

# Career Development Centre



Date: 29<sup>th</sup> August 2020

## NOTICE

### VAT 94 || Flexible Manufacturing System

Career Development Centre in association with Department of Mechanical Engineering provides an opportunity to our students to learn Flexible Manufacturing System under value added trainings.

Details as follows:

<b>Branch/Year</b>	ME 4th Year
<b>Organizer Department</b>	Career Development Centre & Department of Mechanical Engineering
<b>Date of Commencing</b>	7 <sup>th</sup> September 2020
<b>Course Duration</b>	40 Hours
<b>Timings</b>	2:00 PM – 4:00 P.M.
<b>Course Coordinator</b>	Mr. Vibhor Sharma & Mr. Nalin Somani
<b>Platform</b>	Online - MS Team

#### NOTE:

1. The training will run in online mode (till further notice) on MS Team. Students will be assigned batch (as per the schedule) and will be added to their respective MS Teams.
2. It is suggested to all the above-mentioned students to attend the training (detailed schedule will be shared in your respective batch on MS Team).
3. The Department concerned shall notify the details about timings and MS Team batch of the training sessions. In case of any query please contact the Career Development Centre, DIT University.

Gaurav Singh

Head- Career Development Centre

Head- Career Development Cell  
DIT University, Dehradun

To :

All Dean / Director / Head of Department

Chairman

Chancellor

Vice Chancellor

Pro Vice Chancellor

Manager Admin

HR Department

For information Please

Head- Career Development Cell  
DIT University, Dehradun

CAREER DEVELOPMENT CENTRE

**Value Added Training Report – VAT 94**

**Flexible Manufacturing System (Mechanical Engineering -B.Tech)**

**Duration:** 40 hrs. (7<sup>th</sup> September 2020 to 10<sup>th</sup> October 2020)

**Platform:** online- MS Team

**Coordinator:** Mr. Vibhor Sharma (Trainer- Career Development Centre)

**Training Objective:**

- Modern Flexible Manufacturing Systems (FMSs) Training are implemented to accomplish highly efficient, automated, concurrent production of several part types.
- To approach the efficiencies and economies of scale normally associated with mass production, and to maintain the flexibility required for small- and medium-lot-size production of a variety of parts.
- Flexible Manufacturing Systems (FMSs) Training are done to obtain:
  - less waste
  - fewer workstations
  - quicker changes of tools, dies, and stamping machinery
  - reduced downtime
  - better control over quality
  - reduced labor
  - more efficient use of machinery
  - work-in-process inventory reduced
  - increased capacity
  - increased production flexibility

**Training Overview:**

- A flexible manufacturing system may include a configuration of interconnected processing workstations with computer terminals that process the end-to-end cr



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## CAREER DEVELOPMENT CENTRE


- Flexible manufacturing systems will help businesses to create better products, become more efficient, and increase revenue as time goes on.

**Requisite:** Any Graduate or Under –Graduate student can pursue

### **Training Content:**

- Automation In Production Systems,
- Automation Principles and Strategies,
- Industrial Control Systems,
- Applications of Sensors and Actuators,
- ADC/DAC,
- CNC Technology,
- Robot Intelligence,
- Material Handling and Transport Systems,
- Storage Systems,
- Manufacturing Cells,
- Group Technology and Cellular Manufacturing,
- FMS Components,
- Quantitative Analysis of FMS Systems,
- Petri Networks,
- Automated Assembly And Inspection.

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## COURSE FILE


NAME OF COURSE: VAT PROGRAMME-FMS

COURSE CODE: ME335

BRANCH: MECHANICAL Engineering & MECHANICAL Engineering with spec.  
in Automobile Enggg.

SESSION: 2020-2021

NAME OF FACULTY(S): Mr. NITIN KUMAR GUPTA

  
Registrar  
DIT University, Dehradun

NAME OF COURSE COORDINATOR: Mr. Nalin Somani

## Vision & Mission statements of department

### Vision of Department

- To established a recognized centre for providing quality technical education.
- To emerge as a research centre addressing the problems related to mechanical engineering.
- To fulfil the requirements of the industry and the society.
- To produces engineers, who prove to be prolific to the industries to attain new heights.


### Mission of Department

**M1:** To impart quality education to the graduates to enhance their skills and capacity that makes them competitive mechanical engineers globally.

**M2:** To develop research facilities that stimulates faculty, staff and students with opportunities to utilize the technical knowledge.

**M3:** To develop research facilities in order to contribute in the knowledge creation for serving betterment of society.

**M4:** To provide the students with academic environment of excellence, leadership, ethical guidelines and lifelong learning needed for a bright career.

  
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**PO 5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**PO 6: The Engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO 7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO 8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO 9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO 10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO 11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO 12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

#### **Program Specific Outcomes (PSOs)**

**Name of Program: - {B. Tech. ME}**

**PSO1:** Graduate can able to design mechanical components as per the desired specifications and requirements.


**PSO2:** Apply the knowledge of different manufacturing technologies in various industries.

**PSO3:** Execute the knowledge of thermal system design in process industries and power systems.

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### List of Registered Students

Sr.no	Name of student	Roll no
1	Akshat Jain	170106036
2	Roshan joshi	170106003
3	Harsh Gururani	170106073
4	Avinash kumar sonu	170106080
5	Arsh Kumar	170106020
6	Mit Rita Goswami	170106074
7	Himanshi Bisht	170106002
8	Pankaj rawat	170106013
9	Chetan Pandey	170106022
10	Tarun bhatt	170106030
11	Pushpendra Kumar Sahu	160106029
12	Shashank Bahuguna	170106021
13	Abhishek verma	170106008
14	Shivansh pratap singh chauhan	170106055
15	Harshit kumar	170106023
16	Deepak prajapati	170106033
17	Saurabh chand	170106006
18	Manglam Rastogi	170113021
19	ANURAG PAL	170106046
20	Adbhut Tripathi	170106070
21	Abhishek Anand	170106078
22	Anuj P.S Sikarwar	170106064
23	NISCHAY PALIWAL	170106076
24	Mohammad Faisal	170106028

  
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## Time Table Section-A

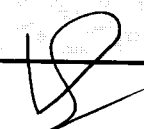
Section: ME-A

Class Coordinator: Mr. Ashish Kumar

Room: LH-105

Periods Days	1 <sup>st</sup> 9:00-9:55	2 <sup>nd</sup> 10:00-10:55	3 <sup>rd</sup> 11:00-11:55	4 <sup>th</sup> 12:00-12:55	01:00-02:00	5 <sup>th</sup> 2:00-2:55	6 <sup>th</sup> 3:00-3:55
MONDAY	ME302 (P1)/ME301 (P3)/ME303 (P2)		ME301 (T2)	L U N C H	ME342-LH105/ME344-LH106/ME345-LH207	APTITUDE & SOFT SKILLS 3	HU Elective
TUESDAY	ME302 (P3)/ME303 (P1)/ME301 (P2)		ME349 (P1)		ME342-LH105/ME344-LH106/ME345-LH207	APTITUDE & SOFT SKILLS 3	HU Elective
WEDNESDAY	ME302	ME301	APTITUDE & SOFT SKILLS 3	L U N C H	ME342(T1)-LH105/ ME344(T1) *** /ME345-LH106	ME346 (T1)-LH105/ ME348 (T1)-LH106/ ME350(T1)-LH111	ME346-LH105/ME348-LH207 ME349-LH208/ME350-LH209
THURSDAY	ME302	ME301	ME301 (T1)-LH105		ME346-LH105/ME348-LH112/ ME349-LH209/ME350-LH106	ME303(P3)/ME301 (P1)/ME302 (P2)	
FRIDAY	VAT (EDM/FMS/CREO)		ME301 (T3)		ME302	ME301	ME346-LH105/ME348-LH112/ME350-LH106/ME349-LH111
SATURDAY							

SUB. CODE	SUB. NAME	NAME OF TEACHER	SUB. CODE	SUB. NAME	NAME OF TEACHER
ME301	Heat Transfer	Dr. Manoj Kumar (L+P2)/RAJEEV PANDEY (P1 & P3)	ME345	Industrial Engineering & Management	JAI PRAKASH AGRAWAL
ME302	Manufacturing Technology	Mr. Ashish Kumar	ME350	Operations Research	DEEPAK KUMAR
ME303	Fluid Machinery(Lab Course)	Mr. Pankaj Singh Chandel			
ME346	Turbomachines	Ravi Kumar	ME349	Automotive Electrical and Electronics	Mohd. Sameer
ME342	Composite Materials	Mr. Pankaj Singh Chandel	VAT	EDM	Nalin somani
			VAT	FMS	NIJIN KUMAR GUPTA
ME344	Fuel Combustion and Environment	GAURAV PRAKASH SRIVASTAVA	VAT	Design Software (CREO)	GAURAV PRAKASH SRIVASTAVA
ME348	Advanced Design of Machine Elements	Mohammed Faraz Azeem			

  
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## List of Practical

1. Study of Flexible Manufacturing Systems (FMS).
2. Axis identification and dimensioning system of CNC Machine. Study
3. Writing a part-programming for a given drawing and running on CNC turn m/c.
4. Writing a part-programming for a job for following operation as a given drawing and running on CNC mill m/c.
5. Experiments on Robots and its programs



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## NOTES

### **Introduction**

Nowadays customers are demanding a wide variety of products. To satisfy this demand, the manufacturers' "production" concept has moved away from "mass" to small "batch" type of production. Batch production offers more flexibility in product manufacturing. To cater this need, Flexible Manufacturing Systems (FMS) have been evolved.

As per Rao, P. N. FMS combines microelectronics and mechanical engineering to bring the economies of the scale to batch work. A central online computer controls the machine tools, other work stations, and the transfer of components and tooling. The computer also provides monitoring and information control. This combination of flexibility and overall control makes possible the production of a wide range of products in small numbers.

FMS is a manufacturing cell or system consisting of one or more CNC machines, connected by automated material handling system, pick-and-place robots and all operated under the control of a central computer. It also has auxiliary sub-systems like component load/unload station, automatic tool handling system, tool pre-setter, component measuring station, wash station etc. Figure 1 shows a typical arrangement of FMS system and its constituents. Each of these will have further elements depending upon the requirement as given below,



Figure.1: Pictorial view of FMS lab (MTAB)

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Today flexibility means to produce reasonably priced customized products of high quality that can be quickly delivered to customers. Different approaches to flexibility and their meanings are shown table 1.

Approach	Flexibility meaning
Manufacturing	<ul style="list-style-type: none"> <li>• The capability of producing different parts without major retooling</li> <li>• A measure of how fast the company converts its process (es) from making an old line of products to produce a new product</li> <li>• The ability to change a production schedule, to modify a part, or to handle multiple parts</li> </ul>
Operational	<ul style="list-style-type: none"> <li>• The ability to efficiently produce highly customized and unique products</li> </ul>
Customer	<ul style="list-style-type: none"> <li>• The ability to exploit various dimension of speed of delivery</li> </ul>
Strategic	<ul style="list-style-type: none"> <li>• The ability of a company to offer a wide variety of products to its customers</li> </ul>
Capacity	<ul style="list-style-type: none"> <li>• The ability to rapidly increase or decrease production levels or to shift capacity quickly from one product or service to another</li> </ul>

**So, what is flexibility in manufacturing?**

While variations abound in what specifically constitutes flexibility, there is a general consensus about the core elements. There are three levels of manufacturing flexibility.

**(a) Basic flexibilities**

- Machine flexibility - the ease with which a machine can process various operations

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A) **Processing Operation:** it performs some activities on a given job. Such activities convert the job from one shape to another continuous up to the final product. It enhances significance by altering the geometry, features or appearance of the initial materials.

B) **Assembly Operation.** It comprises an assembly of two or more parts to make a new component which is called an assembly/subassembly. The subassemblies which are joined permanently use processes like welding, brazing, soldering, adhesive bonding, rivets.

#### Based on Number of Machines

A) **Single Machine Cell (SMC):** it consists of completely automated machines which are capable of performing unattended operations within a time period lengthier than one complete machine cycle. It is skillful of dispensing various parts mix, reacting to fluctuations in manufacture plan, and inviting introduction of a part as a new entry. It is a sequence dependent production system.

B) **Flexible Manufacturing Cell (FMC):** it requires two or three dispensing workstations and a material handling system. The material handling system is linked to a load/unload station. It is a simultaneous production system.

C) **Flexible Manufacturing System (FMS):** it has four or more processing work stations (typically CNC machining centers or turning centers) connected mechanically by a common part handling system and automatically by a distributed computer system. It also includes non-processing work stations that support production but do not directly participate in it e.g., part / pallet washing stations, co-ordinate measuring machines. These features significantly differentiate it from Flexible Manufacturing Cell (FMC)

#### Based on level of Flexibility:

FMS is further classified based on the level of flexibility related to the manufacturing system. Two categories are depicted here:

A) **Dedicated FMS:** it is made to produce a certain variety of part styles. The product design is considered fixed. So, the systems can be designed with a certain amount of process specialization to make the operation more efficient.


B) **Random Order FMS** it is able to handle the substantial variations in part configurations. To accommodate these variations, a random order FMS must be more flexible than the dedicated FMS. A random order FMS is capable of processing parts that have a higher degree of complexity. Thus, to

- Consistent and better quality, due to the automated control
- Lower cost/unit of output, due to the greater productivity using the same number of workers
- Savings from the indirect labour, from reduced errors, rework, repairs and rejects

## **Disadvantages**

- Limited ability to adapt to changes in product or product mix (ex. Machines are of limited capacity and the tooling necessary for products, even of the same family, is not always feasible in a given FMS)
- Substantial pre-planning activity
- Expensive, costing millions of dollars
- Technological problems of exact component positioning and precise timing necessary to process a component

Sophisticated manufacturing systems

  
Professor  
DIT University, Dehradun

## ATTENDANCE AND AWARD SHEET

Faculty - Nitin Gupta			FLEXIBLE MANUFACTURING SYSTEM OLD CAD LAB ME DEPARTMENT													Attendance	Poster Presentation	Power Point Presentation	Job preparations.	Written	Total
Sr	Roll no	Name of student	2/8/2019	9/8/2019	16/08/19	23/08/19	30/08/19	6/9/2019	13/09/19	3/10/2019	11/10/2019	18/10/19	15/11/19	10	30	25	25	10	10		
1	170106036	Alshat Jain	P		P		P-P		P		P	P-C		7	25	24	20	9	88		
2	170106003	Roshan Joshi	P	P		P	P-P					P-C		6	25	22	20	8	81		
3	170106073	Harsh Gururani	P	P			P-P					P-C		5	10	21		7	48		
4	170106080	Avinash Kumar sonu	P	P					P		P	P-C		6	10	21		7	48		
5	170106020	Arsh Kumar	P	P	P		P-P	P-C	P	P		P	P	10	25	24	25	9	98		
6	170106074	Mit Rita Goswami	P	P		P		P-P	P-C		P	P		9	28	24	22	9	98		
7	170106002	Himanshi Bisht	P	P	P			P-C		P	P	P	P	9	25	21	25	7	87		
8	170106013	Pankaj rawat		P		P	P		P-P	P-C	P	P	P	9	25	22	22	9	87		
9	170106022	Chetan Pandey	P		P									4	20	18	15	7	64		
10	170106030	Arun bhatt										P-C		4	25	18	20	8	75		
11	160106029	Pushpendra Kumar Sahu																			
12	170106021	Bhaskar Bahuguna	P	P		P	P-P	P-P		P-C	P	P	P	10	28	23	25	8	94		
13	170106008	Abhishek verma	P	P	P		P-P	P-C	P		P	P	P	10	25	22	25	8	94		
14	170106055	Shivansh pratap singh chauhan	P	P								P-C		5	25	20	20	7	77		
15	170106023	Harshit kumar	P	P				P-C		P	P		P	6	25	22	25	7	81		
16	170106033	Deepak prajapati	P	P		P	P	P-P		P-C	P	P		9	28	22	25	6	90		
17	170106006	Saurabh chand	P	P	P		P						P	6	24	18	20	9	77		
18	170113023	Manglam Rastogi	P					P-P			P	P-C		5	10	20		10	45		
19	170106046	NURAG PAL		P										4	25	18	20	7	74		
20	170106070	Adbhut Tripathi	P	P		P		P-P				P-C		6	28	20	22	9	85		
21	170106078	Abhishek Anand						P-P						4	25	18	25	8	80		
22	170106064	Ranj P.S Sagarwar	P	P			P-P					P-C		5	10	21		9	44		
23	170106076	NISCHAY PALIWAL	P		P	P			P-P	P		P-C	P	8	25	23	25	9	90		
24	170106028	Mohammad Faisal	P																		
25	170106001	Aditi Misra	P	P	P		P					P-C	P	7	24	22	20	8	81		
26	170106019	Imang Nagar				P	P			P-C	P	P-C	P	7	28	22	25	8	90		
27	180106900	Ankit rana	P	P		P	P	P-P	P-P	P-C	P	P	P	10	25	22	22	9	89		
28	180106914	Madhur patari	P	P				P-P		P		P-C		6	25	21	22	7	81		

  
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## Annexure - II

### Value added course Details (Academic Year: 2020-21)

VAT Course Name: Flexible Manufacturing System

VAT Code: VAT 94

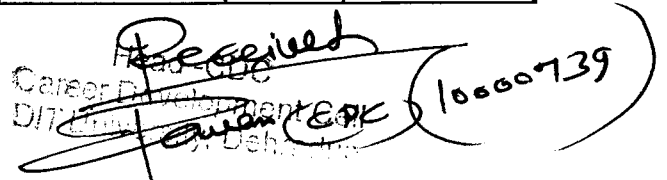
Duration in Hours: 80

Number of Students Enrolled: 124

Number of Students Completed: 120

Grades:	G= GOOD ; S = Satisfactory ; P = Poor ; W = Withdraw			
Student ID	Student Name	Program/Course	Year	Passing Grade
180113904	ASHISH LOHANI	BTME-AE	4th Year	G
180106916	ABHISHEK SINGH	BTME	4th Year	G
180106903	SANMOHAN DAS	BTME	4th Year	S
170106033	DEEPAK PRAJAPATI	BTME	4th Year	S
170106030	TARUN BHATT	BTME	4th Year	G
180106914	MADHUR PATARI	BTME	4th Year	G
170113007	DHEERAJ ADHIKARI	BTME-AE	4th Year	P
180106908	MEGHA RAI	BTME	4th Year	S
170113015	KUNAL SINGH	BTME-AE	4th Year	G
160106029	PUSHPENDRA KUMAR SAHU	BTME	4th Year	G
170106028	MOHAMMAD FAISAL	BTME	4th Year	S
180106912	SANGAM RAMOLA	BTME	4th Year	S
170106020	ARSH KUMAR	BTME	4th Year	G
170113032	MITHANSHU SHARMA	BTME-AE	4th Year	S
170106011	SHIVALAY SAXENA	BTME	4th Year	S
170106080	AVINASH KUMAR SONU	BTME	4th Year	G
170106048	GAUTAM PUNETHA	BTME	4th Year	G
170106062	JAYESH ARORA	BTME	4th Year	S
170113014	ARBAZ KHAN	BTME-AE	4th Year	S
170106063	SHUBHAM KUMAR	BTME	4th Year	G
170113012	SHIVAM KUMAR	BTME-AE	4th Year	G
170106094	NITIN BALAYAN	BTME	4th Year	S
180106913	VIPUL KULASARI	BTME	4th Year	S
170113025	SIDDHARTH SHRIWASTWA	BTME-AE	4th Year	G
170106075	BIPIN SINGH BHAT	BTME	4th Year	G
170106023	HARSHIT KUMAR	BTME	4th Year	S
170106017	AISHWARY GUPTA	BTME	4th Year	S
170113001	VISHESH MITTAL	BTME-AE	4th Year	G
170106077	ANMOL TYAGI	BTME	4th Year	S
170106032	DHIRAJ KUMAR	BTME	4th Year	S
170106054	GOVINDA KUMAR	BTME	4th Year	G
170106036	AKSHAT JAIN	BTME	4th Year	S
170113028	SUMIT KUMAR	BTME-AE	4th Year	S
170106038	MIHIR LAKHERA	BTME	4th Year	S
170113031	RAGHAV RAINA	BTME-AE	4th Year	G
170106049	RAHUL DESWAL	BTME	4th Year	G
170113011	HARSHIT BELWAL	BTME-AE	4th Year	S

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170106025	AKASHJYOTI BARMAN	BTME	4th Year	S
170106089	SAMEER KUMAR	BTME	4th Year	G
170106044	OMAR MASOOD	BTME	4th Year	G
170106084	TANMAY ANIL KADAM	BTME	4th Year	S
170113033	DEVANSH SHUKLA	BTME-AE	4th Year	P
170113023	SREJANSH SRIVASTAVA	BTME-AE	4th Year	G
170106056	AADARSH CHOUDHARY .	BTME	4th Year	S
170106026	OMPRAKASH .	BTME	4th Year	G
170113010	VYOM RASTOGI	BTME-AE	4th Year	G
170106035	MOHIT BHANDARI	BTME	4th Year	S
170106006	SAURABH CHAND	BTME	4th Year	S
170106087	KARTIK KAUSHAL	BTME	4th Year	G
170113013	PULKIT KULYAL	BTME-AE	4th Year	G
170106086	PURU SRIVASTAVA	BTME	4th Year	S
170106078	ABHISHEK ANAND .	BTME	4th Year	P
170113008	RAASHI TANEJA	BTME-AE	4th Year	G
170106008	ABHISHEK VERMA	BTME	4th Year	G
170106083	YUDHISHTAR CHAUHAN	BTME	4th Year	S
180106901	NISHANK KAUSHIK	BTME	4th Year	S
180106904	JATIN PANDEY	BTME	4th Year	P
170106053	ADITYA PRATAP BHANDARI	BTME	4th Year	S
170106069	ANKUR PRATAP SINGH	BTME	4th Year	S
170113027	AKASH SINGH	BTME-AE	4th Year	G
180106900	ANKIT RANA	BTME	4th Year	G
170106029	HARISH KUMAR	BTME	4th Year	S
170113020	SATYAM KUMAR	BTME-AE	4th Year	S
170106074	MIT RITA GOSWAMI	BTME	4th Year	G
170106050	NITESH TRIPATHI	BTME	4th Year	G
170106013	PANKAJ RAWAT	BTME	4th Year	S
170106071	DEV GOSWAMI	BTME	4th Year	S
170113003	RAJAT GUPTA	BTME-AE	4th Year	G
170113017	NITISH KASHYAP	BTME-AE	4th Year	G
170106012	SHIV SABLOK	BTME	4th Year	S
180113900	HARSH TEOTIA	BTME-AE	4th Year	S
170113009	AMOGH UNIYAL	BTME-AE	4th Year	G
170106090	SAHIL KUMAR TIWARI	BTME	4th Year	S
170106088	ALOK RANJAN SINGH	BTME	4th Year	S
170106102	AAKASH KANAKHARA	BTME	4th Year	G
170106081	ADITYA PANCHAL	BTME	4th Year	G
170106002	HIMANSHI BISHT	BTME	4th Year	S
170106034	SAURABH SINGH RAUTELA	BTME	4th Year	S
170106058	MANISH SINGH GARIA	BTME	4th Year	G
170106021	SHASHANK BAHUGUNA	BTME	4th Year	G
170106010	SANSKAR SINGH NEGI	BTME	4th Year	S
170106057	ANIRUDH RAUTELA	BTME	4th Year	S
180113901	ABHED PRASAD	BTME-AE	4th Year	G
170106093	AYUSH CHAKARBORTHY	BTME	4th Year	G