

VAC030	AUTOMATION AND INDUSTRY 4.0
Contact Hours	30 Hours
Prerequisite	Nil

Course Description

This course immerses students in the transformative world of Industry 4.0 and automation in manufacturing. Through theoretical insights, hands-on projects, and real-world case studies, students will gain a comprehensive understanding of how emerging technologies are shaping the future of industries and changing the landscape of production processes.

Course Objectives

Students will be able to:

- Understand the key concepts and principles of Industry 4.0 and automation.
- Explore the impact of emerging technologies on manufacturing processes.
- Analyze the benefits and challenges of integrating automation.
- Discuss the ethical and societal implications of automation.
- Craft strategies for successful implementation of Industry 4.0.

Course Outcomes

On completion of the course, students will be able to:

CO 1: Develop an understanding of smart factories and connected systems.

CO 2: Identify applications of robotics and AI in industrial settings.

CO 3: Collaborate on automation projects and apply practical skills.

CO 4: Craft strategies for successful implementation of Industry 4.0.

Course Outline

Module 1: Introduction to Automation and Industry 4.0 3 hours

- Defining Industry 4.0 and its relevance to modern manufacturing
- Historical context and evolution of automation in industries
- Ethical considerations and societal impacts of automation

Module 2: Emerging Technologies in Manufacturing 3 hours

- Overview of technologies: IoT, AI, machine learning, AR/VR, etc.
- Understanding the digital thread and data-driven decision-making
- Case studies of successful technology integration in industries

Module 3: Smart Factories and Connected Systems 3 hours

- Characteristics of smart factories and cyber-physical systems
- Integrating sensors, data analytics, and connectivity
- Exploring the role of cloud computing and edge computing

Module 4: Robotics and Automation in Manufacturing 3 hours

- Types of industrial robots and their applications



- Collaborative robotics and human-robot interaction
- Automated assembly lines and material handling systems

Module 5: AI and Machine Learning in Manufacturing **3 hours**

- Applications of AI in predictive maintenance and quality control
- Machine learning algorithms for process optimization
- Autonomous decision-making and adaptive manufacturing

Module 6: Benefits and Challenges of Automation **3 hours**

- Analyzing the advantages of automation (efficiency, accuracy, etc.)
- Addressing challenges such as job displacement and training
- Balancing cost-effectiveness and long-term ROI

Module 7: Ethical Considerations in Automation **3 hours**

- Ethical dilemmas in AI-driven decision-making
- Ensuring transparency, accountability, and bias mitigation
- Implications for human dignity and social responsibility

Module 8: Collaborative Automation Projects **3 hours**

- Participating in hands-on automation projects
- Working in teams to design and implement automation solutions
- Applying programming skills to control automated systems

Module 9: Implementing Industry 4.0 Strategies **3 hours**

- Developing roadmaps for integrating Industry 4.0 technologies
- Overcoming barriers and obstacles in implementation
- Creating a culture of innovation and adaptability

Module 10: Future of Automation and Industry 4.0 **3 hours**

- Emerging trends and potential disruptions in manufacturing
- Preparing for a career in the automated industries
- Ethical considerations for shaping the future of automation

Practicum

Students will work in teams to design, program, and test automated systems, fostering collaboration and problem-solving skills. The practicum will provide students with the opportunity to experience firsthand the challenges and opportunities of implementing Industry 4.0 technologies.

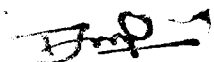
Textbook

Lee, J., & Bagheri, B. (2015). *Cyber-Physical Systems: A New Frontier*. Springer.

Reference Books

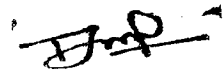
Kagermann, H., Wahlster, W., & Helbig, J. (Eds.). (2013). *Recommendations for Implementing the Strategic Initiative INDUSTRIE 4.0*. Springer.

Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business & Information Systems Engineering*, 6(4), 239-242.



Groover, M. P. (2016). Automation, Production Systems, and Computer-Integrated Manufacturing. Pearson.

	Evaluation Component	Weightage (%)
1	Activities and Assignments	20
2	Project	20
3	Attendance	10
4	End Term Examination	50



Registrar
K. J. Somaiya University
Sohna Road, Gurugram (Haryana)



K.R. MANGALAM UNIVERSITY
EDUCATION FOR LIFE
(Recognized by UGC and a member of AIU)

Ref.No.:KRMU/Admin./Notice/2019-20/1429 (A) Dated: 05th December, 2019

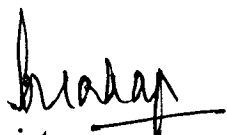
NOTICE

This is to put for information that School of Engineering & Technology is offering Value-Added Course (VAC) for all interested students during Even Semester as per the following specifications.

Course Code	Course Title	Coordinating Department / School	Duration
VAC030	Automation and Industry 4.0	SOET	30 Hrs.

- Maximum 100 seats are available for the course.
- Course Start Date: 02 January 2020
- Course End Date: 19 March 2020

All interested students are required to confirm their registration with the Dean-School of Engineering & Technology latest by **28th December, 2019**.


Registrar

Copy to:

- Vice Chancellor : For kind information
- Dean (Academics Affairs)
- Controller of Examinations
- All Deans/ School Coordinators
- All Faculty Members/ Mentors
- Notice Board
- Office Copy


Registrar
K.R. Mangalam University
Sohna Road, Gurugram (Haryana)



ATTENDANCE SHEET
VAC COURSE FOR ACADEMIC YEAR 2019-20
COURSE CODE: VAC030
COURSE TITLE: AUTOMATION AND INDUSTRY 4.0

ROLL NO	NAME	PROGRAMME	SEMESTER	2-Jan-20	3-Jan-20	4-Jan-20	7-Jan-20	9-Jan-20	10-Jan-20	11-Jan-20	14-Jan-20	15-Jan-20	16-Jan-20
1901010013	JASNEET SINGH	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901010014	SAIM MIRZA	B.Tech CSE	Semester II	P	P	P	P	P	P	P	P	P	P
1901010018	ANANTI PRKASH SINGH	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901010022	ARTAN SINGH	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901010027	AARZO SHUKLA	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901010046	AJAY KUMAR	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901010049	TUSHAR UPADHAYAY	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901012051	ANAL GUPTA	B.Tech CSE	Semester II	P	A	P	P	P	P	P	P	P	P
1901030002	TAPISH CHOUDHARY	B.Tech EEE	Semester VIII	P	A	P	P	P	P	P	P	P	P
1601030004	RANBIR KUMAR	B.Tech EEE	Semester VIII	P	A	P	P	P	P	P	P	P	P
1601040001	BHAVIKA BATRA	B.Tech ECE	Semester VIII	P	A	P	P	P	P	P	P	P	P
1601040003	DHRUV SANORIA	B.Tech ECE	Semester VIII	P	A	P	P	P	P	P	P	P	P
1601030002	C HANDESEN	B.Tech EEE	Semester VIII	P	A	P	P	P	P	P	P	P	P
1601031004	NITESH KUMAR ROY	B.Tech EEE	Semester VIII	P	A	P	P	P	P	P	P	P	P

[Signature]

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

Neel

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram



ATTENDANCE SHEET
VAC COURSE FOR ACADEMIC YEAR 2019-20
COURSE CODE: VAC030
COURSE TITLE: AUTOMATION AND INDUSTRY 4.0

ROLL NO	NAME	18-Jan-20	21-Jan-20	24-Jan-20	28-Jan-20	30-Jan-20	1-Feb-20	4-Feb-20	5-Feb-20	6-Feb-20	7-Feb-20	8-Feb-20	11-Feb-20	12-Feb-20	14-Feb-20
1901010013	JASNEET SINGH	A	P	P	P	P	P	P	P	P	P	P	P	P	P
1901010014	SAMI MIRZA	F	P	A	P	P	P	P	P	P	P	P	P	P	P
1901010018	ANANT PRAKASH SINGH	F	P	P	P	P	P	P	P	P	P	P	P	P	P
1901010022	ARVIND SINGH	F	P	P	P	P	P	P	P	P	P	P	P	P	P
1901010027	AARZO SHUKLA	F	P	P	P	P	P	P	P	P	P	P	P	P	P
1901010046	AJAY KUMAR	F	P	P	P	P	P	P	P	P	P	P	P	P	P
1901010049	TUSHAR UPADHAYAY	F	P	P	P	P	P	P	P	P	P	P	P	P	P
1901012051	AMAL GUPTA	F	P	P	P	P	P	P	P	P	P	P	P	P	P
1901030002	TAPSH CHOUDHARY	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1601030004	RANBIR KUMAR	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1601040001	BHAVIKA BATRA	A	P	P	P	P	P	P	P	P	P	P	P	P	P
1601040003	DHRIY SANORIA	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1601030002	CHANDRESEN	A	P	P	P	P	P	P	P	P	P	P	P	P	P
1601031004	NITESH KUMAR ROY	A	P	P	P	P	P	P	P	P	P	P	P	P	P

[Signature]

Registrar
K. R. Mangalam University
Sector Road, Gurugram, (Haryana)

Neeraj

COURSE INCHARGE

DEAN

School of Engineering & Technology, SOET,
K. R. Mangalam University
Sector Road, Gurugram

DEAN



ATTENDANCE SHEET
VAC COURSE FOR ACADEMIC YEAR 2019-20
COURSE CODE: VAC080
COURSE TITLE: AUTOMATION AND INDUSTRY 4.0

ROLL NO	NAME	15-Feb-20	19-Feb-20	22-Feb-20	25-Feb-20	1-Mar-20	6-Mar-20	12-Mar-20	14-Mar-20	15-Mar-20	18-Mar-20	19-Mar-20	TOTAL	Present	%
1901010013	JASNEET SINGH	P	P	P	P	A	P	P	A	P	P	A	35	30	85.71
1901010014	SANMIR MIRZA	P	P	P	P	P	P	A	P	P	A	P	35	31	88.57
1901010018	ANANT PRAKASH SINGH	P	P	P	P	P	A	P	P	A	P	P	35	30	85.71
1901010022	ARYAN SINGH	P	P	P	P	P	P	P	P	P	P	P	35	30	85.71
1901010027	AARZOO SHUKLA	P	P	P	P	P	P	P	P	P	P	P	35	30	85.71
1901010046	AJAY KUMAR	P	P	P	P	P	P	P	P	P	P	P	35	30	85.71
1901010049	LUSHAR UPADHAYAY	P	P	P	P	P	P	P	P	P	P	P	35	29	82.86
1901012051	AMAL GUPTA	P	P	P	P	P	P	P	P	P	P	P	35	30	85.71
1901030002	TAPISH CHAUDHARY	P	P	P	P	P	P	P	P	P	P	P	35	28	80.00
1601030004	RANBIR KUMAR	P	P	P	P	P	P	P	P	P	P	P	35	29	82.86
1601040001	BHAVIKA BATRA	P	P	P	P	P	P	P	P	P	P	P	35	29	82.86
1601040003	DHRUV SANORIA	P	P	P	P	P	P	P	P	P	P	P	35	29	82.86
1601030002	CHANDER SEN	P	P	P	P	P	P	P	P	P	P	P	35	28	80.00
1601031004	NITESH KUMAR ROY	P	P	P	P	P	P	P	P	P	P	P	35	31	88.57
													35	29	82.86

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DEAN
School of Engineering & Technology (SOET)
K.R. Mangalam University
Sohna road, Gurugram



K.R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

VALUE ADDED COURSE (VAC)

ACADEMIC YEAR 2019-20

COURSE CODE: VAC030

COURSE TITLE: AUTOMATION AND INDUSTRY 4.0

COURSE OFFERED BY: SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)

LIST OF STUDENTS COMPLETING THE COURSE

S.NO	SESSION	ROLL NO	NAME	PROGRAMME	SEMESTER	COURSE CODE	COURSE TITLE	SCHOOL
1	2019-20	1901010013	JASNEET SINGH	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
2	2019-20	1901010014	SAIM MIRZA	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
3	2019-20	1901010018	ANANT PRAKASH SINGH	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
4	2019-20	1901010022	ARYAN SINGH	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
5	2019-20	1901010027	AARZOO SHUKLA	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
6	2019-20	1901010046	AJAY KUMAR	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
7	2019-20	1901010049	TUSHAR UPADHAYAY	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
8	2019-20	1901012051	AMAL GUPTA	B.Tech CSE	Semester II	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
9	2019-20	1901030002	TAPISH CHOUDHARY	B.Tech EEE	Semester VIII	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
10	2019-20	1601030004	RANBIR KUMAR	B.Tech EEE	Semester VIII	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
11	2019-20	1601040001	BHAVIKA BATRA	B.Tech ECE	Semester VIII	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
12	2019-20	1601040003	DHRUV SANORIA	B.Tech ECE	Semester VIII	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
13	2019-20	1601030002	CHANDERSEN	B.Tech EEE	Semester VIII	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)
14	2019-20	1601031004	NITESH KUMAR ROY	B.Tech EEE	Semester VIII	VAC030	AUTOMATION AND INDUSTRY 4.0	SCHOOL OF ENGINEERING AND TECHNOLOGY (SOET)

[Signature]

Approved

K.R. Mangalam University
Sohna Road, Gurgaon (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **JASNEET SINGH**, University Enrolment No **1901010013** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Jul

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **SAIM MIRZA**, University Enrolment No **1901010014** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030 (Automation and Industry 4.0)** during Academic Session **2019-20 (Even Semester)**.

Date: 10.07.2020

hahajan

Controller of Examination

Ind

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **ANANT PRAKASH SINGH**, University Enrolment No **1901010018** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (Automation and Industry 4.0) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Prof.

Registrar

K.R. Mangalam University
Sohna Road, Gurgaon, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **ARYAN SINGH**, University Enrolment No **1901010022** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **AARZOO SHUKLA**, University Enrolment No **1901010027** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (Automation and Industry 4.0) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

hahajan

Controller of Examination

Jaf

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **AJAY KUMAR**, University Enrolment No **1901010046** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

hnanajan

Controller of Examination

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **TUSHAR UPADHAYAY**, University Enrolment No **1901010049** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

hahajan

Controller of Examination

Registrar

K.R. Mangalam University
Sohna Road, Gurgaon, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **AMAL GUPTA**, University Enrolment No **1901012051** of **B.Tech CSE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **TAPISH CHOUDHARY**, University Enrolment No **1901030002** of **B.Tech EEE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (Automation and Industry 4.0) during Academic Session 2019-20 (Even Semester).

Date: 10.07.2020

hahajan

Controller of Examination

Jaf

Registrar

K.R. Mangalam University
Sohna Road, Gurgaon, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **RANBIR KUMAR**, University Enrolment No **1601030004** of **B.Tech**
EEE programme has successfully qualified **VALUE ADDED COURSE VAC030**
'(Automation and Industry 4.0)' during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Registrar

K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **BHAVIKA BATRA**, University Enrolment No **1601040001** of **B.Tech ECE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Registrar

K.R. Mangalam University
Sohna Road, Gurgaon, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **DHRUV SANORIA**, University Enrolment No **1601040003** of **B.Tech ECE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (**Automation and Industry 4.0**) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

brahajan

Controller of Examination

Dr. -

Registrar

K.R. Mangalam University
Sohna Road, Gurgaon, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **CHANDERSEN**, University Enrolment No **1601030002** of **B.Tech**
EEE programme has successfully qualified **VALUE ADDED COURSE VAC030**
(Automation and Industry 4.0) during Academic Session **2019-20** (Even Semester).

h. ahajan

Date: 10.07.2020

Controller of Examination

J. J.

Registrar

K. R. Mangalam University
Sohna Road, Gurugram, (Haryana)



K. R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

CERTIFICATE OF COMPLETION

This is to certify that **NITESH KUMAR ROY**, University Enrolment No **1601031004** of **B.Tech EEE** programme has successfully qualified **VALUE ADDED COURSE VAC030** (Automation and Industry 4.0) during Academic Session **2019-20** (Even Semester).

Date: 10.07.2020

Controller of Examination

h. rajan

Thf

Registrar

K.R. Mangalam University
Sohna Road, Gurgaon, (Haryana)