Dixit A., Deo A., Doohan N.V.	Orchard Boumans Algorithm and MRF Approach Based on Full Threshold Segmentation for Dental X- Ray Images	Traitement du Signal	39	2	10.18280/ts.39023 9
33	Verma D., Nema S., Agrawal R., Sawle Y., Kumar A.	A Different Approach for Maximum Power Point Tracking (MPPT) Using Impedance Matching through Non-Isolated DC-DC Converters in Solar Photovoltaic Systems	Electronics (Switzerland)	11	7	10.3390/electronics 11071053

34	Ahirwar H.S., Srivastava L.	Minimization of Real Power Losses of Transmission Lines and Improvement of Voltage Stability in Power System using Recurring MODE Algorithm	Journal of The Institution of Engineers (India): Series B	103	2	10.1007/s40031-021-00636-z
35	Pathak Y., Shukla P.K., Tiwari A., Stalin S., Singh S.	Deep Transfer Learning Based Classification Model for COVID-19 Disease	IRBM	43	2	10.1016/j.irbm.2020.05.003
36	Tanwar D.V., Ray A.K., Chauhan A.	Lie Symmetries and Dynamical Behavior of Soliton Solutions of KP-BBM Equation	Qualitative Theory of Dynamical Systems	21	1	10.1007/s12346-021-00557-8
37	Kushwah A., Kumar A., Gaur M.K.	Drying kinetics, performance, and quality assessment for banana slices using heat pump–assisted drying system (HPADS)	Journal of Food Process Engineering	45	3	10.1111/jfpe.13964
38	Paliwal N., Srivastava L., Pandit M.	Application of grey wolf optimization algorithm for load frequency control in multi-source single area power system	Evolutionary Intelligence	15	1	10.1007/s12065-020-00530-5
39	Singh A., Amutha J., Nagar J., Sharma S., Lee C.-C.	LT-FS-ID: Log-Transformed Feature Learning and Feature-Scaling-Based Machine Learning Algorithms to Predict the k-Barriers for Intrusion Detection Using Wireless Sensor Network	Sensors	22	3	10.3390/s22031070
40	Gugnani V., Singh R.K.	Analysis of deep learning approaches for air pollution prediction	Multimedia Tools and Applications	81	4	10.1007/s11042-021-11734-x
41	Singh R.K., Tiwari A., Gupta R.K.	Deep transfer modeling for classification of Maize Plant Leaf Disease	Multimedia Tools and Applications	81	5	10.1007/s11042-021-11763-6
42	Aherwar A., Pruncu C.I., Mia M.	Correction to: Optimal design based on fabricated SiC/B4C/Porcelain filled aluminium alloy matrix composite using hybrid AHP/CRITIC-COPRAS approach (Silicon, (2022), 14, 2, (603-615),	Silicon	14	3	10.1007/s12633-021-01639-7

		10.1007/s12633-020-00916-1)				
43	Sharma M., Parmar M.	Sentiment Analysis of Twitter Dataset using Ensemble Classification Approach	International Conference on Artificial Intelligence and Data Engineering, AIDE 2022			10.1109/AIDE57180.2022.10060212
44	Saxena N., Pandit M., Srivastava L.	Improved Binary Bat Algorithm for Optimally Placing Multiple DGs in RDN	2022 IEEE 10th Power India International Conference, PIICON 2022			10.1109/PIICON56320.2022.10045239
45	Singh R.K., Dube A.P., Singh R.	Least Significant Bit-Based Image watermarking Mechanism: A Review	International Journal of Social Ecology and Sustainable Development	13	1	10.4018/IJSESD.298332
46	Gupta V., Sejwar V.	Facial Expression Recognition with Combination of Geometric and Textural Domain Features Extractor using CNN and Machine Learning	Proceedings - International Conference on Augmented Intelligence and Sustainable Systems, ICAISS 2022			10.1109/ICAISS55157.2022.10010853
47	Younus Bhat M., Ahmad O., Bhat A.A., Jain D.K.	Vector-Valued Affine Bi-Frames on Local Fields	Trends in Mathematics			10.1007/978-3-031-19082-7_11
48	Jharbade P., Dixit M.	Detecting Space Debris using Deep Learning Algorithms: A Survey	4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022 - Proceedings			10.1109/ICIRCA54612.2022.9985622

49	Sharma S., Singh R.K.	A Deep Learning Approach in Detection of COVID- 19 Positive Patients using CT Scan Images	4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022 - Proceedings			10.1109/ICIRCA54612.2022.9985655
50	Dutta A., Srivastava S., Goel R., Malvi C.S.	Progresses in Infrared Stealth Composites	Springer Proceedings in Materials	15		10.1007/978-981-19-2572-6_29
51	Srivastava S., Malvi C.S.	Solar Photovoltaic System and Its Fire Safety in Indian Scenario	Springer Proceedings in Materials	15		10.1007/978-981-19-2572-6_33
52	Agrawal A., Pandey S.N., Srivastava L., Walde P., Saket R.K., Khan B.	Multiobjective Salp Swarm Algorithm Approach for Transmission Congestion Management	International Transactions on Electrical Energy Systems	2022		10.1155/2022/8256908
53	Shah R., Pandit R.K., Gaur M.K.	Thermal comfort analysis through development of artificial neural network models: An experimental study in Cwa climate	Materials Today: Proceedings	57		10.1016/j.matpr.2021.11.139
54	Gupta A., Singh R.R.	A Deep Learning Approach to Enhance Underwater Images with Low Contrast, Blurriness and Degraded Color	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings			10.1109/ICECAA55415.2022.9936261
55	Jain V., Parmar M.	Emotion Classification and Intensity Prediction using Hybrid Deep Learning Models	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings			10.1109/ICECAA55415.2022.9936262

56	Sihare S., Dixit M.	MRI-based Tumour Prediction based on U-Net and VGG-Net	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings			10.1109/ICECAA55415.2022.9936184
57	Thakur V.K., Gaur M.K.	Energy and exergy analyses of passive solar still augmented with nanoparticles	International Journal of Exergy	39	4	10.1504/ijex.2022.126824
58	Mahor K., Manjhvar A.K.	Public Sentiment Assessment of Coronavirus- Specific Tweets using a Transformer-based BERT Classifier	International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings			10.1109/ICECAA55415.2022.9936448
59	Dinesh P., Sawle Y.	Optimization of Hybrid Solar, Wind, and Diesel Energy System from Cost Analysis of Micro-Grid Using Homer Software	Lecture Notes in Electrical Engineering	937		10.1007/978-981-19-4300-3_13
60	Thakur V.K., Gaur M.K.	Study the effect of CuO nanoparticles on the performance of passive solar still in winter and summer season	Materials Today: Proceedings	57		10.1016/j.matpr.2021.11.119
61	Dubey R., Rajpoot V., Chaturvedi A., Dixit A., Maheshwari S.	Ball-Bearing Fault Classification Using Comparative Analysis of Wavelet Coefficient based on Entropy Measurement	IETE Journal of Research			10.1080/03772063.2022.2142685
62	Agarwal A., Kumar N., Dubey P.	Machine Learning Based Maximum Power Prediction for Photovoltaic System	Indian Journal of Pure and Applied Physics	60	10	10.56042/ijpap.v60i10.62197
63	Arjaria S.K., Rathore A.S., Bisen D., Bhattacharyya S.	Performances of Machine Learning Models for Diagnosis of Alzheimer's Disease	Annals of Data Science			10.1007/s40745-022-00452-2
64	Tiwari D., Dixit M., Gupta K.	Breast cancer-caps: a breast cancer screening system based on capsule network utilizing the multiview breast	Turkish Journal of Electrical Engineering and	30	5	10.55730/1300-0632.3906

		thermal infrared images	Computer Sciences			
65	Mehto A., Verma R.K., Jain S.	Efficient Trajectory Planning and Route Adjustment Strategy for Mobile Sink in WSN-assisted IoT	2022 IEEE Region 10 Symposium, TENSYMP 2022			10.1109/TENSYMP54529.2022.9864434
66	Rathore A.S., Arjaria S.K., Gupta M., Chaubey G., Mishra A.K., Rajpoot V.	Erythemato-Squamous Diseases Prediction and Interpretation Using Explainable AI	IETE Journal of Research			10.1080/03772063.2022.2114953
67	Gupta M., Rajpoot V., Chaturvedi A., Agrawal R.	A detailed Study of different Clustering Algorithms in Data Mining	2022 2nd International Conference on Intelligent Technologies, CONIT 2022			10.1109/CONIT55038.2022.9848233
68	Dubey S.M., Dubey H.M., Pandit M.	Optimal Generation Scheduling of Hybrid Systems using Manta Ray Foraging Optimizer	2022 2nd International Conference on Emerging Frontiers in Electrical and Electronic Technologies, ICEFEET 2022			10.1109/ICEFEET51821.2022.9848314
69	Jain D.K., Singh T., Saurabh P., Bisen D., Sahu N., Mishra J., Rahman H.	Deep Learning-Aided Automated Pneumonia Detection and Classification Using CXR Scans	Computational Intelligence and Neuroscience	2022		10.1155/2022/7474304
70	Agarwal V., Gupta R.K., Tiwari A.	Applicability of Association Rule Mining in Recommendation System for Big Data Analysis	2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering, ICACITE 2022			10.1109/ICACITE53722.2022.9823695
71	Arya V., Choubey H., Sharma S., Chen T.-Y., Lee C.-C.	Image Enhancement and Features Extraction of Electron Microscopic Images Using Sigmoid	IEEE Access	10		10.1109/ACCESS.2022.3192416

		Function and 2D-DCT				
72	Singh P., Gaur M.K., Malvi C.S.	EFFECT OF DRYING AREA ON HEAT TRANSFER COEFFICIENT AND DRYING KINETICS OF HIGH-MOISTURE CROP DRIED IN A HYBRID ACTIVE GREENHOUSE SOLAR DRYER	Heat Transfer Research	53	11	10.1615/HEATTRANSRES.2022040797
73	Singh T., Saurabh P., Bisen D., Kane L., Pathak M., Sinha G.R.	Ftl-CoV19: A Transfer Learning Approach to Detect COVID-19	Computational Intelligence and Neuroscience	2022		10.1155/2022/1953992
74	Pratap Singh K., Bahl A., Norkey G., Dutt Gautam G.	Experimental investigation and parametric optimization of the hole-circularity and taper angle during laser drilling kevlar-29 fiber composite	Materials Today: Proceedings	56		10.1016/j.matpr.2021.10.155
75	Khandelwal U., Singh T.P.	Attitude towards green manufacturing by Indian manufacturing SMEs: a factor analysis approach	World Review of Entrepreneurship, Management and Sustainable Development	18	4	10.1504/WREMSD.2022.123770
76	Rajput S.K., Dheer D.K.	Integration of 100-kWp PV with low-voltage distribution power system in composite climate: performance and energy metrics analysis	International Journal of Ambient Energy	43	1	10.1080/01430750.2022.2092775
77	Amutha J., Sharma S., Sharma S.K.	Hybrid based Optimization with Unequal Clustering and Mobile Sink for Wireless Sensor Networks	Proceedings - 2022 6th International Conference on Intelligent Computing and Control Systems, ICICCS 2022			10.1109/ICICCS53718.2022.9788348

78	Gaur M.K., Thakur V.K.	Experimental Analysis of Sustainability of Passive Solar Still with Nanoparticles Operating at Various Angles of Glass Cover	Energy Sources, Part A: Recovery, Utilization and Environmental Effects	44	2	10.1080/15567036.2022.2082600
79	Deepak, Malvi C.S.	Experimental investigation of Effect of Dust Accumulation and Discoloration on Photovoltaic Panel Material	Energy Sources, Part A: Recovery, Utilization and Environmental Effects	44	2	10.1080/15567036.2022.2077477
80	Khandelwal U., Singh T.P.	An Empirical Study of Consumer Attitude Toward Adoption of Online Food Ordering App	International Journal of E-Services and Mobile Applications	14	1	10.4018/IJESMA.285549
81	Mishra D.K., Johari K., Ghildiyal S., Upadhyay A.K., Sharma S.	A Novel Approach in Business Intelligence for Big data Analytics using an Unsupervised Technique	ECS Transactions	107	1	10.1149/10701.12525ecst
82	Goyal S., Kushwah V.S., Thakre V.V.	Compact Dual Bandstop Filter Using Folded Lines And Genetic Algorithm	ECS Transactions	107	1	10.1149/10701.12201ecst
83	Mishra D.K., Kumar J., Chaudhary J.K., Upadhyay A.K., Sharma S.	Role of Text Mining to Enhance the Quality of Product using an Unsupervised Machine Learning Approach	ECS Transactions	107	1	10.1149/10701.12553ecst
84	Goyal S., Kushwah V.S., Thakre V.V.	Optimization Of Parallel Coupled Filter Using Genetic Algorithm For C Band Applications	ECS Transactions	107	1	10.1149/10701.12381ecst
85	Chinnasamy P., Arun Kumar S., Navya V., Lakshmi Priya K., Sruthi Boddu S.	Machine learning based cardiovascular disease prediction	Materials Today: Proceedings	64		10.1016/j.matpr.2022.04.907
86	Bhardwaj S., Vimal J., Pandey B.	Fault detection in bevel gearbox using proposed condition indicators and vibration signals	Materials Today: Proceedings	62	P12	10.1016/j.matpr.2022.04.612
87	Belwanshi M., Jayaswal P., Aherwar A.	Wear and fatigue behaviour investigation of hip implant head-stem interface using finite element analysis	Materials Today: Proceedings	56		10.1016/j.matpr.2021.10.188

88	Belwanshi M., Jayaswal P., Aherwar A.	A study on finite element analysis methodologies and approaches used for total hip arthroplasty	Materials Today: Proceedings	56		10.1016/j.matpr.2021.09.161
89	Parashar N., Tiwari A., Gupta R.K.	Mining Minimal Non-redundant Image Association Rules Using Statistical Texture Feature Based Frequent Itemsets	Lecture Notes in Networks and Systems	435		10.1007/978-981-19-0976-4_34
90	Tomar A.S., Jayaswal P.	Envelope Spectrum Analysis of Noisy Signal with Spectral Kurtosis to Diagnose Bearing Defect	Lecture Notes in Mechanical Engineering			10.1007/978-981-16-4083-4_23
91	Agrawal P., Tomar A.S., Jayaswal P.	Fault Investigation of Rolling Element Bearing Using Vibration Signature Analysis and Artificial Neural Network	Lecture Notes in Mechanical Engineering			10.1007/978-981-16-4083-4_18
92	Kumar Vaishnav S., Kumar Trivedi M.	Performance evaluation of treated recycled fine aggregate on mortar properties	Materials Today: Proceedings	62	P12	10.1016/j.matpr.2022.04.645
93	Kumar Vaishnav S., Kumar Trivedi M.	Performance enhancement of the recycled aggregate concrete properties using blended sand	Materials Today: Proceedings	62	P12	10.1016/j.matpr.2022.04.651
94	Bihari S.P., Gupta A., Gupta V., Babul A.K.	Design and Analysis of a Photovoltaic P&O-Based MPPT Lead-Acid Battery	Lecture Notes in Electrical Engineering	893 LNEE		10.1007/978-981-19-1742-4_14
95	Belwanshi M., Jayaswal P., Aherwar A.	Mechanical behaviour investigation of PEEK coated titanium alloys for hip arthroplasty using finite element analysis	Materials Today: Proceedings	56		10.1016/j.matpr.2021.10.112
96	Gupta V., Bihari S.P., Gupta A., Babul A.K.	Stability and Time Response Analysis of Integrated Renewable Energy System	Lecture Notes in Electrical Engineering	893 LNEE		10.1007/978-981-19-1742-4_22
97	Kushwah A., Gaur M.K., Kumar A., Singh P.	Application of ANN and prediction of drying behavior of mushroom drying in side hybrid greenhouse solar dryer: An experimental validation	Journal of Thermal Engineering	8	2	10.18186/THERMAL.1086189

98	Chaubey G., Gavhane P.R., Bisen D., Arjaria S.K.	Customer purchasing behavior prediction using machine learning classification techniques	Journal of Ambient Intelligence and Humanized Computing			10.1007/s12652-022-03837-6
99	Swarnkar K.K., Rai J.N., Wadhwani S.	Stator Inter-Turn Fault Diagnosis by Motor Current Signature Approach	Proceedings - 4th International Conference on Smart Systems and Inventive Technology, ICSSIT 2022			10.1109/ICSSIT53264.2022.9716329
100	Agrawal A., Pandey S.N., Srivastava L., Walde P., Singh S., Khan B., Saket R.K.	Hybrid Deep Neural Network-Based Generation Rescheduling for Congestion Mitigation in Spot Power Market	IEEE Access	10		10.1109/ACCESS.2022.3157846
101	Chakraborty K., Mukherjee S., Mukherjee U., Das S., Paul S.	Development of a Programmable Logic Controller- Based Advance Control Strategy for the Multiple Boiler System	Lecture Notes in Electrical Engineering	851		10.1007/978-981-16-9154-6_42
102	Sagwal R., Kumar A.	Impact of Wind Power Participation on Congestion Management Considering Seasonal Load in Pool Electricity Market While Ensuring Loadability Limit	Lecture Notes in Electrical Engineering	823		10.1007/978-981-16-7472-3_8
103	Dixit A., Tiwari A., Gupta R.K.	Exploring Current Trends and Challenges in Hesitation Mining	Lecture Notes in Networks and Systems	318		10.1007/978-981-16-5689-7_37
104	Singh P., Gaur M.K.	A review on thermal analysis of hybrid greenhouse solar dryer (HGSD)	Journal of Thermal Engineering	8	1	10.18186/thermal.1 067047
105	Singh P., Pandey B.K., Gaur M.K.	Performance evaluation of evacuated solar collector assisted hybrid greenhouse solar dryer under active and passive mode	Materials Today: Proceedings	57		10.1016/j.matpr.2021.10.461

106	Shrivastava A., Gaur M.K., Singh P.	Mango leather (Aam Papad) drying in hybrid greenhouse solar dryer with evacuated tube collector and finned drying tray: drying behavior and economic analysis	Energy Sources, Part A: Recovery, Utilization and Environmental Effects			10.1080/15567036.2022.2029974
107	Ahirwar H., Sahu A., Gupta V.K., Kumar P., Nanda H.S.	Design and finite element analysis of femoral stem prosthesis using functional graded materials	Computer Methods in Biomechanics and Biomedical Engineering	25	11	10.1080/10255842.2021.2006648
108	Mandloi M.S., Parmar A., Malviya P., Malviya L.	Butler Matrix Design for Smart Antenna in X-Band Applications	Lecture Notes in Electrical Engineering	777		10.1007/978-981-16-2761-3_52
109	Kumar A., Kumar S.P., Agrawal A., Velkin V.I.	Alternating current losses in superconducting circular/stacked coils used in energy storage systems	Journal of Energy Storage	45		10.1016/j.est.2021.103721
110	Dubey R., Kumar M., Upadhyay A., Pachori R.B.	Automated diagnosis of muscle diseases from EMG signals using empirical mode decomposition based method	Biomedical Signal Processing and Control	71		10.1016/j.bspc.2021.103098
111	Aherwar A., Pruncu C.I., Mia M.	Optimal Design Based on Fabricated SiC/B4C/Porcelain Filled Aluminium Alloy Matrix Composite Using Hybrid AHP/CRITIC-COPRAS Approach	Silicon	14	2	10.1007/s12633-020-00916-1
112	Sharma K., Trivedi M.K.	Latin hypercube sampling-based NSGA-III optimization model for multimode resource constrained time–cost–quality–safety trade-off in construction projects	International Journal of Construction Management	22	16	10.1080/15623599.2020.1843769

SCOPUS PUBLICATIONS DURING YEAR 2021

S. No.	Authors	Title	Source title	Vol	Issue	DOI
1	Jayaswal R., Dixit M.	Detection of Hidden Facial Surface Masking in Stored and Real Time Captured Images: A Deep	Traitement du Signal	38	6	10.18280/ts.380632

		Learning Perspective in Covid Time				
2	Tiwari D., Dixit M., Gupta K.	Deep Multi-View Breast Cancer Detection: A Multi-View Concatenated Infrared Thermal Images Based Breast Cancer Detection System Using Deep Transfer Learning	Traitement du Signal	38	6	10.18280/ts.38061 3
3	Bagaria R., Wadhwani S., Wadhwani A.K.	Bone fractures detection using support vector machine and error backpropagation neural network	Optik	247		10.1016/j.ijleo.202 1.168021
4	Tiwari A., Trivedi M.K.	Practical Tool for Development of Non- Dominated Optimum Front in Time–Cost Trade-off analysis	Journal of The Institution of Engineers (India): Series A	102	4	10.1007/s40030-021-00554-9
5	Rai R.K., Pathak N., Sharma P., Sharma S., Yadav N., Sharma R.P.	Turbulence generation of ion scale in the presence of magnetic islands and guide field at the magnetopause region	Journal of Astrophysics and Astronomy	42	1	10.1007/s12036-020-09653-8
6	Solanki S., Mahore G.	Low-cost Large Scale Vermicompost Unit	Journal of Physics: Conference Series	2115	1	10.1088/1742-6596/2115/1/012026
7	Shrivastava A., Sharma A., Pandit M., Jately V., Azzopardi B.	Hybrid protection scheme based optimal overcurrent relay coordination strategy for re integrated power distribution grid	Energies	14	21	10.3390/en14217192
8	Dubey S.M., Dubey H.M., Pandit M., Salkuti S.R.	Multiobjective scheduling of hybrid renewable energy system	Energies	14	19	10.3390/en14196376

		using equilibrium optimization				
9	Singh P., Gaur M.K.	Environmental and economic analysis of novel hybrid active greenhouse solar dryer with evacuated tube solar collector	Sustainable Energy Technologies and Assessments	47		10.1016/j.seta.202 1.101428
10	Naidu S.A., Tiwari H.	Eu3+luminescence - A local structural probe in Li5La3M2O12(M = Nb, Ta) with garnet structure	AIP Conference Proceedings	2369		10.1063/5.0060894
11	Thakur V.K., Gaur M.K.	Heat and mass transfer analysis of passive solar still with nanoparticles, operating at different water depth and various slope of glass cover	Desalination and Water Treatment	235		10.5004/dwt.2021.27627
12	Gaur M.K., Tiwari G.N., Singh P., Kushwah A.	Heat transfer analysis of hybrid active solar still with water flowing over glass cover	Journal of Thermal Engineering	7	6	10.18186/thermal.989993
13	Gupta S., Kumar N., Srivastava L., Malik H., Anvari-moghaddam A., García Márquez F.P.	A robust optimization approach for optimal power flow solutions using rao algorithms	Energies	14	17	10.3390/en14175449
14	Kushwah A., Kumar A., Gaur M.K., Pal A.	Garlic dehydration inside heat exchanger-evacuated tube assisted drying system: Thermal performance, drying kinetic and color index	Journal of Stored Products Research	93		10.1016/j.jspr.202 1.101852

15	Tatikayala V.K., DIxit S.	Takagi-Sugeno Fuzzy based Controllers for Grid Connected PV-Wind-Battery Hybrid System	2021 6th International Conference on Recent Trends on Electronics, Information, Communication and Technology, RTEICT 2021			10.1109/RTEICT52294.2021.9573785
16	Shrivastava V.K., Kumar A., Shrivastava A., Tiwari A., Thiru K., Batra R.	Study and Trend Prediction of Covid-19 cases in India using Deep Learning Techniques	Journal of Physics: Conference Series	1950	1	10.1088/1742-6596/1950/1/012084
17	Saxena A., Pandey S.N., Srivastava L.	Assessment and Allocation of Wheeling Service Prices among System Users through Power Tracing	International Journal of Computer Theory and Engineering	13	3	10.7763/IJCTE.2021.V13.1292
18	Singh P., Gaur M.K.	Heat transfer analysis of hybrid active greenhouse solar dryer attached with evacuated tube solar collector	Solar Energy	224		10.1016/j.solener.2021.06.050
19	Rathore B., Chakrabarti S., Srivastava L.	A Self-Regulated Virtual Iimpedance control of VSG in a microgrid	Electric Power Systems Research	197		10.1016/j.epsr.2021.107289
20	Paliwal N., Srivastava L., Pandit M.	Equilibrium optimizer tuned novel FOPID-DN controller for automatic voltage regulator system	International Transactions on Electrical Energy Systems	31	8	10.1002/2050-7038.12930
21	Thakur V.K., Gaur M.K., Sagar M.K., Tiwari G.N.	A study on heat and mass transfer analysis of solar distillation system	Journal of Thermal Engineering	7	5	10.18186/thermal.978021
22	Pathak S.K., Batham D., Prakash S.	Time and bandwidth aware traffic balancing in elastic optical networks – A two dimensional approach	Optical Fiber Technology	64		10.1016/j.yofte.20 21.102585

23	Jayaswal R., Dixit M.	A framework for anomaly classification using deep transfer learning approach	Revue d'Intelligence Artificielle	35	3	10.18280/ria.350309
24	Sharma K., Trivedi M.K.	Development of Multi-Objective Scheduling Model for Construction Projects Using Opposition-Based NSGA III	Journal of The Institution of Engineers (India): Series A	102	2	10.1007/s40030-021-00529-w
25	Kotiyal V., Singh A., Sharma S., Nagar J., Lee C.-C.	Ecs-nl: An enhanced cuckoo search algorithm for node localisation in wireless sensor networks	Sensors	21	11	10.3390/s21113576
26	Bagaria R., Wadhwani S., Wadhwani A.K.	A Wavelet Transform and Neural Network Based Segmentation & Classification System For Bone Fracture Detection	Optik	236		10.1016/j.ijleo.202 1.166687
27	Sonker A., Gupta R.K.	A new procedure for misbehavior detection in vehicular ad-hoc networks using machine learning	International Journal of Electrical and Computer Engineering	11	3	10.11591/ijece.v11 i3.pp2535-2547
28	Gupta S., Kumar N., Srivastava L., Malik H., Pliego Marugán A., García Márquez F.P.	A hybrid jaya–powell's pattern search algorithm for multi-objective optimal power flow incorporating distributed generation	Energies	14	10	10.3390/en14102831
29	Ritu K.R., Mishra B., Wadhwani A.K.	High Performance Adaptive PSO MPPT Technique for PV Based Micro Grid for a Rural Area	Journal of Physics: Conference Series	1817	1	10.1088/1742-6596/1817/1/012026

30	Shaji L., Bansal P., Bhuria V.	Multicarrier PWM Technique with Different Reference Signal for Performance Evaluation of a New Single Phase 5-Level Switched Capacitor Topology	3rd International Conference on Energy, Power and Environment: Towards Clean Energy Technologies, ICEPE 2020			10.1109/ICEPE50861.2021.9404474
31	Shukla S., Pandit M.	Multi-objective fuzzy rank based scheduling of utility connected microgrid with high renewable energy using differential evolution with dynamic mutation	International Transactions on Electrical Energy Systems	31	3	10.1002/2050-7038.12788
32	Achary S.N., Patwe S.J., Vishwanath A., Wajhal S., Krishna P.S.R., Tyagi A.K.	Evolution of crystal structure of PbMoO4 between 5 and 300 K: A low temperature powder neutron diffraction study	Materials Chemistry and Physics	260		10.1016/j.matchemphys.2020.124111
33	Yadav M., Singhal P.K.	Interleaver Assignment Solution for Multi Radio Access Technology Supported 5G Networks	Radioelectronics and Communications Systems	64	2	10.3103/S0735272721020059
34	Rathore B., Chakrabarti S., Srivastava L.	ARI and ARID control of virtual synchronous generator for frequency response improvement	IET Renewable Power Generation	15	3	10.1049/rpg2.12054
35	Tatikayala V.K., Dixit S.	AC Side Controller for Grid Connected Hybrid Renewable Energy Sources	Proceedings of 2021 IEEE 2nd International Conference on Smart Technologies for Power, Energy and Control, STPEC 2021			10.1109/STPEC52385.2021.9718698

36	Rajvaidya M., Batham D.	Efficient cluster based protection strategy to improve survivability in optical networks	Proceedings - 2021 International Conference on Control, Automation, Power and Signal Processing, CAPS 2021			10.1109/CAPS52117.2021.9730634
37	Tatikayala V.K., Dixit S.	DC Side Controllers for Grid Connected Hybrid Renewable Energy Sources	2021 IEEE 2nd International Conference on Electrical Power and Energy Systems, ICEPES 2021			10.1109/ICEPES52894.2021.9699605
38	Shukla S., Pandit M.	Renewable Microgrids with Economic and Environmental Benefits: A Review	2021 IEEE 2nd International Conference on Electrical Power and Energy Systems, ICEPES 2021			10.1109/ICEPES52894.2021.9699589
39	Mishra R., Gupta M., Rajpoot V.	Identifing the Future Security Issues Methods for Secure Data in the Cloud Computing	2021 5th International Conference on Information Systems			10.1109/ISCON52037.2021.9702420
			and Computer Networks, ISCON 2021			
40	Mishra R., Gupta M., Rajpoot V.	An Iot Based Environmental Strategic Solution for Fire and Air Pollution Using Cloud Computing Platform	2021 5th International Conference on Information Systems and Computer Networks, ISCON 2021			10.1109/ISCON52037.2021.9702349
41	Maurya R., Wadhwani S.	Morphology Based Brain Tumor Identification and Segmentation in MR Images	2021 IEEE Bombay Section Signature Conference, IBSSC 2021			10.1109/IBSSC53889.2021.9673338
42	Singh T.P., Khandelwal U.	Relationship between green marketing and behavioural	International Journal of Green Economics	15	3	10.1504/IJGE.2021.120873

		intention: empirical evidence from Indian consumers				
43	Patro A.C., Zaidi S.A., Dixit A., Dixit M.	A novel approach to improve employee retention using machine learning	Proceedings - 2021 IEEE 10th International Conference on Communication Systems and Network Technologies, CSNT 2021			10.1109/CSNT517 15.2021.9509601
44	Panda S., Gupta M., Malvi C.S.	Comparative Study of Photo Voltaic Panel Cooling Methods for Efficiency Enhancement	Communications in Computer and Information Science	1502		10.1007/978-981-16-8896-6_23
45	Singh P., Gaur M.K.	Sustainability assessment of hybrid active greenhouse solar dryer integrated with evacuated solar collector	Current Research in Food Science	4		10.1016/j.crfs.2021.09.011
46	Choudhary J., Kumar B., Gupta A.	Utilization of Waste Glass Powder and Glass Composite Fillers in Asphalt Pavements	Advances in Civil Engineering	2021		10.1155/2021/3235223
47	Thakur V.K., Gaur M.K., Dhamneya A.K., Sagar M.K.	Performance analysis of passive solar still with and without nanoparticles	Materials Today: Proceedings	47		10.1016/j.matpr.20 21.05.539
48	Singh S.K., Sagar M.K., Upadhyay R.K.	Mechanical characterization of plant fortified fiber polymer composites	Materials Today: Proceedings	46		10.1016/j.matpr.20 21.02.507
49	Gupta S., Kumar N., Srivastava L.	An efficient Jaya algorithm with Powell's Pattern Search for optimal power flow incorporating distributed generation	Energy Sources, Part B: Economics, Planning and Policy	16	8	10.1080/15567249.2021.1942595

50	Thakur V.K., Gaur M.K., Dhamneya A.K., Chaurasiya P.K.	Validation of thermal models to predict the productivity and heat transfer coefficients for passive solar still with different nanoparticles	Energy Sources, Part A: Recovery, Utilization and Environmental Effects			10.1080/15567036.2021.1971338
51	Phukan N., M. Kakoty N., Gupta N., Baruah N.	EEG-Based Hand Movement Recognition: Feature Domain and Level of Decomposition	Lecture Notes in Mechanical Engineering			10.1007/978-981-16-1769-0_28
52	Gupta S., Kumar N., Srivastava L.	Solution of optimal power flow problem using sine-cosine mutation based modified Jaya algorithm: a case study	Energy Sources, Part A: Recovery, Utilization and Environmental Effects			10.1080/15567036.2021.1957043
53	Dixit A., Tiwari A., Gupta R.K.	A Model for Trend Analysis in the Online Shopping Scenario Using Multilevel Hesitation Pattern Mining	Mathematical Problems in Engineering	2021		10.1155/2021/2828262
54	Deo A., Rajput S.K.	Improving Energy Efficiency and Reducing CO2 Emission of Institutional Building: An Energy Audit Case Study	Lecture Notes in Electrical Engineering	760		10.1007/978-981-16-1186-5_11
55	Saxena G., Bhadauria S.S.	Haze Identification and Classification Model for Haze Removal Techniques	Lecture Notes in Networks and Systems	202 LNNS		10.1007/978-981-16-0695-3_13
56	Kosti S., Malvi C.S., Vishwakarma S.K.	Hybrid Nano-materials Properties Analysis for Solar Photovoltaic	Lecture Notes in Mechanical Engineering			10.1007/978-981-15-9678-0_26

57	Kushwah A., Kumar A., Pal A., Kumar Gaur M.	Experimental analysis and thermal performance of evacuated tube solar collector assisted solar dryer	Materials Today: Proceedings	47		10.1016/j.matpr.20 21.04.243
58	SAXENA G., BHADAURIA S.S.	An efficient deep learning based fog removal model for multimedia applications	Turkish Journal of Electrical Engineering and Computer Sciences	29	3	10.3906/elk-2005-78
59	Siddiqui A., Pandit R.K.	Smart Cities in India: Linkages with Circular Economy	Environmental Science and Engineering			10.1007/978-3-030-61891-9_12
60	Shah R., Pandit R.K., Gaur M.K.	Role of Building Design in Sustainable Green Development: A Review	Environmental Science and Engineering			10.1007/978-3-030-61891-9_4
61	Rajput S.K., Wadhwani S., Singh J.	Reliability and Energy Efficiency of Ring Frame Machine in Textile Industries: Secure, Smart, and Reliable Network	Lecture Notes in Electrical Engineering	721 LNEE		10.1007/978-981-15-9938-5_61
62	Agrawal A., Malviya R., Pandey S.N., Srivastava L.	Economic Benefits of Implementing Demand Response in Congested Network of Deregulated Power Market	Lecture Notes in Electrical Engineering	721 LNEE		10.1007/978-981-15-9938-5_38
63	Agrawal A., Pandey S.N., Srivastava L.	Demand Response-Based Congestion Management Considering Wind Energy Source in Competitive Power Market	Lecture Notes in Electrical Engineering	721 LNEE		10.1007/978-981-15-9938-5_19
64	Jain A., Bhat A.A., Jain R., Jain D.K.	Certain results of (p, q)-analogue of aleph- function with (p, q)-derivative	Journal of Statistics Applications and Probability	10	1	10.18576/JSAP/10 0105

65	Agrawal N., Goswami S., Bagaria R., Muthele A.	A Comparative Brief Study on Level-Shifted Pulse Width Modulation and Hybrid Pulse Width Modulation Switching Techniques for 7-Level CHB Single-Phase Inverter	Lecture Notes in Electrical Engineering	691		10.1007/978-981-15-7511-2_14
66	Bhadauria A.S., Pathak R., Chaudhary M.	A SIQ mathematical model on COVID-19 investigating the lockdown effect	Infectious Disease Modelling	6		10.1016/j.idm.2020.12.010
67	Verma A., Yadav S.	On the incomplete second Appell hypergeometric matrix functions	Linear and Multilinear Algebra	69	9	10.1080/03081087.2019.1640178

SCOPUS PUBLICATIONS DURING YEAR 2020

S.No	Authors	Title	Source title	Vol	Issue	DOI
1	Bhatele K.R., Bhadauria S.S.	Glioma segmentation and classification system based on proposed texture features extraction method and hybrid ensemble learning	Traitement du Signal	37	6	10.18280/TS.370611
2	Dixit S., Batham D., Narwaria R.P.	Cost function-based class of service provisioning strategy in elastic optical networks	International Journal of Communication Systems	33	18	10.1002/dac.4634
3	Batham D., Kumar Pathak S., Singh Yadav D., Prakash S.	A traffic scheduling strategy based on cost function for differentiated class of service in multi-domain optical networks	Optical Fiber Technology	60		10.1016/j.yofte.2020.102337
4	Bhat A.A., Tassaddiq A., Jain D.K., Naaz H.	New generating functions of I-function satisfying Truesdell's Fq -equation	Advances in Difference Equations	2020	1	10.1186/s13662-020-02912-6
5	Poonam S., Manjaree P., Laxmi S.	Comparison of traditional and swarm intelligence based techniques for optimization of hybrid renewable energy system	Renewable Energy Focus	35		10.1016/j.ref.2020.06.010

6	MohanRao K., Tiwari H., Naidu S.A., Varadaraju U.V.	Eu(III)-doped barium tellurooxyphosphate phosphor with orange-red emission	Bulletin of Materials Science	43	1	10.1007/s12034-019-2014-y
7	Batham D., Yadav D.S.	HPDST: Holding pathlength domain scheduled traffic strategy for multi-domain optical networks	Optik	222		10.1016/j.ijleo.2020.165145
8	Anand V.K., Aherwar A., Mia M., Elfakir O., Wang L.	Influence of silicon carbide and porcelain on tribological performance of Al6061 based hybrid composites	Tribology International	151		10.1016/j.triboint.2020.106514
9	Vedula R.M.S., Bhadoria R.S., Dixit M.	Integrating blockchain with AI	Multidisciplinary Functions of Blockchain Technology in AI and IoT Applications			10.4018/978-1-7998-5876-8.ch001
10	Saxena G., Gaur M.K.	Performance Evaluation and Drying Kinetics for Solar Drying of Hygroscopic Crops in Vacuum Tube Assisted Hybrid Dryer	Journal of Solar Energy Engineering, Transactions of the ASME	142	5	10.1115/1.4046465
11	Saxena G., Bhadauria S.S.	An efficient single image haze removal algorithm for computer vision applications	Multimedia Tools and Applications	79	37-38	10.1007/s11042-020-09421-4
12	Singh D.	Retraction Note: Emergent D-Instanton as a Source of Dark Energy (Brazilian Journal of Physics, (2019), 49, 2, (249-255), 10.1007/s13538-019-00635-y)	Brazilian Journal of Physics	50	5	10.1007/s13538-020-00774-7
13	Singh S., Verma S.K., Tiwari A.	A novel method for destabilization of terrorist network	Modern Physics Letters B	34	27	10.1142/S0217984920502980X
14	Rahaman V., Singh B., Salunkhe M.M.	OBE assessment tools for mapping learning outcomes identifying slow learners: A congruent approach	Assessment Tools for Mapping Learning Outcomes With Learning Objectives			10.4018/978-1-7998-4784-7.ch005
15	Sharma S., Dwivedi P.	A comparative study of existing mechanisms for implementation of OBE in various countries	Assessment Tools for Mapping Learning Outcomes With Learning			10.4018/978-1-7998-4784-7.ch012

			Objectives			
16	Bansal P., Singh A.	Adaptive Notch Filter Control Algorithm for 5-Level Distribution Static Compensator	Proceedings of 2020 IEEE 1st International Conference on Smart Technologies for Power, Energy and Control, STPEC 2020			10.1109/STPEC49749.2020.9297721
17	Roy K., Srivastava L., Dixit S.	A forward-backward sweep and ALO based approach for DG allocation in radial distribution system	Proceedings of 2020 IEEE 1st International Conference on Smart Technologies for			10.1109/STPEC49749.2020.9297775
			Power, Energy and Control, STPEC 2020			
18	Shaji L., Bansal P., Bhuria V.	Performance Analysis of a New Single Phase Single Source 7-Level Inverter Topology Using Different SPWM Techniques	Proceedings of 2020 IEEE 1st International Conference on Smart Technologies for Power, Energy and Control, STPEC 2020			10.1109/STPEC49749.2020.9297703
19	Roy K., Srivastava L., Dixit S.	Optimal Placement and Sizing of Distributed Generation Using Multi-Verse Optimization	Proceedings - 2020 12th International Conference on Computational Intelligence and Communication Networks, CICN 2020			10.1109/CICN49253.2020.9242614
20	Khan M.A., Dixit M.	Discovering Exoplanets in Deep Space using Deep Learning Algorithms	Proceedings - 2020 12th International Conference on Computational Intelligence and Communication Networks, CICN 2020			10.1109/CICN49253.2020.9242636

21	Rajput R.S., Gupta R., Trivedi A.	An Adaptive Covariance Matrix Based on Combined Fully Blind Self Adapted Method for Cognitive Radio Spectrum Sensing	Wireless Personal Communications	114	1	10.1007/s11277-020-07352-9
22	Gupta S., Modem S., Thakre V.V.	Phase congruency and ODBTC based image retrieval	IET Image Processing	14	10	10.1049/iet-ipr.2019.1023
23	Kundu S.K., Singhal P.K.	A slotted circularly polarized semicylindrical conformal patch antenna for EBS and BRS bands	Journal of Computational Electronics	19	2	10.1007/s10825-020-01480-y
24	Suman H., Srivastava R., Shrivastava S., Srivastava A., Jacob A.P., Malvi C.S.	DFT analysis of H2S adsorbed zigzag and armchair graphene nanoribbons	Chemical Physics Letters	745		10.1016/j.cplett.2020.137280
25	Singh S., Verma S.K., Tiwari A.	A novel approach for finding crucial node using ELECTRE method	International Journal of Modern Physics B	34	9	10.1142/S0217979220500769
26	Jayaswal R., Dixit M.	Comparative analysis of human face recognition by traditional methods and deep learning in real-time environment	Proceedings - 2020 IEEE 9th International Conference on Communication Systems and Network Technologies, CSNT 2020			10.1109/CSNT48778.2020.9115779
27	Goswami A., Dixit M.	An analysis of image segmentation methods for brain tumour detection on MRI images	Proceedings - 2020 IEEE 9th International Conference on Communication Systems and Network Technologies, CSNT 2020			10.1109/CSNT48778.2020.9115791
28	Soni O.K., Kumare J.S.	A survey on underwater images enhancement techniques	Proceedings - 2020 IEEE 9th International Conference on Communication Systems and Network Technologies, CSNT 2020			10.1109/CSNT48778.2020.9115732

29	Goswami D.N., Shukla M., Chaturvedi A.	Phishing detection using significant feature selection	Proceedings - 2020 IEEE 9th International Conference on Communication			10.1109/CSNT48778.2020.9115782
			Systems and Network Technologies, CSNT 2020			
30	Bhadouria A.S., Agarwal K.	Effective framework for underwater image enhancement using multi-fusion technique	Proceedings - 2020 IEEE 9th International Conference on Communication Systems and Network Technologies, CSNT 2020			10.1109/CSNT48778.2020.9115777
31	Khan M.A., Dixit M., Dixit A.	Demystifying and anticipating graduate school admissions using machine learning algorithms	Proceedings - 2020 IEEE 9th International Conference on Communication Systems and Network Technologies, CSNT 2020			10.1109/CSNT48778.2020.9115788
32	Pandit S., Shukla P.K., Tiwari A., Shukla P.K., Maheshwari M., Dubey R.	Review of video compression techniques based on fractal transform function and swarm intelligence	International Journal of Modern Physics B	34	8	10.1142/S0217979220500617
33	Rajawat A., Singhal P.K.	Design and Analysis of Inset Fed Wide-Band Rectenna with Defected Ground Structure	Journal of Circuits, Systems and Computers	29	3	10.1142/S0218126620500474
34	Tassaddiq A., Bhat A.A., Jain D.K., Ali F.	On (p, q)-sumudu and (p, q)-Laplace transforms of the basic analogue of Aleph-function	Symmetry	12	3	10.3390/sym12030390
35	Tiwari R., Agrawal S., Kasdekar D.K.	Application of ELECTRE-I,II methods for EDM performance measures in manufacturing decision making	IOP Conference Series: Materials Science and Engineering	748	1	10.1088/1757-899X/748/1/012015

36	Goswami D.N., Shukla M., Chaturvedi A.	An optimal technique for predictive phishing detection	International Journal of Scientific and Technology Research	9	2	
37	Agrawal P., Jayaswal P.	Diagnosis and Classifications of Bearing Faults Using Artificial Neural Network and Support Vector Machine	Journal of The Institution of Engineers (India): Series C	101	1	10.1007/s40032-019-00519-9
38	Mishra D.K., Sharma S.	Existing mechanisms for data deduplication	Data Deduplication Approaches: Concepts, Strategies, and Challenges			10.1016/B978-0-12-823395-5.00002-1
39	Rahaman V., Sharma S.	Reading an extremist mind through literary language: Approaching cognitive literary hermeneutics to R.N. Tagore's play The Post Office for neuro-computational predictions	Cognitive Informatics, Computer Modelling, and Cognitive Science: Volume 2: Application to Neural Engineering, Robotics, and STEM			10.1016/B978-0-12-819445-4.00010-2
40	Mishra D.K., Upadhyay A.K., Sharma S.	Role of big data analytics in manufacturing of intelligent robot	Materials Today: Proceedings	47		10.1016/j.matpr.2021.05.101
41	Sharma N.K., Gaur M.K., Malvi C.S.	Application of phase change materials for cooling of solar photovoltaic panels: A review	Materials Today: Proceedings	47		10.1016/j.matpr.2021.05.127
42	Mishra D.K., Upadhyay A.K., Sharma S.	Text mining in manufacturing process using unsupervised techniques of Machine learning	Materials Today: Proceedings	47		10.1016/j.matpr.2021.05.112
43	Mishra D.K., Upadhyay A.K., Sharma S.	An efficient approach for manufacturing process using Big data analytics	Materials Today: Proceedings	47		10.1016/j.matpr.2021.05.146
44	Belwanshi M., Jayaswal P., Aherwar A.	A study on tribological effect and surface treatment methods of Bio-ceramics composites	Materials Today: Proceedings	44		10.1016/j.matpr.2020.10.458

45	Aherwar A., Patnaik A., Pruncu C.I.	Effect of B4C and waste porcelain ceramic particulate reinforcements on mechanical and tribological	Journal of Materials Research and Technology	9	5	10.1016/j.jmrt.2020.07.003
		characteristics of high strength AA7075 based hybrid composite				
46	Jain P., Jain S., Sharma R., Thakare V.V.	Microstrip rectangular patch antenna with comb shape slot	Materials Today: Proceedings	30		10.1016/j.matpr.2020.03.339
47	Shrivastava A., Saini D.K., Pandit M.	Distribution grid parameter variation due to solar PV power integration	International Journal of Renewable Energy Research	10	3	
48	Shrivastava A., Saini D.K., Pandit M.	Peer review of renewable energy-based adaptive protection(S) & relay coordination optimization techniques	Recent Advances in Electrical and Electronic Engineering	13	8	10.2174/2352096513999200430091230
49	Johari P.K., Gupta R.K.	An improved image retrieval by using texture color descriptor with novel local textural patterns	International Journal of Advanced Computer Science and Applications	11	9	10.14569/IJACSA.2020.0110932
50	Saxena G., Gaur M.K.	Energy, exergy and economic analysis of evacuated tube solar water heating system integrated with heat exchanger	Materials Today: Proceedings	28		10.1016/j.matpr.2020.04.793
51	Kumar T.V., Dixit S.	Enhancement of power quality for wind systems in grid application with svpwm control	Journal of Advanced Research in Dynamical and Control Systems	12	5 Special Issue	10.5373/JARDCS/V12SP5/20200176 7
52	Jain P., Sharma R., Thakare V.V.	Comparative Analysis of a Novel Shape Patch Antenna for Wi-Max Band with Genetic Algorithm Optimization	Lecture Notes in Electrical Engineering	648		10.1007/978-981-15-2926-9_55
53	Singh P., Gaur M.K.	Review on development, recent advancement and applications of various types of solar dryers	Energy Sources, Part A: Recovery, Utilization and Environmental Effects			10.1080/15567036.2020.1806951
54	Dixit A., Tiwari A., Gupta R.K.	Investigating Multilevel Hesitated Patterns Using Vague Set Theory	Advances in Intelligent Systems and Computing	1154		10.1007/978-981-15-4032-5_31

55	Sharma H.K., Singh M., Pandey G.	An eco-friendly novel technique for power generation utilising municipal waste water and sludge recycling	International Journal of Environment and Waste Management	26	1	10.1504/IJEWM.2020.108063
56	Sharma A.K., Bhandari R., Aherwar A., Pinca-Bretotean C.	A study of fabrication methods of aluminum based composites focused on stir casting process	Materials Today: Proceedings	27		10.1016/j.matpr.2020.03.316
57	Kumar J., Shinde V.	Computational Performance of Server Using the Mx/M/1 Queue Model	Springer Proceedings in Mathematics and Statistics	307		10.1007/978-981-15-1157-8_5
58	Sharma A.K., Bhandari R., Aherwar A., Rimašauskiene R., Pinca-Bretotean C.	A study of advancement in application opportunities of aluminum metal matrix composites	Materials Today: Proceedings	26		10.1016/j.matpr.2020.02.516
59	Agrawal P., Jayaswal P.	A Review of Fault Detection, Diagnosis, and Prognosis of Rolling Element Bearing Using Advanced Approaches and Vibration Signature Analysis	Lecture Notes in Mechanical Engineering			10.1007/978-981-15-3746-2_19
60	Parashar N.	Classification using association rule mining over mammogram images: A review	International Journal on Emerging Technologies	11	2	
61	Paliwal N., Srivastava L., Pandit M.	Jaya Algorithm Based Optimal Design of LQR Controller for Load Frequency Control of Single Area Power System	Lecture Notes in Networks and Systems	100		10.1007/978-981-15-2071-6_48
62	Dubey R.	Rolling Ball-Bearing Fault Classification Using Variational Mode Decomposition and Footprint of Hilbert Transform	Advances in Intelligent Systems and Computing	1118		10.1007/978-981-15-2475-2_53
63	Parmar R., Wadhwani S., Pandit M.	Modified flower pollination algorithm for optimal power flow in transmission congestion	Advances in Intelligent Systems and Computing	1085		10.1007/978-981-15-1366-4_15

64	Sharma A.K., Bhandari R., Aherwar A., Rimašauskiene R.	Matrix materials used in composites: A comprehensive study	Materials Today: Proceedings	21		10.1016/j.matpr.2019.11.086
65	Atangana A., Jain S.	Models of fluid flowing in non-conventional media: New numerical analysis	Discrete and Continuous Dynamical Systems - Series S	13	3	10.3934/dcdss.20 20026
66	Chaudhary V., Dubey H.M., Pandit M.	Solution of Non-convex Economic Dispatch Problems by Water Cycle Optimization	Advances in Intelligent Systems and Computing	949		10.1007/978-981-13-8196-6_73
67	Tomar A.S., Dubey H.M., Pandit M.	Combined Economic Emission Dispatch Using Spider Monkey Optimization	Advances in Intelligent Systems and Computing	949		10.1007/978-981-13-8196-6_72
68	Dev S., Aherwar A., Patnaik A.	Material Selection for Automotive Piston Component Using Entropy-VIKOR Method	Silicon	12	1	10.1007/s12633-019-00110-y

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S. No.	Authors	Title	Source title	Vol	Issue	DOI
1	Neeboriya S.	Novel Dual-Mode Microstrip Triangular Patch Resonator Bandpass Filter	Journal of Communications Technology and Electronics	64	12	10.1134/S1064226 91912012X
2	Geed S.R., Samal K., Tagade A.	Development of adsorption-biodegradation hybrid process for removal of methylene blue from wastewater	Journal of Environmental Chemical Engineering	7	6	10.1016/j.jece.201 9.103439
3	Sharma A., Sharma S., Shrivastava S., Singhal P.K., Shukla S.	Mobile phone induced cognitive and neurochemical consequences	Journal of Chemical Neuroanatomy	102		10.1016/j.jchemneu.2019.101684
4	Pandit S., Shukla P.K., Tiwari A., Shukla P.	Review of different video compression methods based on fractal transform	International Journal of Scientific and Technology Research	8	11	

5	Patsariya P., Singh R.R.	Classifier rank identification using multi-criteria decision making method for intrusion detection dataset	International Journal of Innovative Technology and Exploring Engineering	9	1	10.35940/ijitee.A5 223.119119
6	Kumar P., Ganguli A., Benipal G.	Comparative assessment of the contending force and placement methods for weightless sagging cables	Asian Journal of Civil Engineering	20	7	10.1007/s42107-019-00163-9
7	Singh D.	Correction to: Emergent D-Instanton as a Source of Dark Energy (Brazilian Journal of Physics, (2019), 49, 2, (249-255), 10.1007/s13538-019-00635-y)	Brazilian Journal of Physics	49	5	10.1007/s13538-019-00696-z
8	Agrawal M., Bhuria V., Dixit S.	Performance Evaluation of 1-Phase 5-Level T-style Multilevel Inverter using Advanced PWM Techniques	2019 3rd International Conference on Recent Developments in Control, Automation			10.1109/RDCAPE47089.2019.8979118
			and Power Engineering, RDCAPE 2019			
9	Aherwar A., Patnaik A., Bahraminasab M.	Effect of Molybdenum Content on Structure and Properties of a Co-Cr Biomedical Alloy	Journal of Materials Engineering and Performance	28	10	10.1007/s11665-019-04356-w
10	Agrawal A., Parmar M.	Multilevel fraud detection system using voting techniques	International Journal of Innovative Technology and Exploring Engineering	8	12	10.35940/ijitee.L2840.1081219
11	Dandotiya M., Parmar M.	Optimal hesitation rule mining using weighted apriori with genetic algorithm	International Journal of Innovative Technology and Exploring Engineering	8	12	10.35940/ijitee.L2825.1081219

12	Aherwar A., Singh T., Singh A., Patnaik A., Fekete G.	Optimum selection of novel developed implant material using hybrid entropy-PROMETHEE approach [Optimale Auswahl von neuentwickelten Implantatwerkstoffen mittels Hybrid-Entropie-PROMETHEE-Ansatz]	Materialwissenschaft und Werkstofftechnik	50	10	10.1002/mawe.201800088
13	Gupta P., Jadon S.S.	Effect of changing lifestyle on urban pattern	AIP Conference Proceedings	2158		10.1063/1.5127148
14	Srivastava R., Suman H., Shrivastava S., Srivastava A.	DFT analysis of pristine and functionalized zigzag CNT: A case of H2S sensing	Chemical Physics Letters	731		10.1016/j.cplett.20 19.07.003
15	Sharma H., Shrivastava L.	A wideband microstrip patch antenna with integrated circular slot for RF energy harvesting	International Journal of Innovative Technology and Exploring Engineering	8	11	10.35940/ijitee.K1453.0881119
16	Bhatia P., Pachauri A., Sood A., Gaur M.K.	A mini review: Polymer-matrix nanocomposites and its synthesis techniques	AIP Conference Proceedings	2142		10.1063/1.5122560
17	Kushwah R.P.S., Sengar A.P.S., Chauhan A.S., Singhal P.K.	Array Antenna Coverage: For High Rise Building Scenarios	2019 8th Asia-Pacific Conference on Antennas and Propagation, APCAP 2019			10.1109/APCAP47827.2019.9472050
18	Kushwah R.P.S., Chauhan A.S., Sengar A.P.S., Acharya I., Singhal P.K.	Low loss Multi-Port Power Divider for BSA Application	2019 8th Asia-Pacific Conference on Antennas and Propagation, APCAP 2019			10.1109/APCAP47827.2019.9471985
19	Dhingra M., Jain S.C., Jadon R.S.	Malicious intrusion detection using machine learning schemes	International Journal of Engineering and Advanced Technology	8	6	10.35940/ijeat.F8839.088619

20	Gaur M.K., Tiwari G.N., Singh P., Kushwah A.	Development of empirical relations to compute the heat transfer coefficients for distiller operating in different operating modes	Desalination and Water Treatment	158		10.5004/dwt.2019.24235
21	Pandit R.K., Gaur M.K., Kushwah A., Singh P.	Comparing the thermal performance of ancient buildings and modern-style housing constructed from local and modern construction materials**	Nanotechnology Perceptions	15	2	10.4024/N12PA19 L.ntp.15.02
22	Sharma A., Sonker A.	Benefaction of Digital Image Processing Techniques in Quality Assessment of Rose Flower	2019 10th International Conference on Computing, Communication and Networking Technologies, ICCCNT 2019			10.1109/ICCCNT45670.2019.8944567
23	Semil R., Jaiswal P.	Bearing fault diagnosis using support vector machine with genetic algorithms based optimization and K fold cross-validation method.	International Journal of Recent Technology and Engineering	8	2	10.35940/ijrte.B2828.078219
24	Jain S., Mishra P.K., Thakare V.V., Mishra J.	Design of microstrip moisture sensor for determination of moisture content in rice with improved mean relative error	Microwave and Optical Technology Letters	61	7	10.1002/mop.31763
25	Singh U.P., Jain S., Tiwari A., Singh R.K.	Gradient evolution-based counter propagation network for approximation of noncanonical system	Soft Computing	23	13	10.1007/s00500-018-3160-7
26	Chouhan S.S., Kaul A., Singh U.P.	Image Segmentation Using Computational Intelligence Techniques: Review	Archives of Computational Methods in Engineering	26	3	10.1007/s11831-018-9257-4
27	Dev S., Aherwar A., Patnaik A.	Preliminary Evaluations on Development of Recycled Porcelain	Silicon	11	3	10.1007/s12633-018-9979-9

		Reinforced LM-26/Al-Si10Cu3Mg1 Alloy for Piston Materials				
28	Singh U.P., Jain S., Gupta R.K., Tiwari A.	AFMBC for a Class of Nonlinear Discrete-Time Systems with Dead Zone	International Journal of Fuzzy Systems	21	4	10.1007/s40815-019-00621-1
29	Goyal R., Sharma S., Upadhyay A.K.	Pair-wise trust prediction employing matrix factorization for online social network	International Journal of Engineering and Advanced Technology	8	5	
30	Sharma G., Kumar P., Shrivastava L.	Improvement in K-medoids using shortest path in wireless sensor network	International Journal of Innovative Technology and Exploring Engineering	8	8	
31	Geed S.R., Samal K., Srivastava H., Kartheek B.	Study the performance of continuous bioreactor for the treatment of wastewater containing methyl parathion by isolated Alcaligenes species	Journal of Environmental Chemical Engineering	7	3	10.1016/j.jece.2019.103158
32	Kundu S.K., Jaiswal S., Singhal P.K.	Design of Circularly Polarized Patch Antenna on Conical Structure	2019 6th International Conference on Signal Processing and Integrated Networks, SPIN 2019			10.1109/SPIN.2019.8711634
33	Goyal R., Upadhyay A.K., Sharma S., Mishra P.K.	Trust factor organization for trust prediction in online social network	International Journal of Innovative Technology and Exploring Engineering	8	7	
34	Yadav K.K., Marriboyina V., Sharma S.	A firefly approach to collaborative filtering based recommender systems through fuzzy features	International Journal of Innovative Technology and Exploring Engineering	8	7	
35	Rajak S.K., Aherwar A., Unune D.R., Mia M., Pruncu C.I.	Evaluation of copper-based alloy (C93200) composites reinforced with marble dust developed by stir casting under vacuum	Materials	12	10	10.3390/ma12101574

		environment				
36	Aherwar A., Patnaik A., Bahraminasab M., Singh A.	Preliminary evaluations on development of new materials for hip joint femoral head	Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications	233	5	10.1177/14644207 17714495
37	Singh D., Kar S.	Emergent D-Instanton as a Source of Dark Energy	Brazilian Journal of Physics	49	2	10.1007/s13538-019-00635-y
38	Yadav M., Shokeen V., Singhal P.K.	Flip Left-to-Right Approach Based Inverse Tree Interleavers for Unconventional Integrated OFDM-IDMA and SCFDMA-IDMA Systems	Wireless Personal Communications	105	3	10.1007/s11277-019-06133-3
39	Raghuwanshi N.K., Parey A.	A New Technique of Gear Mesh Stiffness Measurement Using Experimental Modal Analysis	Journal of Vibration and Acoustics, Transactions of the ASME	141	2	10.1115/1.4042100
40	Agrawal S., Singh R.K., Singh U.P., Jain S.	Biogeography particle swarm optimization based counter propagation network for sketch based face recognition	Multimedia Tools and Applications	78	8	10.1007/s11042-018-6542-z
41	Shokeen V., Yadav M., Singhal P.K.	Simulation performance of conventional IDMA system with DPSK modulation and modern fisher- yates interleaving schemes	Smart Computational Strategies: Theoretical and Practical Aspects			10.1007/978-981-13-6295-8_14
42	Kantharia M., Mishra P.K., Trivedi M.K., Gogoi R.	Effect of chemical exposure on mechanical strength of polymer mortar	International Journal of Recent Technology and Engineering	7	6	
43	Samal K., Raj N., Mohanty K.	Saponin extracted waste biomass of Sapindus mukorossi for adsorption of methyl violet dye in aqueous system	Surfaces and Interfaces	14		10.1016/j.surfin.20 18.12.009

44	Dixit M., Khan M.A.	Analysis on Applicability and Feasibility of Dynamic Programming on the Basis of Time Complexity and Space Through Case Studies	Data, Engineering and Applications: Volume 2	2		10.1007/978-981-13-6351-1_27
45	Dhakar M., Tiwari A.	The Conceptual and Architectural Design of an Intelligent Intrusion Detection System	Securing the Internet of Things: Concepts, Methodologies, Tools, and Applications			10.4018/978-1-5225-9866-4.ch024
46	Aherwar A.	Manufacturing and Evaluation of Corrosion Resistance of Nickel-Added Co–30Cr–4Mo Metal Alloy for Orthopaedic Biomaterials	Materials Horizons: From Nature to Nanomaterials			10.1007/978-981-13-9977-0_11
47	Shinde V., Biniwale D., Bharadwaj S.K.	AVAILABILITY ANALYSIS FOR ESTIMATION OF REPAIR RATE OF PERFORMANCE BASED LOGISTICS UNDER OPERATING CONDITION	Journal of Reliability and Statistical Studies	12	1	
48	Raj B., Jani Anbarasi L., Narendra M., Subashini V.J.	A New Transformation of 3D Models Using Chaotic Encryption Based on Arnold Cat Map	Lecture Notes on Data Engineering and Communications Technologies	29		10.1007/978-3-030-12839-5_29
49	Rajak S.K., Aherwar A., Pruncu C.I.	Mechanical and tribological properties of composite made of marble dust-reinforced C93200 copper alloy	Materials Research Express	7	1	10.1088/2053-1591/ab6534
50	Sharan G., Patel R.K.	Optimization of cutting parameters of turning for hardness of AISI 4140 alloy steel	Materials Today: Proceedings	18		10.1016/j.matpr.20 19.07.289

51	Khan M.A., Tripathi A., Dixit A., Dixit M.	Correlative Analysis and Impact of Intelligent Virtual Assistants on Machine Learning	Proceedings - 2019 11th International Conference on Computational Intelligence and Communication Networks, CICN 2019			10.1109/CICN.201 9.8902424
52	Pandit S., Shukla P.K., Tiwari A., Shukla P.	Comparative exploration of compression and decompression impact on fractal video	Journal of Advanced Research in Dynamical and Control Systems	11	2 Special Issue	
53	Jain S., Atangana A.	Biological model of dengue spread with non- markovian properties	Springer Proceedings in Mathematics and Statistics	272		10.1007/978-981-13-9608-3_13
54	Kumar J., Shinde V., Johari P.	Call admission control scheme for cellular wireless network using queueing model	Communications in Computer and Information Science	899		10.1007/978-981-13-2035-4_11
55	Bhan R., Ahmad M.S., Jain M., Singh A., Pamula R., Faruki P.	VM availability in presence of malicious attacks in open-source cloud	Proceedings of the 9th International Conference On Cloud Computing, Data Science and Engineering, Confluence 2019			10.1109/CONFLUENCE.2019.8776920
56	Tomar A.S., Dubey H.M., Pandit M.	Spider monkey optimization for economic dispatch with diverse cost function	Proceedings of the 9th International Conference On Cloud Computing, Data Science and			10.1109/CONFLUENCE.2019.8776914
			Engineering, Confluence 2019			
57	Sisodia S., Kumar Y., Wadhwani A.K.	A new combinatorial HGAPSO algorithm based transmission system planning	Journal of Advanced Research in Dynamical and Control Systems	11	6 Special Issue	
58	Bandil M.K., Wadhwani A.K.	Multi-resolution EEG and EEG sub-band features optimization for epileptic classification using hybrid evolutionary	Procedia Computer Science	152		10.1016/j.procs.20 19.05.020

		computing technique				
59	Rathor S., Jadon R.S.	The art of domain classification and recognition for text conversation using support vector classifier	International Journal of Arts and Technology	11	3	10.1504/IJART.201 9.100431
60	Kumar S.B., Singhal P.K.	Fractal Geometry with Enhanced Bandwidth Using Periodically Capacitive Loading Structure	Lecture Notes in Electrical Engineering	553		10.1007/978-981-13-6772-4_32
61	Kosti S., Kundu J., Malvi C.S.	Nanoparticles reinforcement effect on the MMC's characteristics	Lecture Notes in Mechanical Engineering			10.1007/978-981-13-6577-5_44
62	Pandit S., Shukla P.K., Tiwari A.	Investigating the effect of compression and decompression in video using fractal technique	Lecture Notes in Networks and Systems	75		10.1007/978-981-13-7150-9_8
63	Upadhyay L.	Quantum cryptography: A survey	Advances in Intelligent Systems and Computing	939		10.1007/978-3-030-16681-6_3
64	Shrivastava A., Saini D.K., Pandit M.	Relay co-ordination optimization for integrated solar photo-voltaic power distribution grid	Cogent Engineering	6	1	10.1080/23311916 .2019.1612601
65	Kushwah D., Singh R.R., Tomar D.S.	An approach to meta-alert generation for anomalous TCP traffic	Communications in Computer and Information Science	939		10.1007/978-981-13-7561-3_15
66	Gaur M.K., Tiwari G.N., Kushwah A., Kumar A., Saxena G.	Integrated PVT hybrid active solar still (HASS) with an optimized number of collectors	Green Energy and Technology			10.1007/978-981-13-6887-5_10
67	Pal H., Kasdekar D.K., Agrawal S.	Modeling and Simulation of Al6082 MMC of Gravity Die Casting for Solidification Time	Advances in Intelligent Systems and Computing	904		10.1007/978-981-13-5934-7_13
68	Agrawal P., Jayaswal P.	Selection of best classification algorithm for fault diagnosis of bearing using vibration signature analysis	International Journal of Innovative Technology and Exploring	8	5	

			Engineering			
69	Goyal S.J., Upadhyay A.K., Jadon R.S.	Facial emotion recognition through hand gesture and its position surrounding the face	International Journal of Engineering and Advanced Technology	8	3	
70	Kantharia M., Mishra P., Trivedi M.K.	Strength of cement mortar using nano oxides: An experimental study	International Journal of Engineering and Advanced Technology	8	3	
71	Kumar Sharma K., Gurjar D., Jyotyana M., Kumari V.	Denoising of Brain MRI Images Using a Hybrid Filter Method of Sylvester-Lyapunov Equation and Non Local Means	Advances in Intelligent Systems and Computing	851		10.1007/978-981-13-2414-7_46
72	Goyal R., Updhyay A.K., Sharma S.	Trust Prediction Using Ant Colony Optimization and Particle Swarm Optimization in Social Networks	Advances in Intelligent Systems and Computing	841		10.1007/978-981-13-2285-3_57
73	Jain S., Mishra P.K., Thakare V.V.	Rice moisture detection based on oven drying technique using microstrip ring sensor	Lecture Notes in Electrical Engineering	478		10.1007/978-981-13-1642-5_9
74	Kundu S.K., Walia D.S., Jaiswal S., Singhal P.K.	High-gain L probe-fed planar and cylindrical patch antenna for X band applications	Lecture Notes in Electrical Engineering	478		10.1007/978-981-13-1642-5_19
75	Rathore P., Shrivastava L.	Connectivity analysis of mobile ad hoc network using fuzzy logic controller	Communications in Computer and Information Science	839		10.1007/978-981-13-2372-0_9
76	Agrawal S., Singh R.K., Singh U.P.	Fuzzy counter propagation network for freehand sketches-based image retrieval	Advances in Intelligent Systems and Computing	742		10.1007/978-981-13-0589-4_16
77	Kumare J.S., Gupta P., Singh U.P., Singh R.K.	An efficient contrast enhancement technique based on firefly optimization	Advances in Intelligent Systems and Computing	742		10.1007/978-981-13-0589-4_17
78	Dubey R., Makwana R.R.S.	Computer-assisted valuation of descriptive answers using weka with randomforest classification	Lecture Notes in Electrical Engineering	476		10.1007/978-981-10-8234-4_31

79	Gaur M.K., Singh S.K., Sood A., Chauhan D.S.	Experimental investigation of physical and tribological properties of engine oil with nano-particles additives	Lecture Notes in Mechanical Engineering			10.1007/978-3-319-93587-4_27

SCOPUS PUBLICATIONS DURING YEAR 2018

S. No.	Authors	Title	Source title	Vol.	Issue	DOI
1	Atangana A., Jain S.	The role of power decay, exponential decay and Mittag-Leffler function's waiting time distribution: Application of cancer spread	Physica A: Statistical Mechanics and its Applications	512		10.1016/j.physa.2018.08.033
2	Kushwah K., Narvey R., Singhal A.	Head Posture Analysis using sEMG Signal	2018 International Conference on Advanced Computation and Telecommunication, ICACAT 2018			10.1109/ICACAT.2018.8933731
3	Pathak P., Singhal P.K., Rawat S.	Design and Analysis of Modified Elliptical Patch in Stacked Arrangement for Circularly Polarized Broadband Performance	2018 IEEE International WIE Conference on Electrical and Computer Engineering, WIECON-ECE 2018			10.1109/WIECON-ECE.2018.8783161
4	Verma S., Chaturvedi V.	Multiresponse Optimization of Fused Deposition Modeling Process Using Utility-Based Taguchi Approach	Journal of Advanced Manufacturing Systems	17	4	10.1142/S0219686718500312
5	Kundu S., Mahor V., Gupta R.	A Highly Accurate Fire Detection Method Using Discriminate Method	2018 International Conference on Advances in Computing, Communications and Informatics, ICACCI 2018			10.1109/ICACCI.2018.8554799
6	Sharma A.K., Gaur M.K., Dwivedi R.K.	Parametric Study on Vibration and Harmonic Analysis of Moderately Thick Functionally Graded Plates Using FEM	MATEC Web of Conferences	237		10.1051/matecconf/201823701007

7	Punhani J., Dixit M.	Optimization of edges of an image using gravitational search algorithm	Proceedings - 2018 8th International Conference on Communication Systems and Network Technologies, CSNT 2018			10.1109/CSNT.2018.8820285
8	Sharma A.K., Sharma P., Chauhan P.S., Bhadoria S.S.	Study on harmonic analysis of functionally graded plates using fem	International Journal of Applied Mechanics and Engineering	23	4	10.2478/ijame-2018-0053
9	Jain S., Atangana A.	Analysis of Lassa hemorrhagic fever model with non-local and non-singular fractional derivatives	International Journal of Biomathematics	11	8	10.1142/S1793524518501000
10	Chouhan S.S., Kaul A., Singh U.P.	Soft computing approaches for image segmentation: a survey	Multimedia Tools and Applications	77	21	10.1007/s11042-018-6005-6
11	Bhadouria V.P.S., Srivastava L.	Grey Wolf optimization algorithm for optimal siting and sizing of capacitors	2018 2nd IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2018			10.1109/ICPEICES.2018.8897330
12	Gupta S.K., Gupta H., Shrivastava T., Rathore K.	Order reduction of linear time invariant system using particle swarm optimization	2018 2nd IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2018			10.1109/ICPEICES.2018.8897337
13	Rathore K., Bansal P.	A new 15-level asymmetrical multilevel inverter topology with reduced number of devices for different PWM techniques	2018 2nd IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2018			10.1109/ICPEICES.2018.8897372
14	Jatav V.K., Sharma S.	Stem cells: An approach for treatment of atherosclerosis	Asian Journal of Pharmaceutical and Clinical Research	11	10	10.22159/ajpcr.2018.v11i10.22690

15	Cuadrado-Godia E., Dwivedi P., Sharma S., Santiago A.O., Gonzalez J.R., Balcells M., Laird J., Turk M., Suri H.S., Nicolaides A., Saba L., Khanna N.N., Suri J.S.	Cerebral small vessel disease: A review focusing on pathophysiology, biomarkers, and machine learning strategies	Journal of Stroke	20	3	10.5853/jos.2017.0 2922
16	Singhal S.	Octagonal Sierpinski band-notched super-wideband antenna with defected ground structure and symmetrical feeding	Journal of Computational Electronics	17	3	10.1007/s10825-018-1194-9
17	Agarwal R., Jain S., Agarwal R.P., Baleanu D.	A remark on the fractional integral operators and the image formulas of generalized lommel-wright function	Frontiers in Physics	6	AUG	10.3389/fphy.2018. 00079
18	Punhani J., Dixit M.	Impact of optimization in edge detection using adaptive thresholding	Proceedings - 2018 10th International Conference on Computational Intelligence and Communication Networks, CICN 2018			10.1109/CICN.2018. 8864959
19	Khan M.A., Tripathi A., Dixit M.	All time tracking system for recovering stolen devices even in power-off state	Proceedings - 7th International Conference on Communication Systems and Network Technologies, CSNT 2017			10.1109/CSNT.2017 .8418549

20	Aherwar A., Singh A., Patnaik A.	Mechanical and wear performance evaluation of tungsten added Co-30Cr-4Mo- 1Ni biomedical alloy with Taguchi optimization [Mechanische- und Verschleißleistungsbewertung einer Wolfram-Co-30Cr-4Mo-1Ni biomedizinischen Legierung über Taguchi-Optimierung]	Materialwissenschaft und Werkstofftechnik	49	7	10.1002/mawe.201700063
21	Singh H., Srivastava L.	Multi-objective optimal reactive power dispatch for distribution system	IEEE International Conference on Power, Control, Signals and Instrumentation Engineering, ICPCSI 2017			10.1109/ICPCSI.2017.8391774
22	Ali M.A., Dubey H.M., Pandit M.	Moth-flame optimization for multi area economic dispatch: A novel heuristic paradigm	2017 International Conference on Energy, Communication, Data Analytics and Soft Computing, ICECDS 2017			10.1109/ICECDS.2017.8389602
23	Agrawal N., Tomar S.S., Bansal P.	A multilevel inverter topology using reverse-connected voltage sources	2017 International Conference on Energy, Communication, Data Analytics and Soft Computing, ICECDS 2017			10.1109/ICECDS.2017.8389652
24	Kekre A., Gawre S.K.	Solar photovoltaic remote monitoring system using IOT	International Conference on Recent Innovations in Signal Processing and Embedded Systems, RISE 2017	2018-January		10.1109/RISE.2017.8378227
25	Soni H.K., Sharma S., Upadhyay A.K.	An empirical algorithm for high and low correlative association rule mining	International Journal of Intelligent Engineering and Systems	11	3	10.22266/ijies2018.0630.24
26	Geed S.R., Prasad S., Kureel M.K., Singh R.S., Rai B.N.	Biodegradation of wastewater in alternating aerobic-anoxic lab scale pilot plant by Alcaligenes sp. S3 isolated from agricultural field	Journal of Environmental Management	214		10.1016/j.jenvman.2018.03.031

27	Agrawal N., Bansal P.	A new 21-level asymmetrical multilevel inverter topology with different PWM techniques	2017 Recent Developments in Control, Automation and Power Engineering, RDCAPE 2017			10.1109/RDCAPE.2017.8358271
28	Yadav M., Shokeen V., Singhal P.K.	Testing of Durstenfeld's algorithm based optimal random interleavers in OFDM- IDMA systems	Proceedings - 2017 3rd International Conference on Advances in Computing, Communication and Automation (Fall), ICACCA 2017	2018-January		10.1109/ICACCAF.2017.8344675
29	Das A., Srivastava L.	Optimal placement and sizing of distributed generation units for power loss reduction using Moth-Flame optimization algorithm	2017 International Conference on Intelligent Computing, Instrumentation and Control Technologies, ICICICT 2017	2018-January		10.1109/ICICICT1.2017.8342805
30	Rajput N., Chaudhary V., Dubey H.M., Pandit M.	Optimal generation scheduling of thermal System using biologically inspired grasshopper algorithm	2nd International Conference on Telecommunication and Networks, TEL-NET 2017	2018-January		10.1109/TEL-NET.2017.8343580
31	Geed S.R., Kureel M.K., Prasad S., Singh R.S., Rai B.N.	Novel study on biodegradation of malathion and investigation of mass transfer correlation using alginate beads immobilized Bacillus sp. S4 in bioreactor	Journal of Environmental Chemical Engineering	6	2	10.1016/j.jece.2018.05.025
32	Aherwar A., Singh A., Patnaik A.	A study on mechanical behavior and wear performance of a metal–metal Co–30Cr biomedical alloy with different molybdenum addition and optimized using Taguchi experimental design	Journal of the Brazilian Society of Mechanical Sciences and Engineering	40	4	10.1007/s40430-018-1107-7
33	Singh U.P., Jain S.	Optimization of neural network for nonlinear discrete time system using modified quaternion firefly algorithm: case study of Indian currency exchange rate prediction	Soft Computing	22	8	10.1007/s00500-017-2522-x

34	Singh U.P., Jain S., Tiwari A., Singh R.K.	Approximation of nonlinear discrete-time system using FA-based neural network	Granular Computing	3	1	10.1007/s41066-017-0055-4
35	Agrawal S., Sejwar V.	Crime identification using FP-growth and multi objective particle swarm optimization	Proceedings - International Conference on Trends in Electronics and Informatics, ICEI 2017	2018-January		10.1109/ICOEI.2017.8300799
36	Shakya V., Makwana R.R.S.	Feature selection based intrusion detection system using the combination of DBSCAN, K-Mean++ and SMO algorithms	Proceedings - International Conference on Trends in Electronics and Informatics, ICEI 2017	2018-January		10.1109/ICOEI.2017.8300843
37	Rajput V., Manjhvar A.	A model for forecasting dengue disease using genetic based weighted FP-growth	Proceedings - International Conference on Trends in Electronics and Informatics, ICEI 2017	2018-January		10.1109/ICOEI.2017.8300846
38	Gupta S., Manjhvar A.K.	Relation classification from unstructured medical text using feature based machine learning approach	Proceedings - International Conference on Trends in Electronics and Informatics, ICEI 2017	2018-January		10.1109/ICOEI.2017.8300890
39	Chouhan S.S., Kaul A., Singh U.P., Jain S.	Bacterial foraging optimization based radial basis function neural network (BRBFNN) for identification and classification of plant leaf diseases: An automatic approach towards plant pathology	IEEE Access	6		10.1109/ACCESS.2018.2800685
40	Kantharia M., Mishra P.K., Jani S., Trivedi M.K.	Experimental assessment of cement mortar using nano oxide compounds	Materials Today: Proceedings	29		10.1016/j.matpr.20 20.07.299
41	Bhattacharya S., Agarwal A., Sikarwar M., Mishra	Smart measurement technique employed for detection of localized anomalies in the atmosphere	Materials Today: Proceedings	29		10.1016/j.matpr.20 20.07.331

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42	Agarwal A., Bhattacharya S., Chaudhari S.	Electric field mill, an effective methodology to measure the localized lower atmospheric electric field	Materials Today: Proceedings	29		10.1016/j.matpr.20 20.07.297
43	Pathak P., Singhal P.K.	Compact broadband monopole antenna for C band applications	Advanced Electromagnetics	7	5	10.7716/AEM.V7I5. 815
44	Kosti S., Malvi C.S.	Cumulative influence of nanoparticles on MMCs' time–temperature history curve	Nanomaterials and Energy	7	1	10.1680/jnaen.17.0 0011
45	Saxena A., Khule M.	Remapping Attack Detection and Prevention for Reliable Data Service in MANET	Lecture Notes in Networks and Systems	34		10.1007/978-981-10-8198-9_13
46	Pandey P., Litoriya R., Tiwari A.	A framework for fuzzy modelling in agricultural diagnostics	Journal Europeen des Systemes Automatises	51		10.3166/JESA.51.20 3-223
47	Jain S., K.mishra P., Thakare V.V., Mishra J.	Microstrip moisture sensor based on microstrip patch antenna	Progress In Electromagnetics Research M	76		10.2528/PIERM180 92602
48	Dubey D., Dubey D., Singh U.P.	Performance of service-oriented architecture (SOA): Medical image systems for chronic diseases	Chronic Illness and Long-Term Care: Breakthroughs in Research and Practice	2		10.4018/978-1-5225-7122-3.ch039
49	Agrawal S., Agrawal S., Kumar Kasdekar D.	Optimization of MRR and electrolyte coating thickness of ECM parameters using PCA based GRA	Materials Today: Proceedings	5	9	10.1016/j.matpr.20 18.06.246
50	Kumar S.B., Singhal P.K.	Investigation of Fractal Antenna for RF Energy Harvesting System	Asian Journal of Water, Environment and Pollution	15	3	10.3233/AJW-180048
51	Maheshwari S., Jain R.C., Jadon R.S.	An insight into rare class problem: Analysis and potential solutions	Journal of Computer Science	14	6	10.3844/jcssp.2018. 777.792
52	Kumar A., Jaiswal V., Gupta A., Verma G.	Larvicidal activity of methanol and chloroform extract of swertia celiata against three mosquito vectors	Journal of Communicable Diseases	50	2	10.24321/0019.513 8.201809

53	Singh Rajawat A., Sharma A.K., Gehlot P.	Free vibration analysis of Stiffened Laminated Plate using FEM	Materials Today: Proceedings	5	2	10.1016/j.matpr.20 17.12.115
54	Gehlot P., Sharma A.K., Rajawat A.S.	Harmonic analysis of stiffened functionally graded plate using FEM	Materials Today: Proceedings	5	2	10.1016/j.matpr.20 17.12.096
55	Kushwah S.S., Kasdekar D.K., Agrawal S.	Mathematical and prediction modeling of material removal rate for evaluating the effects of process parameters	Advances in Intelligent Systems and Computing	696		10.1007/978-981-10-7386-1_44
56	Kumar Kasdekar D., Parashar V., Arya C.	Artificial neural network models for the prediction of MRR in Electro-chemical machining	Materials Today: Proceedings	5	1	10.1016/j.matpr.20 17.11.146
57	Saxena G., Gaur M.K.	Exergy analysis of evacuated tube solar collectors: A review	International Journal of Exergy	25	1	10.1504/IJEX.2018.088887
58	Mishra N., Soni H.K., Sharma S., Upadhyay A.K.	Development and analysis of Artificial Neural Network models for rainfall prediction by using time-series data	International Journal of Intelligent Systems and Applications	10	1	10.5815/ijisa.2018.01.03
59	Garg N., Gupta R.K.	Performance evaluation of new text mining method based on GA and K-means clustering algorithm	Advances in Intelligent Systems and Computing	562		10.1007/978-981-10-4603-2_3
60	Agarwal V., Tiwari A., Gupta R.K., Singh U.P.	Discovering optimal patterns for forensic pattern warehouse	Advances in Intelligent Systems and Computing	562		10.1007/978-981-10-4603-2_11

SCOPUS PUBLICATIONS DURING YEAR 2017

S. No.	Authors	Title	Source title	Vol	Issue	DOI
1	Singh R.K., Agrawal S., Singh U.P., Jain S.	Intelligent image retrieval via deep learning techniques	Deep Learning for Image Processing Applications			10.3233/978-1-61499-822-8-68
2	Tiwari S., Bhargava P.	Load Distribution Factors for Composite Multicell Box Girder Bridges	Journal of The Institution of Engineers (India): Series A	98	4	10.1007/s40030-017-0243-x

3	Yadav M., Shokeen V., Singhal P.K.	Uncoded integrated interleave division multiple access systems in presence of power interleavers	Radioelectronics and Communications Systems	60	11	10.3103/S0735272 71711005X
4	Yadav M., Shokeen V., Kumar Singhal P.	Flip left-right approach based novel inverse tree interleavers for IDMA scheme	AEU - International Journal of Electronics and Communications	81		10.1016/j.aeue.201 7.07.025
5	Yadav M., Gautam P.R., Shokeen V., Singhal P.K.	Modern Fisher–Yates Shuffling Based Random Interleaver Design for SCFDMA- IDMA Systems	Wireless Personal Communications	97	1	10.1007/s11277-017-4492-9
6	Patel S.K., Sonker A.	Internet Protocol Identification Number Based Ideal Stealth Port Scan Detection Using Snort	Proceedings - 2016 8th International Conference on Computational Intelligence and Communication Networks, CICN 2016			10.1109/CICN.2016. 89
7	Kailashiya C., Sharma H.B., Kailashiya J.	Telomerase based anticancer immunotherapy and vaccines approaches	Vaccine	35	43	10.1016/j.vaccine .2 017.09.011
8	Aherwar A., Singh A., Patnaik A.	Prediction of effect of tungsten filled Co- 30Cr-4Mo-1Ni metal matrix biomedical composite alloy on sliding wear peculiarity using Taguchi methodology and ANN	Advances in Materials and Processing Technologies	3	4	10.1080/2374068X. 2017.1366104
9	Jain S.K., Tiwari S., Dixit A., Sharma C.K.	Estimation of Fundamental Time Periods of Elevated Reservoirs	Journal of The Institution of Engineers (India): Series A	98	3	10.1007/s40030-017-0220-4
10	Singh U.P., Jain S.	Object extraction using topological models from complex scene image	Handbook of Research on Advanced Concepts in Real- Time Image and Video Processing			10.4018/978-1-5225-2848-7.ch013

11	Soni H.K., Sharma S., Jain M.	Plausible characteristics of association rule mining algorithms for e-commerce	Proceedings of the 3rd IEEE International Conference on Advances in Electrical and Electronics, Information, Communication and Bio- Informatics, AEEICB 2017			10.1109/AEEICB.2017.7972379
12	Lagwal M., Bhardwaj N.	Load balancing in cloud computing using genetic algorithm	Proceedings of the 2017 International Conference on Intelligent Computing and Control Systems, ICICCS 2017	2018-January		10.1109/ICCONS.2017.8250524
13	Jain G., Sejwar V.	Improving the security by using various cryptographic techniques in cloud computing	Proceedings of the 2017 International Conference on Intelligent Computing and Control Systems, ICICCS 2017	2018-January		10.1109/ICCONS.2017.8250721
14	Pathak S., Sejwar V.	Optimized noisy image segmentation using genetic algorithm	Proceedings of the 2017 International Conference on Intelligent Computing and Control Systems, ICICCS 2017	2018-January		10.1109/ICCONS.2017.8250681
15	Shridhar M., Parmar M.	Association rule mining with regression for optimization approach	Proceedings of the 2017 International Conference on Intelligent Computing and Control Systems, ICICCS 2017	2018-January		10.1109/ICCONS.2017.8250664
16	Kanojia A., Jain S.K.	Performance of coconut shell as coarse aggregate in concrete	Construction and Building Materials	140		10.1016/j.conbuildmat.2017.02.066
17	Parsediya D.K.	Deflection and stresses of effective micro-cantilever beam designs under low mass loading	International Conference on Electrical Power and Energy Systems, ICEPES 2016			10.1109/ICEPES.2016.7915915
18	Pandit M., Jain K., Dubey H.M., Singh	Large Scale Multi-area Static/Dynamic Economic Dispatch using Nature Inspired	Journal of The Institution of Engineers (India): Series B	98	2	10.1007/s40031-016-0248-2

	R.	Optimization				
19	Sakhre V., Singh U.P., Jain S.	FCPN Approach for Uncertain Nonlinear Dynamical System with Unknown Disturbance	International Journal of Fuzzy Systems	19	2	10.1007/s40815-016-0145-5
20	Malvi C.S., Gupta A., Gaur M.K., Crook R., Dixon-Hardy D.W.	Experimental investigation of heat removal factor in solar flat plate collector for various flow configurations	International Journal of Green Energy	14	4	10.1080/15435075.2016.1268619
21	Dubey D., Dubey D., Singh U.P.	Performance of service-oriented architecture (SOA): Medical image systems for chronic diseases	Exploring Enterprise Service Bus in the Service-Oriented Architecture Paradigm			10.4018/978-1-5225-2157-0.ch020
22	Rana B.S., Srivastava L.	Optimal StatCom placement using Gravitational Search Algorithm	1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016			10.1109/ICPEICES.2016.7853702
23	Saxena A.R., Kulshreshtha A., Bansal P.	Universal bus digitally controlled front end damped PFC Cuk converter as LED drivers	1st IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems, ICPEICES 2016			10.1109/ICPEICES.2016.7853665
24	Prakash V., Saxena S.	Molecular overview of heavy metal phytoremediation	Handbook of Research on Inventive Bioremediation Techniques			10.4018/978-1-5225-2325-3.ch010
25	Shrivastava S., Johari P.K.	Analysis on high utility infrequent itemsets mining over transactional database	2016 IEEE International Conference on Recent Trends in			10.1109/RTEICT.2016.7807958
			Electronics, Information and Communication Technology, RTEICT 2016 - Proceedings			

26	Verma S., Majhvar A.K.	Updated page rank of dynamically generated research authors' pages: A new Idea	2016 IEEE International Conference on Recent Trends in Electronics, Information and Communication Technology, RTEICT 2016 - Proceedings			10.1109/RTEICT.20 16.7807954
27	Jain R., Johari P.K.	An improved approach of CBIR using color based hsv quantization and shape based edge detection algorithm	2016 IEEE International Conference on Recent Trends in Electronics, Information and Communication Technology, RTEICT 2016 - Proceedings			10.1109/RTEICT.20 16.7808181
28	Sharma V., Jainwal K., Tripathi A.	Design of a hybrid ring oscillator at 1.5/3.0 GHz with low power supply sensitivity	2016 IEEE Asia Pacific Conference on Circuits and Systems, APCCAS 2016			10.1109/APCCAS.20 16.7804054
29	Aherwar A., Bahramina sab M.	Biocompatibility evaluation and corrosion resistance of tungsten added Co-30Cr-4Mo- 1Ni alloy	Bio-Medical Materials and Engineering	28	6	10.3233/BME-171706
30	Sharma A.K.	Free Vibration Analysis of Laminated Composite Plates with Elastically Translational Restrained Edges	Materials Today: Proceedings	4	8	10.1016/j.matpr.20 17.07.062
31	Mishra N., Soni H.K., Sharma S., Upadhyay A.K.	A comprehensive survey of data mining techniques on time series data for rainfall prediction	Journal of ICT Research and Applications	11	2	10.5614/itbj.ict.res. appl.2017.11.2.4
32	Shrivastava S., Johari P.K.	Privacy preservation of infrequent itemsets mining using GA approach	Advances in Intelligent Systems and Computing	555		10.1007/978-981-10-3779-5_12
33	Kasdekar D.K., Parashar V.	Performance of Box-Behnken and prediction model are compared with Al- Nano MMC to maximize the MRR	Materials Today: Proceedings	4	2	10.1016/j.matpr.20 17.02.202

34	Sharma P., Sharma A.K.	Harmonic Analysis of Al/Al2O3 and Ti-6Al-4V/Aluminium oxide Functionally Graded Plate	Materials Today: Proceedings	4	2	10.1016/j.matpr.20 17.02.012
35	Shrivastava A., Pandit M., Saini D., Mishra R.G.	Optimal power dispatch in competitive market	Advances in Intelligent Systems and Computing	479		10.1007/978-981-10-1708-7_123

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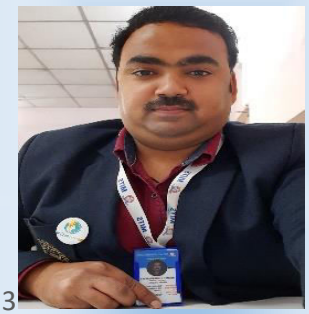

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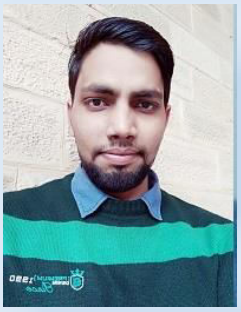

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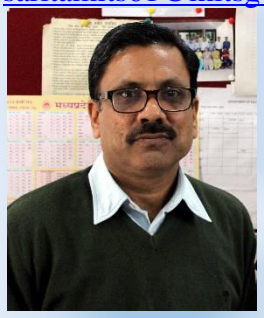

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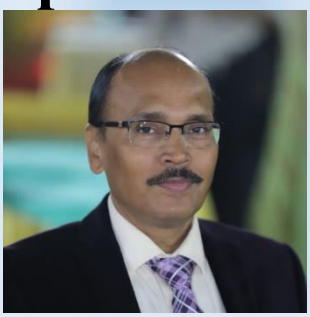

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