



# **JK LAKSHMIPAT UNIVERSITY, JAIPUR**

## **Institute of Engineering and Technology**

**Minutes of 9<sup>th</sup> meeting of Board of Studies (BoS), held on**

**Saturday: 04.05.2019 in the Board Room at 11:00 a.m.**

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**Present:**

1. Dr. R. L. Raina, Vice Chancellor, JKLU
2. Dr. Sanjay Goel, Director-IET
3. Dr. B. R. Natarajan, Professor and Head, Chemical Engineering, Bansthali Vidyapeeth
4. Mr. Yashpal, Assistant Manager, DEKRA India Pvt. Ltd., New Delhi
5. Dr. D. K. Sharma, Professor and Head, Civil Engineering, SKIT, Jaipur
6. Mr. Amit Trivedi, COO, My Recharge Skill Development and Director, Synergy, Jaipur
7. Mr. R. Narasimhan, VP (Projects), SB Energy, New Delhi
8. Dr. Jitendra Kumar Singh, Assistant Professor-CHE, JKLU
9. Dr. Kedar Sharma, Associate Professor-CE, JKLU
10. Dr. Tanmay Kumar Deb, Assistant Professor- CE, JKLU
11. Dr. Sonal Jain, Associate Professor-CSE, JKLU
12. Dr. Gustavo Sanchez, Professor-EEE, JKLU
13. Dr. Devika Kataria, Associate Professor-EEE, JKLU
14. Dr. Pushpendra Singh, Associate Professor-EEE, JKLU
15. Dr. Ravi Shankar Prasad, Associate Professor-ME, JKLU
16. Dr. Rajlakshmi Nayak, Assistant Professor-ME, JKLU
17. Dr. Vipin Kumar Jain, Associate Professor-SLA, JKLU
18. Dr. Umesh Gupta, Associate Professor-SLA, JKLU
19. Dr. Jaya Gupta, Assistant Professor-SLA, JKLU
20. Dr. Poonam Vyas, Assistant Professor-SLA, JKLU
21. Dr. Richa Mishra, Assistant Professor-IM, JKLU



## **1. Welcome**

Hon'ble Vice Chancellor, Dr. Roshan Lal Raina welcomed all Members of the BoS of Institute of Engineering and Technology. He also briefly introduced the following external members participating in the BoS Meeting, first time:

- Dr. B. R. Natarajan, Professor and Head, Chemical Engineering, Bansthali Vidyapeeth
- Mr. R. Narasimhan, VP (Projects), SB Energy, New Delhi
- Dr. D. K. Sharma, Professor and Head, Civil Engineering, SKIT, Jaipur
- Mr. Yashpal, Assistant Manager, DEKRA India Pvt. Ltd., New Delhi
- Mr. Amit Trivedi, Director-Synergize – Special Invitee

The Board also recorded its sincere appreciation to the following members for their contribution:

- Dr. R. Mukhopadhyay, Director, R&D, JK Tyre Industries and Chief Executive, HASETRI, Kankroli, Rajsamand
- Dr. (Mr.) Ashu Jain, Professor, Civil Engineering, IIT Kanpur
- Dr. Rajiv Jain, MD, Gulshan Rai & Co., Jaipur
- Dr. Pramod Kumar Singh, Associate Professor, IIITM, Gwalior
- Mr. Khalid Kamal Hussain, Principal Education, Training and Assessment, Infosys, Jaipur
- Dr. Manoj Fauzdar, Professor, Electrical Engineering, MNIT Jaipur
- Dr. V. K. Chaubey, Professor and Head, EEE, BITS Pilani
- Dr. S. L. Soni, Director, NIT Uttarakhand
- Dr. Kanupriya Sachdev, Professor, Physics, MNIT Jaipur
- Dr. K. C. Jain, Retd. Professor and Head, Mathematics, MNIT Jaipur

While introducing the members, leave of absence was granted to the following members:

1. Dr. Sanjay Vashishtha, Managing Director, First Green Consulting Pvt. Ltd., Gurgaon
2. Mr. Sanjeev Jindal, GM, Airport Authority of India, New Delhi
3. Prof. Rahul Banerjee, Director, LNMIIT, Jaipur
4. Mr. Arun Singhal, MD, Accenture Technology, Gurgaon
5. Prof. S.D. Joshi, Professor and Head, Electrical Engineering, IIT Delhi
6. Dr. Jinesh Kumar Jain, Associate Professor, MNIT, Jaipur
7. Dr. S. Taruna, Associate Professor-CSE, JKLU

## **2. Opening Remarks**

In his opening remarks, Hon'ble Vice Chancellor informed the Board about the following:

- Establishment of Atal Incubation Centre at JKLU and sanction of Grant-in-aid under the Atal Innovation Mission (AIM) of the Government of India. The University is among the 72 shortlisted Institutions to establish AIC.



- Conferment of the Fifth JKLU Laureate Award on Shri Pranab Mukherjee, Hon'ble Former President of India who also delivered *Shri Hari Shankar Singhania Memorial Oration* on '**Youth and Nation Building**'.
- Celebration of Founder's Day on November 23, 2018 with **Prof. Anil D Sahastrabudhe, Chairman, AICTE** as the Chief Guest. Earlier during the day Prof. Sahastrabudhe had an interactive session with the faculty in which he touched upon contemporary challenges and opportunities prevailing in Indian Higher Education System. He also appreciated the efforts of the University on its initiative to bring in and adopt Olin pedagogy of Project Based Learning.
- Inauguration of the commencement of the **Institute of Design** on December 21, 2018. The Institute will offer three Bachelor of Design (B.Des) programs in (i) *Product Design*, (ii) *Interaction Design* and (iii) *Interdisciplinary Design* from 2019-20 academic session.
- Conduct of **Masterclass on 'Experiential and Project Based Learning in Engineering Education: How to make it work'** during January 11-12, 2019 in association with Olin College of Engineering, USA by Dr. Siddharthan Govindaswamy, Associate Professor, Olin College of Engineering. The Chief Guest on this occasion was **Prof. M.P. Poonia, Vice Chairman, AICTE**.
- Organization of **International Conference** on "*Innovations in Technology and Management for Achieving Sustainable Development Goals (SDGs)*" during February 1-3, 2019.

Chief Guest : Mr. Kamal Singh, Executive Director, UN Global Compact Network India

Keynote speaker : Mr. Pramod Kumar Jain (ED-Design), NCRTC

Guest of Honor : Dr. Karim MH, University of Kharazmi, Tehran, Iran

Papers : Submitted: 75; Presented: 60

- Inauguration of **MP Ranjan – JKLU Design Resource Centre** on March 25, 2019 by **Hon'ble Minister Shri Parsadi Lal Meena**, Minister of Industry, Government of Rajasthan.
- **Academic Collaboration with:**
  - (i) **University of Massachusetts at Amherst (UMass)**, a top 30 Public University in the United States. The collaboration will allow students enrolling at JKLU to get a full master's degree in (i) *Applied Economics*; (ii) *Data Analytics*; and (iii) *Public Policy* from UMass, Amherst.
  - (ii) **University of Florida (UF), Gainesville, USA**, ranked as the 8<sup>th</sup> best public university of USA and ranked 156<sup>th</sup> in World Times Higher Education (THE) Ranking 2019. Apart from many areas of academic collaboration, JKLU students can go to UF for summer internships.
- Conduct of **JKLU Innovation Challenge 2018**, a unique competition aimed at "Finding Solutions for Tomorrow, Today", was launched by JK Lakshmipat University, in which 9323 students of class 11<sup>th</sup> & 12<sup>th</sup> from 113 schools participated. The students offered innovative solutions, based on currently available resources, towards achieving any of the Sustainable Development Goals (SDGs) set by the United Nations. An eminent jury consisting of top leaders from industry, education and media declared the results in April, 2019. The top two prizes were won by Riya Kataria of The Shri Ram School, Mousari, Gurgaon and Ravinder Bishnoi of Kendriya Vidyalaya, AFS; Jaisalmer for their innovations on saving crops using sound technology and purification of air, respectively. Maharani Gayatri Devi Girls' School, Jaipur won the Innovative Campus award.



### 3. Confirmation of Minutes

Minutes of the 8<sup>th</sup> BoS meeting, held on October 13, 2018 were confirmed.

4. **Action Taken Report** based on the Minutes of 8<sup>th</sup> Board of Studies Meeting held on October 13, 2018 was noted.

### 5. B. Tech Program

Director-IET, Dr. Sanjay Goel made a presentation on the program, briefing the teaching approach adopted by the Institute and focus areas of the University such as Design Thinking, Internet of Things, Data Sciences and AI and Robotics & Automation. He outlined the four dimensions of students' engagements, namely, active, collaborative, integrative, and reflective engagement being promoted by JKLU. He also informed the house about the following new initiatives:

1. Rote learning is completely de-emphasized at JKLU and assessment scheme usually includes several components like assignments, labs, projects, etc. The written exams are designed to assess problem solving ability through questions focusing on analysis, synthesis, and evaluation.
2. Learning outcomes focusing on higher order thinking and practical skills were developed for all even semester 2019 courses.
3. Relevant engineering standards have been incorporated in all engineering courses.
4. All engineering courses also touch upon the relevant sustainability issues.

He highlighted the key characteristics of the proposed curriculum of **B. Tech program**, such as minor and concentrations, integrated courses, open and department electives, thematic weeks, etc. The new curriculum structure of all BTech programs offers 166-167 credits. However, a student will be eligible for the degree on completion of 160 credits and all core courses. This means that a student can choose to drop some elective/project out of 166-167 credit structure. He presented the curriculum of B. Tech programs in Civil Engineering, Computer Science and Engineering, Electrical and Electronics Engineering and Mechanical Engineering for 2019-23 batch. Details are provided in **Annexure-1**. The BoS members appreciated the scheme and gave following suggestions:

The Board appreciated the innovative course structure for B. Tech program. The suggestions provided by them are as follows:

- Topics like turbines, boilers, pumps, etc., should be added in the curriculum for Mechanical Engineering.
- Techniques like CPM and PERT should be the part of curriculum of all the B. Tech programs.
- Business aspects should be an important part in project courses to give an idea about market viability of the product.
- Exploration of Social Needs/Challenges etc. should be allowed and encouraged as the part of summer internships.



- The courses such as Philosophy, History, Human Rights, Constitution of India, etc. should be offered as Liberal Arts courses.

The Board appreciated and approved the new B. Tech program for 2019-23 batch and also the program for the remaining semesters for the B. Tech batches 2016-20, 2017-21 and 2018-22 in accordance to the 2019-23 scheme. Details are provided in **Annexure-1**.

## 6. M. Tech Program

After discussion on B. Tech programs, Dr. Sanjay Goel presented an overview of the new curriculum of the MTech programs in **Health, Safety and Environmental Engineering, Data Sciences, Automation and Robotics, and Embedded Systems and Internet of Things**. He shared that all the MTech programs are interdisciplinary in nature leveraging the strengths in several departments. He also informed that all MTech programs will offer an exit option with a PG Diploma after 2 semesters of course work and a summer internship. Details are provided in **Annexure-1**. The BoS members appreciated the scheme and gave following suggestions.

- The core course "Industrial safety and Hazard management" offered in Health, Safety and Environmental Engineering should be offered as two core courses "Industrial Safety Management" and "Risk and Hazard Management". These courses may be offered in 1<sup>st</sup> and 2<sup>nd</sup> semester respectively.
- The core course "Safety in the Chemical Industry" offered in Health, Safety and Environmental Engineering should be offered as elective course.
- "Teaching Practices" related courses should be offered for all interested MTech students. It was agreed to offer such courses as an option along with Communication and Critical Thinking/Liberal Arts courses.

The Board approved the new curriculum of all M. Tech programs, 2<sup>nd</sup> year of MTech (HSE) 2018-20 batch, and also the 5<sup>th</sup> year program for dual degree B. Tech + M. Tech program in Computer Science Engineering, 2015-20 batch in accordance to the MTech 2019-21 program. Details are provided in **Annexure-1**.

Dr. Natarajan congratulated the JKLU team for coming out with very good curriculum. Board appreciated the pedagogy adopted by the Institute and the course structure of all the programs. Dr. Sanjay Goel thanked all the members of Board for joining the meeting and sharing their valuable inputs.

Date: 04.05.2019

(Dr. Sanjay Goel)  
Director: IET-JKLU  
Chairman: BoS, IET-JKLU

**Academic Year 2019-20 onwards: Curriculum for all BTech Batches Batch 2019-23**

Here is a brief summary of the key features of the new proposed curriculum structure for BTech:

1. Strong feature of old system (Common 1<sup>st</sup> year offering large integrated PBL courses, PS-I, PS-II, and IBM/CISCO specializations, and) retained.
2. The total program credits as per the regular structure are 166-167. However, the minimum credit requirement for the degree is 160. A student can even choose to drop out a few electives, minor projects, or thematic weeks, if s/he so desires and completes 160 credits.
3. For IBM specialization, a student has to earn 6 extra credits in 3<sup>rd</sup> and 4<sup>th</sup> semesters. Other 5 IBM specialization related courses are given in lieu of regular courses without increasing the credit requirements.
4. Each student has to complete **36-37 credits (9 courses) of compulsory discipline specific courses** in 2<sup>nd</sup> and 3<sup>rd</sup> year. Mechanical and Civil engineering students will do one extra discipline specific lab course keeping the total credits at 36.
5. The credits per semester (1st -7th semester) are 20-22 credits. For IBM specialization, this goes up to 25 and 24 credits in semester 3 and semester 4 respectively.
6. The regular weekly contact hours through L/T/P/Studio are 17-25 hrs per week. For IBM specialization, this goes up to 28 and 27 in semester 3 and semester 4 respectively.
7. Option for earning additional **Minor certification in a different discipline** (through electives/minor project, 16 Credits) or **Concentration in a specific area** (through electives, 12 credits) within the major discipline. The lists for minor and concentrations are given at the end of this document. More minors and concentrations can be considered in future.
8. Pervasive Emphasis on **Data Analytics, IoT, Embedded Systems, Automation, Computing for engineering analysis, Digitization, Intelligent systems, Critical thinking, Communication, etc., in all disciplines of engineering.** /\* This will be a unique feature of JKLU in India
9. 5 Nos. of focused thematic full-day week-long workshops (2 credit each) on Science, Design/ Management/Liberal Arts, IoT and Automation, and Emerging Technologies in 2<sup>nd</sup>-6<sup>th</sup> semesters. /\* This will be a unique feature of JKLU in India
10. Unique **common 1<sup>st</sup> year** experience (41 credits) offering **Project Based Learning** of Maths, Programming, Design, Workshop, Electronics, Applied Mechanics, Environment Studies, etc., in the context of engineering problem solving. /\* This will be a unique feature of JKLU in India
11. Compulsory common courses = 41 Credits of 1<sup>st</sup> year + other 23 Credits (7 courses)
12. Communication and Critical Thinking Courses = 12 Credits (6 Courses, already included in 6 and 7 above) /\* This will be a unique feature of JKLU in India
13. Courses integrating Mathematics, Programming, and Engineering = 26 credits (4 courses, already included in 6 and 7 above) ). /\* This will be a unique feature of JKLU in India
14. Courses integrating Design and Engineering = 6 credits (1<sup>st</sup> sem course, already included in 6 above) /\* This will be a unique feature of JKLU in India.
15. Common interdisciplinary team taught courses = 36 Credits (8 Courses, already included in 6 and 7 above). /\* This will be a unique feature of JKLU in India
16. Internships + Minor Project = 26-30 Credits (PS-I, PS-II, 1 or 2 Minor Projects).
17. Electives = 28-32 Credits (7 or 8 courses, Departmental/Open).
18. CSE 2019-23 curriculum has been **benchmarked with ACM-IEEE recommendations** (Computer Science 2013 and Computer Engineering 2016) for our CSE

stream. Broadly, in terms of topics, we are complying well (though not fully) with both these different model curricula for Computer Science as well as Computer Engineering.

19. All BTech 2019-23 has been **benchmarked with AICTE model curriculum 2018** for all our streams. Broadly, in terms of topics, we are more or less complying well with AICTE model curriculum for all streams except for a few minor variations. This has been achieved in spite of so many distinguishing features of JKLU curriculum. However, our sequence and packing are significantly different from AICTE model curriculum.

**1<sup>st</sup> Year (2019-23) (Common for all BTech)**

<b>1<sup>st</sup> Sem</b>	Computational Data Analysis	Design and Prototyping	Experimental Science I	Fundamentals of Communication			21
	(10s 2 0) 10	(6s 0 0) 6	(1 0 4) 3	2			25 Hrs./week
<b>2<sup>nd</sup> Sem</b>	Calculus and Applied Mechanics (6s 2 0) 6	Fundamentals of Automation Engineering (6s 2 0) 6	Object Oriented Programming (Java + Simple Database) (1 0 4) 3/ <b>IBM-SP-I</b> 3	Energy and Environmental Studies (1 0 0) 1	Critical Thinking and Power of Storytelling (2 0 0) 2	<b>Science week 2</b>	20 24 hrs./week

**3rd Semester (2018-22):**

CSE	Data Structures (3 0 2) 4	Computational Engineering Analysis-I (3 1 2) 5 (ODE, Complex, Laplace, ME/CE (Column, Beam, Struts), EE (Net fun, Net synthesis, Transient analysis) )	Engineering Measurements and Machines (3 0 4) 5 (Measurement theory & sensors + mechanical & electrical machines)	Theoretical Foundation of Computer Science (3 1 0) 4	Perspective s on Contempor ary Issues 2	Program ming Week 2	IBM-SP-II 3	22/25
				Electronic Devices and Circuits (Semiconductors, devices (diode, hjt, mosfet),ckt models, 2 port, freq response) (3 0 2) 4				24/28 Hrs.
EEE								22
								25 Hrs.
ME	Materials Engineering (3 0 2) 4			Engineering Thermodynamics (3 0 2) 4			Engineering Drawing (0 0 2) 1	23
								27 Hrs.
CE (?)	Civil Engineering Materials (3 0 2) 4			Digital Surveying and Mapping (3 0 2) 4				23
								27 Hrs



**3rd Semester (2019-23):**

<b>CSE</b>	Data Structures (3 0 2) 4	Computational Engineering Analysis-I (3 1 2) 5 (ODE, Complex, Laplace, MF/CE (Column, Beam, Struts), EE (Net fun, Net synthesis, Transient analysis) )	Engineering Measurements and Machines (3 0 4) 5 (Measurement theory & sensors + mechanical & electrical machines)	Theoretical Foundation of Computer Science (3 1 0) 4	Perspectives on Contemporary Issues 2	<b>Management/ Design/Liberal Arts week</b>  2	<b>IBM-SP-II 3</b>	22/25
<b>EEE</b>				Electronic Devices and Circuits (Semiconductors, diode, bjt, mosfet), ckt models, 2 port, freq response) (3 0 2) 4				22
<b>ME</b>	Materials Engineering (3 0 2) 4			Engineering Thermodynamics (3 0 2) 4				25 Hrs.
<b>CE (?)</b>	Civil Engineering Materials (3 0 2) 4			Digital Surveying and Mapping (3 0 2) 4				22
								25 Hrs

**4<sup>th</sup> Semester (2018-22, 2019-23):**

CSE	Design and Analysis of Algorithms (3 0 2) 4	Database Systems (3 0 2) 4	Computational Engineering Analysis-II (PDE, Fourier Tr, Z, Heat conduction, Filter design, ckt analysis using graph)  (3 1 2) 5	Computer Architecture & Organization  (3 0 2) 4	Communication and Identity (2 0 0) 2	Management/ Design/ Liberal Arts week  2	IBM-SP-III 3	21/24
				23/27 Hrs.				
EEE	Analog Circuits (3 0 2) 4	Advanced Electrical Machines/ Electromagnetics and Microwaves (3 0 2) 4		Signals and Control Systems (3 0 4) 5			22	
				25 Hrs.				
ME	Transport Phenomena (3 0 2) 4	Strength of Materials and Analysis (3 0 0) 3		Production Technology-I (3 0 2) 4			Mechanical Engineering CAD Lab (0 0 2) 1	21
				23 Hrs.				
CE (?)	Fluid Mechanics and Hydraulic Engineering (3 0 2) 4	Structural Analysis (3 0 0) 3		Construction Technology (3 0 2) 4			Civil Engineering CAD Lab (0 0 2) 1	21
				23 Hrs.				

**5<sup>th</sup> Semester (2017-21):**

CSE	Operating Systems (3 0 2) 4	Design and Analysis of Algorithms (3 0 2) 4	Theory of Computation and Compiler Design (3 0 2) 4	DE/OE IBM-SP-V 4	Communication and Identity 2	<b>Management/ Design/Liberal Arts week 2</b>	20 Cr (22 hrs/ week)
EE	Advanced Electrical Machines (3 0 2) 4	Control Systems (3 0 2) 4	Power Systems-I (3 0 2) 4	DE/OE 4			
ECE	Mechanical and Electrical Machines  (3 0 2) 4	Measurement and Control Systems (3 0 2) 4	Analog and Digital Communications (3 0 2) 4				
ME		Theory of Machines (3 0 2) 4	Production Technology- II (3 0 2) 4				
CE (12 students)		Design of RCC and Steel Structures (3 0 2) 4	Geotechnical Engineering (3 0 2) 4				

**5<sup>th</sup> Semester (2018-22, 2019-23):**

CSE	Operating Systems (3 0 2) 4	AI and Machine Learning (3 0 2) 4	DE/ IBM-SP-IV 4	OE 4	Understanding and Managing Conflict 2	IoT and Automation Week 2 + Automation Project 2	22 (22 hrs/ week)
EEE	Analog and Digital Communications (3 0 2) 4	Power Systems-I/ Digital Systems Design (3 0 2) 4	DE 4				
ME	Theory of Machines (3 0 2) 4	Production Technology- II (3 0 2) 4					
CE (12 students)	Design of RCC and Steel Structures (3 0 2) 4	Geotechnical Engineering (3 0 2) 4					

**6<sup>th</sup> Semester (2017-21):**

CSE	Computer Networks and Distributed Systems (3 0 2) 4	AI and Machine Learning (3 0 2) 4	DE/IBM-SP-VI 4	OE 4	Critical Thinking for Decisions at Workplace 2	IoT and Automation Week 2 + Automation Project 2	22 Cr (22 hrs/ week)
EE	Industrial Electronics (3 0 2) 4	Power Systems-II (3 0 2) 4	DE 4				
ECE	Digital Communication Networks (3 0 2) 4	Digital Signal Processing (3 0 2) 4					
ME	Design of Machine Elements (3 0 2) 4	Automobile Engineering (3 0 2) 4					
CE	Transportation Engineering (3 0 2) 4	Construction Project Management (3 0 2) 4					



**6<sup>th</sup> Semester (2018-22, 2019-23):**

<b>CSE</b>	Computer Networks and Distributed Systems (3 0 2) 4	<b>DE/IBM-SP-V</b> 4	Compiler Design/ Software Engineering (3 0 2) 4	<b>DE/OE/IBM-SP-VI</b> /Minor Project 4	Critical Thinking for Decisions at Workplace (2 0 0) 2	<b>Emerging Tech Week</b> 2	20 (17-22 hrs.)
<b>EEE</b>	Industrial Electronics/ Digital Communication Networks (3 0 2) 4	<b>DE</b> 4	Power Systems-II/ Digital Signal Processing (3 0 2) 4	<b>DE/OE</b> /Minor Project 4			
<b>ME</b>	Design of Machine Elements 4		Automobile Engineering 4				
<b>CE</b>	Transportation Engineering 4		Construction Project Management 4				

**7<sup>th</sup> Semester (2016-20)**

CSE	Advanced Data Structures and Algorithms (3 0 2) 4	DE 4	DE 4	OE 4	Minor Project/ IBM-SP-VII 4	20 Cr
ECE	DE 4	DE 4			Minor Project 4	
EE						
ME	Computer Aided Product Design (2 0 4) 4					
CE	Construction Project Management (3 0 2) 4	Earthquake Engineering (3 1 0) 4				
CHE	Advanced Transport Phenomena (3 0 2) 4	DE 4				

**7<sup>th</sup> Semester (2017-21)**

CSE	Advanced Data Structures and Algorithms (3 0 2) 4	Software Engineering (3 0 2) 4	DE 4	OE 4	Minor Project/ <b>IBM-SP-VII</b> 4	20 Cr
ECE	DE 4	DE 4			Minor Project 4	
EE						
ME						
CE						

**7<sup>th</sup> Semester (2018-22, 2019-23)**

CSE	DE 4	DE 4	DE 4	OE 4	Minor Project/ IBM-SP-VII 4		20 Cr (20/25 hrs/week)
EEE/ME/CE	DE 4	DE 4	DE 4	OE 4	Minor Project 4		20 Cr 20 hrs/week

**8<sup>th</sup> Semester (2016-20, 2017-21, 2018-22, 2019-23)**

CSE	Practice School - II / Entrepreneurial Project/Research Project/Semester at a partner University	16 Credits
ECE		
EE		
ME		
CE		

**Specialization, Certification, Minor, and Concentration Options for BTech Students**

Following options are available for those students who want to specialize in an area within or outside their main discipline. A student can only opt for any one of the following options. However, a minimum number of interested students will be required to actually run any of these options in a particular batch.

**A. IBM Specializations and Certification for CSE (Additional Fee: 12,500/- per semester)**

- 2016-20: Big Data and Analytics (19); Information Security (13); Cloud Computing (24)
- 2017-21: Big Data and Analytics (27); Information Security (10); Cloud Computing (11); Mobile Computing (5)
- 2018-22: Big Data and Analytics (23)
- 2019-23: Big Data and Analytics; Information Security; Cloud Computing; Mobile Computing; Blockchain; IoT and Blockchain

**B. CISCO Certifications for CSE and ECE/EEE (Total extra Fee: Rs. 5,000/-)**

- CCENT (Cisco Certified Entrance Certificate) on completion of 2 modules, (1) Introduction to Network and (2) Routing and Switching Essentials
- CCNA Academy Certificate on completion of another 2 modules on (3) Connecting Network and (4) Scalable Network
  - 2015-19: 22 students
  - 2016-20: 15 students
  - 2017-21: 20 students
  - 2018-22: To be announced in 2<sup>nd</sup> year

**C. JKLU Concentrations (2017-21 onwards) (an option within the main discipline)  
(Through Electives/Minor Project, 12 Credits):**

- CSE: Data Science and Artificial Intelligence; Software Engineering and Robotic Process Automation; Embedded Systems and IoT;
- CE: Structural Engineering; Construction Technology



3. ME: Machine Design; Automobile Engineering
4. ECE/EE/EEE: Embedded Systems and IoT
5. EE/EEE: Power Systems

D. **JKLU Minors (2017-21 Onwards) (an option outside the main discipline)**  
**(Through Electives; 16 Credits):**

1. CSE for EEE, ME, and CE
2. Data and Computational Sciences for all
3. EE for CSE, ME, and CE
4. Communication Engineering for CSE, ME, and CE
5. Mechanical Engineering for CSE, EEE, ECE, EE, and CE
6. Civil Engineering for CSE, EEE, ECE, EE, and ME
7. Embedded Systems and IoT for ME and CE (It is also available as a concentration option within CSE, EEE, ECE, and EE)



(Prof. Sanjay Goel)

Chairman, BoS

<b>JK Lakshmipat University, Jaipur</b> <b>Institute of Engineering and Technology</b> <b>Course Structure for the M.Tech (Batch 2019-2021), April 2019</b> <b>Specialisations: Data Science (DS); Health, Safety, and Environmental Engineering (HSEE); Internet of Things (IoT);</b> <b>Automation and Robotics (A&amp;R);</b> <b>All M.Tech programs offer the exit option after one year with PG Diploma</b>									
Specialisation	Courses								Hours & Credits
<b>Semester I</b>									
DS	Statistical Data Analysis-I (3 0 4) 5		Cloud based Big Data System-I (3 0 2) 4	Machine Learning and Data Mining (3 0 4) 5	Elective-1 (3 0 0) 3	Project-I/ Research Methodology-I (2 0 0) 2	CCCT (2 0 0) 2	Hours: 26 Credits: 21	
HSEE			Industrial Automation and Internet of Things-I (3 0 2) 4	Industrial Safety and Hazard Management (3 0 4) 5					
IoT	IoT Architecture and Protocols (3 0 4) 5								
A&R	Robotic Process Automation (3 0 4) 5								
<b>Semester II</b>									
DS	Statistical Data Analysis-II (3 0 4) 5		Cloud based Big Data System-II (3 0 2) 4	Advanced Machine Learning (3 0 4) 5	Elective-2 (3 0 0) 3	Project-II/ Research Methodology-II (2 0 0) 2	CCCT (2 0 0) 2	Hours: 26 Credits: 21	
HSEE	Computer Aided Risk Analysis (3 0 4) 5		Safety in Chemical Industry (3 0 2) 4	Regulation for Health, Safety, and Environment Management (3 0 4) 5					
IoT	IoT Security and Reliability (3 0 4) 5		Industrial Automation and Internet of Things-II (3 0 2) 4	Cloud and Edge Computing (3 0 4) 5					
A&R	Intelligent Control Systems (3 0 4) 5			Mechatronics (3 0 4) 5					
<b>Internship (6- 8 weeks)</b>								<b>4</b>	
<b>Exit Option with PG Diploma</b>									
<b>Semester III</b>									
DS	Elective-3 (3 0 0) 3		Elective – 4 (3 0 0) 3	Dissertation/Industrial Project/Entrepreneurial Project 10			Hours: 6+ Credits: 16		
HSEE									
IoT									
A&R									
<b>Semester IV</b>									
DS	Dissertation/Industrial Project/Entrepreneurial Project 16							Credits: 16	
HSEE									
IoT									
A&R									

Specialisation	Courses							Hours & Credits
Semester I								
DS	Statistical Data Analysis-I (3 0 4) 5		Cloud based Big Data System-I (3 0 2) 4	Machine Learning and Data Mining (3 0 4) 5	Elective-1 (3 0 0) 3	Project-I/ Research Methodology-I (2 0 0) 2	CCCT (2 0 0) 2	Hours: 26 Credits: 21
HSEE			Industrial Automation and Internet of Things-I (3 0 2) 4	Industrial Safety and Hazard Management (3 0 4) 5				
IoT	Statistical Data Analysis-I (3 0 4) 5	Instrumentation and Embedded Systems Lab (0 0 4) 2		IoT Architecture and Protocols (3 0 4) 5				
A&R	Optimisation and Control (3 0 0) 3			Robotic Process Automation (3 0 4) 5				
Semester II								
DS	Statistical Data Analysis-II (3 0 4) 5		Cloud based Big Data System-II (3 0 2) 4	Advanced Machine Learning (3 0 4) 5	Elective-2 (3 0 0) 3	Project-II/ Research Methodology-II (2 0 0) 2	CCCT (2 0 0) 2	Hours: 26 Credits: 21
HSEE	Computer Aided Risk Analysis (3 0 4) 5		Safety in Chemical Industry (3 0 2) 4	Regulation for Health, Safety, and Environment Management (3 0 4) 5				
IoT	IoT Security and Reliability (3 0 4) 5		Industrial Automation and Internet of Things-II (3 0 2) 4	Cloud and Edge Computing (3 0 4) 5				
A&R	Intelligent Control Systems (3 0 4) 5			Mechatronics (3 0 4) 5				
Internship (6- 8 weeks)								4
Exit Option with PG Diploma								
Semester III								
DS	Elective-3 (3 0 0) 3		Elective – 4 (3 0 0) 3	Dissertation/Industrial Project/Entrepreneurial Project 10			Hours: 6+ Credits: 16	
HSEE								
IoT								
A&R								
Semester IV								
DS	Dissertation/Industrial Project/Entrepreneurial Project 16							Credits: 16
HSEE								
IoT								
A&R								



### **Electives**

The core courses of a program will be available as electives in another program.  
In addition, following electives are also proposed.  
More electives will be added flexibly.

SN	Course	DS	HSEE	A&R	IoT
<b>Elective-I</b>					
1	Mathematical Modelling	E1	E1	E1	E1
2	Soft- computing and Applications	E1		E1	E1
3	Mobile Application Development	E1	E1	E1	E1
4	Data Structures and Algorithms for Big Data	E1			E1
5	Natural Language Processing and Understanding	E1		E2	E2
6	Computer Vision	E2		E2	E2
7	Large Scale Graph Algorithms and Analytics	E2			E2
8	Web Algorithms and Analytics	E2			
9	Industrial Robotics			E2	E2
10	Forensic Analytics	E3/E4			
11	Multi-Objective Optimisation	E3/E4	E3/E4	E3/E4	E3/E4
12	Industrial Robotics			E2	E2
13	Computational Game Theory and Applications	E3/E4	E3/E4	E3/E4	E3/E4
14	Autonomous Decision-making	E3/E4		E3/E4	E3/E4
15	Performance Assessment of Engineering Systems	E3/E4	E3/E4	E3/E4	E3/E4
16	Flexible Computer Networks				E3/E4
17	Structural Health Monitoring		E1		
18	Safety in Civil Construction and Design		E1		
19	Electrical Safety		E1	E1	E1
20	Safety in Mines & Exploration		E2		
21	Biomechanics for Ergonomics		E2		
22	Industrial Waste Management		E2		
23	Fire Engineering and Management		E3/E4		
24	Transportation Safety Engineering		E3/E4		
25	Environmental Impact Assessment and Environmental Auditing		E3/E4		
26	Business Process Automation	E3/E4		E3/E4	
27	Manufacturing Process Automation			E3/E4	E3/E4

  
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Based on the suggestions given by various stakeholders, program-wise following courses have been introduced. The details of these courses are given below.

#### COURSES INTRODUCED

Program Name	Batch	Code	Subject Name	Credits	Year	Semester	Core/ Elective
B Tech CE	2017-21	CE1205	Building Planning & Design	4	3	6	Elective
B Tech CE	2017-21	CE1206	Disaster Management	4	3	6	Open Elective
B Tech CE	2017-21	EE1111	Introduction to IoT	2	3	6	Core
B Tech CE	2019-23	ES1105	Energy and Environmental Studies	1	1	2	Core
B Tech CE	2019-23	AS1102	Scientific Perspectives	2	1	2	Core
B Tech CSE	2016-20	CS2405	Deep Learning	5	4	8	MOOC
B Tech CSE	2016-20	PR1105	Entrepreneurial Project	16	4	8	Core
B Tech CSE	2016-20	PR1104	Research Project	16	4	8	Core
B Tech CSE	2017-21	CS1206	Competitive Programming	2	3	6	Open Elective
B Tech CSE	2017-21	CS1111	Computer Networks and Distributed Systems	4	3	6	Core
B Tech CSE	2017-21	IL1201	Mechatronics and Robots	4	3	6	Open Elective
B Tech CSE	2017-21	CS1209	Routing and Switching and Wireless Essential	2	3	6	Elective
B Tech CSE	2018-22	ES1109	Computational Engineering Analysis-II	5	2	4	Core
B Tech CSE	2018-22	CS1402	Data Analytics using Python	3	2	4	MOOC
B Tech CSE	2018-22	CS1106	Database Systems	4	2	4	Core
B Tech CSE	2018-22	CS1207	Introduction to Networks	Audit	2	4	Elective
B Tech EE	2017-21	EE1209	Advanced Control systems	4	3	6	Elective
B Tech EE	2017-21	EE1114	Power System-II	4	3	6	Core
B Tech EEE	2018-22	EE1102	Analog Circuits	4	2	4	Core
B Tech EEE	2018-22	EE1104	Electromagnetics and Microwaves	4	2	4	Core
B Tech EEE	2018-22	IL1102	Introduction to Design	2	2	4	Core
B Tech EEE	2018-22	EE1105	Signals and Control Systems	5	2	4	Core
B Tech ME	2017-21	ME1206	Computer Aided Modeling and Simulation	2	3	6	Independent Study
B Tech ME	2017-21	ME1110	Design of Machine Elements	4	3	6	Core
B Tech ME	2018-22	ME1107	Mechanical Engineering CAD Lab	1	2	4	Core
B Tech ME	2018-22	ME1105	Strength of Material and	4	2	4	Core

Annexure: 2

			Analysis				
M Tech HSEE	2019-21	CS2107	Computer Aided Risk Analysis	5	1	2	Core
M Tech HSEE	2019-21	PR2102	Project-II	2	1	2	Core
M Tech HSEE	2019-21	IL2104	Regulation for Health, Safety, and Environment Management	5	1	2	Core
M Tech HSEE	2019-21	IL2103A	Risk and Hazard Management	4	1	2	Core



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