

# **Courses of Study**

**(Detailed Course Contents)**

**Under-graduate (2023 Batch)**



**Shri Mata Vaishno Devi University**

**Kakryal, Katra 182320 Jammu & Kashmir**

## **VISION**

Establishment of a Scientific & Technical University of Excellence to nurture young and talented human resources for the service of Indian Society & world at large and preserving the integrity and sanctity of human values.

## **MISSION**

The mission of the University is the pursuit of Education, Scholarship and Research at the highest International level of excellence.

## **OBJECTIVES**

- Provide education and training of excellent quality, both at undergraduate and postgraduate level.
- Ensure that the University achieves and maintains an international standing in both teaching and research
- Promote study and research in new and emerging areas and encourage academic interaction of the faculty and the students at national and international levels.
- Encourage close collaboration with industry and facilitate the application of research for commercial use and for the benefit of society.

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**Details of**

**Syllabus of Courses**

**Offered by**

**School of Computer Science& Engineering**

## Annexure "B"

### Course Structure of B. Tech (Computer Science & Engineering) programme [Entry Batch 2023]

#### Semester I

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>BSC 1</b>	MTL BS101	Engineering Mathematics-I	3	1	0	4
<b>BSC 2</b>	PHL BS101	Engineering Physics	3	0	0	3
<b>BSC 2</b>	PHP BS101	Engineering Physics Lab	0	0	2	1
<b>ESC 1</b>	CSL ES101	Introduction to C Programming	3	0	0	3
<b>ESC 1</b>	CSP ES101	C Programming Lab	0	0	2	1
<b>ESC 2</b>	ECL ES103	Digital Electronics	3	0	0	3
<b>ESC 2</b>	ECP ES103	Digital Electronics Lab	0	0	2	1
<b>SEC 1</b>	MEM SE103	Engineering Graphics with CAD	1	0	2	2
<b>AEC 1 / VAC 1</b>		Ability Enhancement /Value Added Course				2
		<b>Total Credits</b>				<b>20</b>

#### Semester II

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>BSC 3</b>	MTL BS102	Engineering Mathematics-II	3	1	0	4
<b>BSC 4</b>	BTL BS102	Biology for Engineers	3	1	0	4
<b>DCC 1</b>	CSL DC102	Programming using Python	3	0	0	3
<b>DCC 1</b>	CSP DC102	Python Programming Lab	0	0	2	1
<b>DCC 2</b>	CSL DC104	Data structure	3	0	0	3
<b>DCC 2</b>	CSP DC104	Data Structure Lab	0	0	2	1
<b>SEC 2</b>	MEM SE102	Engineering Workshop	1	0	2	2
<b>AEC 2</b>		Ability Enhancement Course				2
<b>VAC 2</b>		Value Added Course				2
<b>MAC 1</b>	PCN MA102	Universal Human Values - II	2	0	0	0
		<b>Total Credits</b>				<b>22</b>

**Exit option:** Students who opt to exit after completion of the year and have secured 42 credits (As per the program structure) shall be awarded the UG Certificate if, in addition, they earn additional 6 credits through 2 months of summer internship/ ITI level course/skill-based course during the summer vacation of the first year.

#### Semester III

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>BSC 5</b>	MTL BS201	Discrete Structures	3	0	0	3
<b>ESC 3</b>	ECL ES205	Microprocessors & Interfacing	3	0	0	3
<b>ESC 3</b>	ECP ES205	Microprocessors & Interfacing Lab	0	0	2	1
<b>DCC 3</b>	CSL DC201	Theory of Computation	3	1	0	4
<b>DCC 4</b>	CSL DC203	Operating Systems	3	0	0	3
<b>DCC 4</b>	CSP DC203	Operating Systems Lab	0	0	2	1
<b>DCC 5</b>	CSL DC205	Data Science & Analytics	3	0	0	3
<b>DCC 5</b>	CSP DC205	Data Science & Analytics Lab	0	0	2	1
<b>SEC 3</b>		Skill Enhancement Course - 3				2



<b>PR</b>	CSI PR201	Summer Internship-I				1
<b>VAC 3</b>	BTL VA202	Environmental Science & Education	2	0	0	2
		<b>Total Credits</b>				<b>24</b>

#### Semester IV

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>DCC 6</b>	CSL DC202	Soft Computing	3	0	0	3
<b>DCC 6</b>	CSP DC202	Soft Computing Lab	0	0	2	1
<b>DCC 7</b>	CSL DC204	Design & Algorithm Analysis	3	0	0	3
<b>DCC 7</b>	CSP DC204	Design & Algorithm Analysis Lab	0	0	2	1
<b>DCC 8</b>	CSL DC206	Database Management Systems	3	0	0	3
<b>DCC 8</b>	CSP DC206	Database Management Systems Lab	0	0	2	1
<b>DCC 9</b>	CSL DC208	Computer Organization & Architecture	3	1	0	4
<b>DCC 10</b>	CSL DC210	Compiler Design	3	1	0	4
<b>VAC 4</b>		Value Added Courses				2
		<b>Total Credits</b>				<b>22</b>

**Exit option:** Students who opt to exit after completion of the second year and have secured 88 credits (As per the program structure) shall be awarded the UG Diploma if, in addition, they earn an additional 6 credits through 2 months of summer internship/ Diploma level courses/skill vacation of the second year.

#### Semester V

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>DCC 11</b>	CSL DC301	Computer Networks & Communication	3	0	0	3
<b>DCC 11</b>	CSP DC301	Computer Networks & Communication Lab	0	0	2	1
<b>DCC 12</b>	CSL DC303	Object Oriented Programming using JAVA	3	0	0	3
<b>DCC 12</b>	CSP DC303	Object Oriented Programming Lab using JAVA	0	0	2	1
<b>DCC 13</b>	CSL DC305	Machine Learning	3	0	0	3
<b>DCC 13</b>	CSP DC305	Machine Learning Lab	0	0	2	1
<b>DEC 01</b>		School Elective – I	3	1/0	0/2	4
<b>DEC 2 /GEC 1</b>		School Elective – II/Generic Elective - I	3	1/0	0/2	4
<b>PR</b>	CSI PR301	Summer Internship-II				1
<b>DCC</b>	CSD PR301	Project Work – I				2
		<b>Total Credits</b>				<b>23</b>

#### Semester VI

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>DCC 14</b>	CSL DC302	Deep Learning	3	0	0	3
<b>DCC 14</b>	CSP DC302	Deep Learning Lab	0	0	2	1
<b>DCC 15</b>	CSL DC304	Software Engineering	3	0	0	3
<b>DCC 15</b>	CSP DC304	Software Engineering Lab	0	0	2	1
<b>DEC 3</b>	CSX DEXXX	School Elective – III	3	1/0	0/2	4
<b>DEC 4 /GEC 2</b>	CSX DEXXX / CSX GEXXX	School Elective – IV/Generic Elective -II	3	1/0	0/2	4
<b>AEC</b>		Management / Entrepreneurship/Economy	3	0	0	3
<b>DCC</b>	CSD PR302	Project Work – II				2
<b>MAC 2</b>	PCN MA302	Indian Knowledge System	2	0	0	NC
		<b>Total Credits</b>				<b>21</b>

**Exit option:** Students who opt to exit after completion of the third year and have secured 132 credits (As per the program structure) shall be awarded B.VOC Degree in the Major discipline if, in addition, they have completed the summer internship of additional 4 credits during summer vacation of the third year.

**Semester VII**

Course Type	Course Code	Course Title	L	T	P/S	Credits
<b>DCC 16</b>	CSL DC401	Digital Image Processing	3	0	0	3
<b>DCC 16</b>	CSP DC401	Digital Image Processing Lab	0	0	2	1
<b>DEC 5</b>	CSX DEXXX	School Elective – V	3	1/0	0/2	4
<b>DEC 6 / GEC 3</b>	CSX DEXXX / CSX GEXXX	School Elective – VI/ Generic Elective – III	3	1/0	0/2	4
<b>PR</b>	CSI PR401	Summer Internship - III				2
<b>DCC/PR</b>	CSD PR401	Project Work- III				4
		<b>Total Credits</b>				<b>18</b>

Internship to be completed in summer vacation after sixth semester.

**Semester VIII**

<b>DCC/PR</b>	CSD PR402/ CSI PR402	Major Project /Internship (Industrial or In-house Project)				10
		<b>Total Credits</b>	<b>160</b>			<b>10</b>

### LIST OF SCHOOL ELECTIVE COURSES

List of School Electives For B.Tech. CSE						
S. No.	Course Code	Course Title	L	T	P	C
<b>DEC – I</b>						
1	CSL DE301	Software Defined Networks	3	0	2	4
2	CSL DE303	Storage Networks	3	1	0	4
3	CSL DE305	Computer Vision	3	1	0	4
4	CSE DE307	Web Programming	3	0	2	4
5	CSL DE309	Block Chain Technology	3	1	0	4
6	CSL DE311	Data Visualization <b>(Hon. DS &amp; AI)</b>	3	0	2	4
<b>DEC – II</b>						
1	CSL DE313	Probability & Stochastic Processes <b>(Hon. DS &amp; AI)</b>	3	1	0	4
2	CSL DE315	Cloud Computing	3	1	0	4
3	CSL DE317	Parallel & Distributed Computing	3	1	0	4
4	CSL DE319	Advanced Mobile Communication using 5G	3	1	0	4
5	CSL DE325	Advanced Computer Architecture	3	1	0	4
6	CSL DE323	Computer Network Security	3	0	2	4
<b>DEC – III</b>						
1	CSL DE302	Data mining & warehousing <b>(Hon. DS &amp; AI)</b>	3	0	2	4
2	CSL DE304	Human Computer Interaction	3	1	0	4
3	CSL DE306	Quantum Computing	3	0	2	4
4	CSL DE308	Mobile & App Development	3	1	0	4
<b>DEC – IV</b>						
1	CSL DE322	Digital twin <b>(Hon. DS &amp; AI)</b>	3	0	2	4
2	CSL DE310	Internet of Things <b>(Hon. DS &amp; AI)</b>	3	1	0	4
3	CSL DE312	Wireless Networks	3	0	2	4
4	CSL DE314	Information Coding Practices	3	1	0	4
5	CSL DE316	Computer Embedded Systems	3	1	0	4
6	CSL DE318	Multimedia and Virtual Reality	3	1	0	4
7	CSL DE320	High Performance Computing	3	1	0	4
<b>DEC – V</b>						
1	CSL DE401	Nature Inspired Algorithms <b>(Hon. DS &amp; AI)</b>	3	0	2	4
2	CSL DE411	Robotics & Vision Control <b>(Hon. DS &amp; AI)</b>	3	1	0	4
3	CSL DE403	Metaheuristic Design Framework	3	1	0	4
4	CSL DE405	Cyber Security	3	1	0	4
5	CSL DE407	E-Commerce & Cyber Laws	3	1	0	4
6	CSL DE409	Digital Forensic	3	1	0	4
<b>DEC – VI</b>						
1	CSL DE413	Natural Language Processing <b>(Hon. DS &amp; AI)</b>	3	1	0	4
2	CSL DE415	Foundation Models <b>(Hon. DS &amp; AI)</b>	3	1	0	4



### B.Tech. CSE Honors. in Data Science & Artificial Intelligence

Course Type	Course Code	Course Title	L	T	P/S	Credits
DEC	CSL DE311	Data Visualization	3	0	2	4
DEC	CSL DE313	Probability & Stochastic Processes	3	1	0	4
DEC	CSL DE302	Data mining & warehousing	3	0	2	4
DEC	CSL DE322	Digital twin	3	0	2	4
DEC	CSL DE310	Internet of Things	3	0	2	4
DEC	CSL DE401	Nature Inspired Algorithms	3	0	2	4
DEC	CSL DE411	Robotics & Vision Control	3	1	0	4
DEC	CSL DE413	Natural Language Processing	3	1	0	4
DEC	CSL DE415	Foundation Models	3	1	0	4
DEC	CSL DE315	Cloud Computing	3	0	2	4
DEC	CSL DE320	High Performance Computing	3	1	0	4
DEC	CSL DE321	Business Analytics with R	3	0	2	4

#### a) Minor Specialization in Artificial Intelligence

#### b) Minor Specialization in Information Security

Minor Specialization in Artificial Intelligence					
Course Code	Course Title	L	T	P/S	Credits
CSL GE301	Introduction to Artificial Intelligence	3	1	0	4
CSL GE305	Probability & Statistics	3	1	0	4
CSL GE302	Introduction to Machine Learning	3	0	2	4
CSL GE306	Data Analytics	3	0	2	4
CSL GE401	Soft Computing	3	0	2	4
CSL GE405	Natural Language Processing	3	1	0	4
CSL GE402	Artificial Intelligence for Engineering Applications	3	1	0	4
CSL GE406	Prompt Engineering	3	1	0	4
CSL GE410	Vision Transformers	3	1	0	4

Minor Specialization in Information Security					
Course Code	Course Title	L	T	P/S	Credits
CSL GE303	Computer Network & Communication	3	0	2	4
CSL GE307	Information & Coding Practices	3	1	0	4
CSL GE304	Wireless Networks	3	0	2	4
CSL GE308	Internet of Things	3	0	2	4
CSL GE403	Introduction to Cyber Security	3	1	0	4
CSL GE407	Block Chain Coding	3	1	0	4
CSL GE404	Privacy & Security in Online Social Media	3	1	0	4
CSL GE408	Information Response & Management	3	1	0	4

**B. Tech. (Honor's) Program:** The four-year B. Tech. (Honor's) degree in the Major discipline will be awarded to those who have completed the credit requirement of a four-year B.Tech. degree program and earned 12 Additional Credits through DEC's provided a minimum of seven DEC's earned are from the basket of a particular specialization/domain.

These elective courses can be registered during V to VIII semester subject to a maximum limit of course



registration up to 32 credits, including core and other courses.

Department Elective Course – 7	4	DEC
Department Elective Course – 8	4	DEC
Department Elective Course – 9	4	DEC

These elective courses can be registered during V to VIII semester subject to a maximum limit of course registration up to 32 credits, including core and other courses. On exit, student shall be awarded B.Tech.(Honor's) in Major discipline with specialization in the specific domain.

## **2. B. Tech. Program with Minor/Interdisciplinary Area Specialization:**

The four-year B. Tech. degree in the Major discipline with Minor in a specific domain will be awarded to those who have completed the credit requirement of four-year B. Tech degree program and earned 12 Additional Credits through GECs provided all credits earned through GECs are from the basket of a particular Minor.

Generic Elective Course – 5	4	GEC
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Generic Elective Course – 6	4	GEC
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Generic Elective Course – 7	4	GEC
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The set of courses required to be taken, by students of other School, to obtain Minor/Interdisciplinary Area Specialization will be clearly defined by each School for the benefit of the students. The four-year B. Tech. degree with Minor in a specific domain will be awarded to those who complete a four-year degree program with 172 credits and have satisfied the credit requirement. A student, who wishes to pursue B. Tech. with Minor, shall earn 12 additional credits from General Elective course provided all 7 GECs (GEC1 to GEC7) are earned from the basket of courses prescribed for that particular Minor.

**For detailed syllabus of courses Please click on the link provided below:**

[https://drive.google.com/drive/folders/1CUDn89Ib0E9z-SvL6Bx-74vYogHalO3N?usp=drive\\_link](https://drive.google.com/drive/folders/1CUDn89Ib0E9z-SvL6Bx-74vYogHalO3N?usp=drive_link)