

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**  
**SCHEME OF TEACHING AND EXAMINATION 2015-2016**  
**B.E. Computer Science & Engineering/ B.E. Information Science & Engineering**

**IV SEMESTER**

Sl. No	Subject Code	Title	Teaching Hours /Week		Examination			Credits	
			Theory	Practical/ Drawing	Duration	Theory/ Practical Marks	I.A. Marks		Total Marks
1	15MAT41	Engineering Mathematics - IV	04	--	03	80	20	100	4
2	15CS 42	Software Engineering	04	--	03	80	20	100	4
3	15CS43	Design and Analysis of Algorithms	04	--	03	80	20	100	4
4	15CS 44	Microprocessors and Microcontrollers	04	--	03	80	20	100	4
5	15CS45	Object Oriented Concepts	04	--	03	80	20	100	4
6	15CS46	Data Communication	04	--	03	80	20	100	4
7	15CSL47	Design and Analysis of Algorithm Laboratory	--	11+2P	03	80	20	100	2
8	15CSL48	Microprocessors Laboratory	--	11+2P	03	80	20	100	2
<b>TOTAL</b>			<b>24</b>	<b>06</b>	<b>24</b>	<b>640</b>	<b>160</b>	<b>800</b>	<b>28</b>

Note: 'T' Stands for Instruction Hours and 'P' for practical Hours



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**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**  
**SCHEME OF TEACHING AND EXAMINATION 2015-2016**  
 B.E. Information Science & Engineering

V SEMESTER

Sl. No	Subject Code	Title	Teaching Hours /Week		Examination				Credits
			Theory	Practical/ Drawing	Duration	Theory/ Practical Marks	LA. Marks	Total Marks	
1	15CS51	Management and Entrepreneurship for IT industry	04	--	03	80	20	100	4
2	15CS52	Computer Networks	04	--	03	80	20	100	4
3	15CS53	Database Management System	04	--	03	80	20	100	4
4	15CS54	Automata theory and Computability	04	--	03	80	20	100	4
5	15CS/IS55x	Professional Elective 1	03	--	03	80	20	100	3
6	15CS56x	Open Elective 1	03	--	03	80	20	100	3
7	15CSL57	Computer Network Laboratory	--	1I+2P	03	80	20	100	2
8	15CSL58	DBMS Laboratory with mini project	--	1I+2P	03	80	20	100	2
<b>TOTAL</b>			<b>22</b>	<b>6</b>	<b>24</b>	<b>640</b>	<b>160</b>	<b>800</b>	<b>26</b>

**Professional Elective 1**

15CS551	Object Oriented Modeling and Design
15IS552	Social Network Analysis
15CS553	Advanced JAVA and J2EE
15IS554	Programming Languages

1. Professional Elective: Electives relevant to chosen specialization /branch
2. Open Elective: Electives from other technical and/or emerging subject areas (Announced separately)



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**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**Scheme of Teaching and Examination 2017-2018**  
**Choice Based Credit System (CBCS)**

**B.E: Information Science and Engineering**

**IV SEMESTER**

Sl. No	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17MAT41	Engineering Mathematics - IV	Maths	04		03	60	40	100	4
2	17CS42	Object Oriented Concepts	CS/IS	03		03	60	40	100	3
3	17CS43	Design and Analysis of Algorithms	CS/IS	04		03	60	40	100	4
4	17CS44	Microprocessors and Microcontrollers	CS/IS	04		03	60	40	100	4
5	17CS45	Software Engineering	CS/IS	04		03	60	40	100	4
6	17CS46	Data Communication	CS/IS	04		03	60	40	100	4
7	17CSL47	Design and Analysis of Algorithm Laboratory	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
8	17CSL48	Microprocessors Laboratory	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
9	17KL/CPH39/49	Kannada/Constitution of India, Professional Ethics and Human Rights	Humanities	01		01	30	20	50	01
<b>TOTAL</b>				<b>Theory: 24hours Practical: 06 hours</b>		<b>25</b>	<b>510</b>	<b>340</b>	<b>850</b>	<b>28</b>

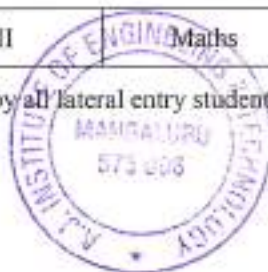
**1. Kannada/Constitution of India, Professional Ethics and Human Rights:** 50 % of the programs of the Institution have to teach Kannada/Constitution of India, Professional Ethics and Human Rights in cycle based concept during III and IV semesters.

**2. Audit Course:**

(i) \*All lateral entry students (except B.Sc candidates) have to register for Additional Mathematics – II, which is 03 contact hours per week.

1	17MATDIP41	Additional Mathematics –II	Maths	03		03	60	--	60	--
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(ii) Language English (Audit Course) be compulsorily studied by all lateral entry students (except B.Sc candidates)



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**Scheme of Teaching and Examination 2017-2018**  
**Choice Based Credit System (CBCS)**

**B.E: Information Science and Engineering**

**V SEMESTER**

Sl. No	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17CS51	Management and Entrepreneurship for IT Industry	CS/IS	04		03	60	40	100	4
2	17CS52	Computer Networks	CS/IS	04		03	60	40	100	4
3	17CS53	Database Management System	CS/IS	04		03	60	40	100	4
4	17CS54	Automata theory and Computability	CS/IS	04		03	60	40	100	4
5	17CS/IS55x	Professional Elective-1	CS/IS	03		03	60	40	100	3
6	17CS56x	Open Elective-1	CS/IS	03		03	60	40	100	3
7	17CSL57	Computer Network Laboratory	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
8	17CSL58	DBMS Laboratory with mini project	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
<b>TOTAL</b>				<b>Theory: 22hours Practical: 06 hours</b>		<b>24</b>	<b>480</b>	<b>320</b>	<b>800</b>	<b>26</b>

Professional Elective-1		Open Elective – 1*** (List offered by CSE Board only)	
17CS551	Object Oriented Modeling and Design	17CS561	Programming in JAVA (Not for CSE/ISE students)
17IS552	Social Network Analysis	17CS562	Artificial Intelligence
17CS553	Advanced JAVA and J2EE	17CS563	Embedded Systems
17IS554	Programming Languages	17CS564	Dot Net framework for application development;
		17CS565	Cloud Computing (Not for CSE/ISE students)

\*\*\*Students can select any one of the open electives offered by any Department (Please refer to consolidated list of VTU for open electives).

Selection of an open elective is not allowed, if:

- The candidate has no pre – requisite knowledge.
- The candidate has studied similar content course during previous semesters.
- The syllabus content of the selected open elective is similar to that of Departmental core course(s) or to be studied Professional elective(s).

Registration to open electives shall be documented under the guidance of Programme Coordinator and Adviser.



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**Scheme of Teaching and Examination 2017-2018**  
**Choice Based Credit System (CBCS)**

**B.E: Information Science and Engineering**

**VI SEMESTER**

Sl No	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17CS61	Cryptography, Network Security and Cyber Law	CS/IS	04		03	60	40	100	4
2	17IS62	File Structures	CS/IS	04		03	60	40	100	4
3	17IS63	Software Testing	CS/IS	04		03	60	40	100	4
4	17CS64	Operating Systems	CS/IS	04		03	60	40	100	4
5	17CS/IS65x	Professional Elective-2	CS/IS	03		03	60	40	100	3
6	17CS66x	Open Elective-2	CS/IS	03		03	60	40	100	3
7	17ISL67	Software Testing Laboratory	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
8	17ISL68	File Structures Laboratory with mini project	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
<b>TOTAL</b>				<b>Theory:22hours Practical: 06 hours</b>		<b>24</b>	<b>480</b>	<b>320</b>	<b>800</b>	<b>26</b>

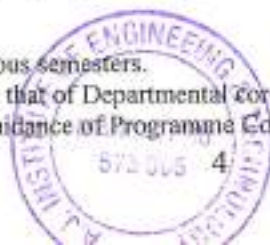
Professional Elective-2		Open Elective – 2*** (List offered by CSE Board only)	
17CS651	Data Mining and Data Warehousing	17CS661	Mobile Application Development
17IS652	System Software	17CS662	Big Data Analytics (Not for CSE/ISE students)
17CS653	Operations research	17CS663	Wireless Networks and Mobile computing
17CS654	Distributed Computing system	17CS664	Python Application Programming
		17CS665	Service Oriented Architecture
		17CS666	Multicore Architecture and Programming

\*\*\*Students can select any one of the open electives offered by any Department (Please refer to consolidated list of VTU for open electives).

Selection of an open elective is not allowed, if:

- The candidate has no pre – requisite knowledge.
- The candidate has studied similar content course during previous semesters.
- The syllabus content of the selected open elective is similar to that of Departmental core course(s) or to be studied Professional elective(s).

Registration to open electives shall be documented under the guidance of Programme Coordinator and Adviser.



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**Scheme of Teaching and Examination 2017-2018**  
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**B.E: Information Science and Engineering**

**VII SEMESTER**

Sl No	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17CS71	Web Technology and its applications	CS/IS	04		03	60	40	100	4
2	17IS72	Software Architecture and Design Patterns	CS/IS	04		03	60	40	100	4
3	17CS73	Machine Learning	CS/IS	04		03	60	40	100	4
4	17CS/IS74x	Professional Elective 3	CS/IS	03		03	60	40	100	3
5	17CS/IS75x	Professional Elective 4	CS/IS	03		03	60	40	100	3
6	17CSL76	Machine Learning Laboratory	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
7	17CSL77	Web Technology Laboratory with mini project	CS/IS	01-Hour Instruction 02-Hour Practical		03	60	40	100	2
8	17ISP78	Project Work Phase-I + Project work Seminar	CS/IS		03	--	--	100	100	2
<b>TOTAL</b>				<b>Theory:18 hours Practical and Project: 09 hours</b>		<b>21</b>	<b>420</b>	<b>380</b>	<b>800</b>	<b>24</b>

Professional Elective-3		Professional Elective-4	
17CS741	Natural Language Processing	17CS751	Soft and Evolutionary Computing
17CS742	Cloud Computing and its Applications	17CS752	Computer Vision and Robotics
17CS743	Information and Network Security	17IS753	Information Management System
17CS744	Unix System Programming	17CS754	Storage Area Networks

**1. Project Phase – I and Project Seminar:** Comprises of Literature Survey, Problem identification, Objectives and Methodology. CIE marks shall be based on the report covering Literature Survey, Problem identification, Objectives and Methodology and Seminar presentation skill.



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**Scheme of Teaching and Examination 2017-2018**  
**Choice Based Credit System (CBCS)**

**B.E: Information Science and Engineering**

**VIII SEMESTER**

Sl No	Course Code	Title	Teaching Department	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Drawing	Duration in hours	SEE Marks	CIE Marks	Total Marks	
1	17CS81	Internet of Things and Applications	CS/IS	4	-	3	60	40	100	4
2	17CS82	Big Data Analytics	CS/IS	4	-	3	60	40	100	4
3	17CS/IS83X	Professional Elective-5	CS/IS	3	-	3	60	40	100	3
4	17IS84	Internship/ Professional Practice	CS/IS	Industry Oriented		3	50	50	100	2
5	17ISP85	Project Work-II	CS/IS	-	6	3	100	100	200	6
6	17ISS86	Seminar	CS/IS	-	4	-	-	100	100	1
<b>TOTAL</b>				<b>Theory: 11 hours Project and Seminar: 10 hours</b>		<b>15</b>	<b>330</b>	<b>370</b>	<b>700</b>	<b>20</b>

Professional Elective -5	
17CS831	High Performance Computing
17CS832	User Interface Design
17IS833	Virtual Reality
17CS834	System Modeling and Simulation

**1. Internship/ Professional Practice:** 4 Weeks internship to be completed between the (VI and VII semester vacation) and/or (VII and VIII semester vacation) period.



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**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**Scheme of Teaching and Examination 2018 – 19**  
**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Effective from the academic year 2018 – 19)**

III SEMESTER												
Sl. No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week			Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P					
1	BSC	18MAT31	Transform Calculus, Fourier Series And Numerical Techniques	Mathematics	2	2	--	03	40	60	100	3
2	PCC	18CS32	Data Structures and Applications	CS / IS	3	2	--	03	40	60	100	4
3	PCC	18CS33	Analog and Digital Electronics	CS / IS	3	0	--	03	40	60	100	3
4	PCC	18CS34	Computer Organization	CS / IS	3	0	--	03	40	60	100	3
5	PCC	18CS35	Software Engineering	CS / IS	3	0	--	03	40	60	100	3
6	PCC	18CS36	Discrete Mathematical Structures	CS / IS	3	0	--	03	40	60	100	3
7	PCC	18CSL37	Analog and Digital Electronics Laboratory	CS / IS	--	2	2	03	40	60	100	2
8	PCC	18CSL38	Data Structures Laboratory	CS / IS	--	2	2	03	40	60	100	2
9	HSMC	18KVK39	Vyavaharika Kannada (Kannada for communication)	HSMC	--	2	--	--	100	--	100	1
		18KAK39	Aadaliha Kannada (Kannada for Administration)									
		OR	OR									
		18CPC39	Constitution of India, Professional Ethics and Cyber Law		1	--	--	02	40	60		
<b>TOTAL</b>					17	08		24	420	480	900	24
					OR	OR	04	OR	OR	OR		
					18	10		26	360	540		

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course

18KVK39 Vyavaharika Kannada (Kannada for communication) is for non-Kannada speaking, reading and writing students and 18KAK39 Aadaliha Kannada (Kannada for Administration) is for students who speak, read and write Kannada.

**Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs**

10	NCMC	18MATDIP31	Additional Mathematics - I	Mathematics	02	01	--	03	40	60	100	0
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(a) The mandatory non-credit courses Additional Mathematics I and II prescribed for III and IV semesters respectively, to the lateral entry Diploma holders admitted to III semester of BE/B.Tech. programs, shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the University examination. In case, any student fails to register for the said course/ fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured F grade. In such a case, the students have to fulfill the requirements during subsequent semesters to appear for SEE.

(b) These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree

**Courses prescribed to lateral entry B. Sc degree holders admitted to III semester of Engineering programs**

Lateral entrant students from B.Sc. Stream, shall clear the non-credit courses Engineering Graphics and Elements of Civil Engineering and Mechanics of the First Year Engineering Programme. These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.

AICTE Activity Points to be earned by students admitted to BE/B.Tech./B. Plan. day college programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines): Over and above the academic grades, every Day College regular student admitted to the 4 years Degree programme and every student entering 4 years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. Students transferred from other Universities to fifth semester are required to earn 50 Activity Points from the year of entry to VTU. The Activity Points earned shall be reflected on the student's eighth semester Grade Card. The activities can be spread over the years, anytime during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, minimum hours' requirement should be fulfilled. Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.



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**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**Scheme of Teaching and Examination 2018 – 19**  
**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Effective from the academic year 2018 – 19)**

IV SEMESTER												
Sl No	Course and Course Code		Course Title	Teaching Department	Teaching Hours /Week			Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P					
1	BSC	18MAT41	Complex Analysis, Probability And Statistical Methods	Mathematics	2	2	--	03	40	60	100	3
2	PCC	18CS42	Design and Analysis of Algorithms	CS / IS	3	2	--	03	40	60	100	4
3	PCC	18CS43	Operating Systems	CS / IS	3	0	--	03	40	60	100	3
4	PCC	18SC44	Microcontroller and Embedded Systems	CS / IS	3	0	--	03	40	60	100	3
5	PCC	18CS45	Object Oriented Concepts	CS / IS	3	0	--	03	40	60	100	3
6	PCC	18CS46	Data Communication	CS / IS	3	0	--	03	40	60	100	3
7	PCC	18CSL47	Design and Analysis of Algorithm Laboratory	CS / IS	--	2	2	03	40	60	100	2
8	PCC	18CSL48	Microcontroller and Embedded Systems Laboratory	CS / IS	--	2	2	03	40	60	100	2
9	HSMC	18KVK49	Vyavaharika Kannada (Kannada for communication)	HSMC	--	2	--	--	100	--	100	1
		18KAK49	Aadaltha Kannada (Kannada for Administration)		--	2	--	--	100	--		
		OR	OR									
		18CPC39	Constitution of India, Professional Ethics and Cyber Law		1	--	--	02	40	60		
<b>TOTAL</b>					<b>17</b>	<b>08</b>	<b>04</b>	<b>24</b>	<b>420</b>	<b>480</b>	<b>900</b>	<b>24</b>
					<b>OR</b>	<b>OR</b>	<b>OR</b>	<b>OR</b>	<b>OR</b>	<b>OR</b>		
					<b>18</b>	<b>10</b>		<b>26</b>	<b>360</b>	<b>540</b>		

Note: BSC: Basic Science, PCC: Professional Core, HSMC: Humanity and Social Science, NCMC: Non-credit mandatory course

18KVK49 Vyavaharika Kannada (Kannada for communication) is for non-Kannada speaking, reading and writing students and 18KAK49 Aadaltha Kannada (Kannada for Administration) is for students who speak, read and write Kannada.

**Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs**

10	NCMC	18MATDIP41	Additional Mathematics - II	Mathematics	02	01	--	03	40	60	100	0
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(a) The mandatory non-credit courses Additional Mathematics I and II prescribed for III and IV semesters respectively, to the lateral entry Diploma holders admitted to III semester of BE/B.Tech programs, shall attend the classes during the respective semesters to complete all the formalities of the course and appear for the University examination. In case, any student fails to register for the said course/ fails to secure the minimum 40 % of the prescribed CIE marks, he/she shall be deemed to have secured F grade. In such a case, the student have to fulfil the requirements during subsequent semester/s to appear for SEE.

(b) These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree

**Courses prescribed to lateral entry B. Sc degree holders admitted to III semester of Engineering programs**

AICTE activity Points: In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.



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**Scheme of Teaching and Examination 2018 – 19**  
**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Effective from the academic year 2018 – 19)**

V SEMESTER												
Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	HSMC	18CS51	Management, Entrepreneurship for IT Industry	HSMC	2	2	--	03	40	60	100	3
2	PCC	18CS52	Computer Networks and Security	CS / IS	3	2	--	03	40	60	100	4
3	PCC	18CS53	Database Management System	CS / IS	3	2	--	03	40	60	100	4
4	PCC	18CS54	Automata theory and Computability	CS / IS	3	--	--	03	40	60	100	3
5	PCC	18CS55	Application Development using Python	CS / IS	3	--	--	03	40	60	100	3
6	PCC	18CS56	Unix Programming	CS / IS	3	--	--	03	40	60	100	3
7	PCC	18CSL57	Computer Network Laboratory	CS / IS	--	2	2	03	40	60	100	2
8	PCC	18CSL58	DBMS Laboratory with mini project	CS / IS	--	2	2	03	40	60	100	2
9	HSMC	18CIV59	Environmental Studies	Civil/ Environmental [Paper setting: Civil Engineering Board]	1	--	--	02	40	60	100	1
<b>TOTAL</b>					<b>18</b>	<b>10</b>	<b>04</b>	<b>26</b>	<b>360</b>	<b>540</b>	<b>900</b>	<b>25</b>
<b>Note: PCC: Professional Core, HSMC: Humanity and Social Science.</b>												
<b>AICTE activity Points:</b> In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.												



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**VI SEMESTER**

Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P					
1	PCC	18IS61	File Structures	CS / IS	3	2	--	03	40	60	100	4
2	PCC	18IS62	Software Testing	CS / IS	3	2	--	03	40	60	100	4
3	PCC	18CS63	Web Technology and its applications	CS / IS	3	2	--	03	40	60	100	4
4	PEC	18CS64X	Professional Elective -I	CS / IS	3	--	--	03	40	60	100	3
5	OE	18CS65X	Open Elective -A	CS / IS	3	--	--	03	40	60	100	3
6	PCC	18ISL66	Software Testing Laboratory	CS / IS	--	2	2	03	40	60	100	2
7	PCC	18ISL67	File Structures Laboratory with mini project	CS / IS	--	2	2	03	40	60	100	2
8	MP	18ISMP68	Mobile Application Development	CS / IS	--	--	2	03	40	60	100	2
9	INT	--	Internship	(To be carried out during the intervening vacations of VI and VII semesters)				--	--	--	--	--
<b>TOTAL</b>					<b>15</b>	<b>10</b>	<b>06</b>	<b>24</b>	<b>320</b>	<b>480</b>	<b>800</b>	<b>24</b>

Note: PCC: Professional core, PEC: Professional Elective, OE: Open Elective, MP: Mini-project, INT: Internship.

**Professional Elective -I**

Course code under 18XX64X	Course Title
18CS641	Data Mining and Data Warehousing
18CS642	Object Oriented Modelling and Design
18CS643	Cloud Computing and its Applications
18CS644	Advanced JAVA and J2EE
18IS645	Information Management System

**Open Elective -A (Not for CSE / ISE Programs)**

18CS651	Mobile Application Development
18CS652	Introduction to Data Structures and Algorithms
18CS653	Programming in JAVA
18CS654	Introduction to Operating System

Students can select any one of the open electives offered by any Department (Please refer to the list of open electives under 18CS65X). Selection of an open elective is not allowed provided.

- The candidate has studied the same course during the previous semesters of the programme.
- The syllabus content of open elective is similar to that of Departmental core courses or professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the programme.

Registration to electives shall be documented under the guidance of Programme Coordinator/ Adviser/Mentor.

**Mini-project work:** Based on the ability/abilities of the students and recommendations of the mentor, a single discipline or a multidisciplinary Mini- project can be assigned to an individual student or to a group having not more than 4 students.

**CIE procedure for Mini-project:**

(i) **Single discipline:** The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide. The CIE marks awarded for the Mini-project work, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

(ii) **Interdisciplinary:** Continuous Internal Evaluation shall be group wise at the college level with the participation of all the guides of the college. The CIE marks awarded for the Mini-project, shall be based on the evaluation of project report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**SEE for Mini-project:**

(i) **Single discipline:** Contribution to the Mini-project and the performance of each group member shall be assessed individually in the semester end examination (SEE) conducted at the department.

(ii) **Interdisciplinary:** Contribution to the Mini-project and the performance of each group member shall be assessed individually in semester end examination (SEE) conducted separately at the departments to which the student/s belong to.

**Internship:** All the students admitted in III year of BE/B.Tech shall have to undergo mandatory internship of 4 weeks during the vacation of VI and VII semesters and for VII and VIII semesters. A University examination shall be conducted during VIII semester and the prescribed credit shall be included in VIII semester. Internship shall be considered as a part of passing and shall be considered for the award of degree. Those, who do not take up/complete the internship shall be declared fail and shall have to complete during subsequent University examination after satisfying the internship requirements.

**AICTE activity Points:** In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be eligible for the award of degree only after the release of the Eighth semester Grade Card.



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**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**Scheme of Teaching and Examination 2018 – 19**  
**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Effective from the academic year 2018 – 19)**

VII SEMESTER												
Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	18CS71	Artificial-Intelligence and Machine Learning	CS / IS	4	--	--	03	40	60	100	4
2	PCC	18CS72	Big Data Analytics	CS / IS	4	--	--	03	40	60	100	4
3	PEC	18CS73X	Professional Elective – 2	CS / IS	3	--	--	03	40	60	100	3
4	PEC	18CS74X	Professional Elective – 3	CS / IS	3	--	--	03	40	60	100	3
5	OEC	18CS75X	Open Elective –B	CS / IS	3	--	--	03	40	60	100	3
6	PCC	18CSL76	Artificial Intelligence and Machine Learning Laboratory	CS / IS	--	--	2	03	40	60	100	2
7	Project	18CSP77	Project Work Phase – 1	CS / IS	--	--	2	--	100	--	100	1
8	INT	--	Internship	(If not completed during the vacation of VI and VII semesters, it has to be carried out during the intervening vacations of VII and VIII semesters)								
<b>TOTAL</b>					<b>17</b>	<b>--</b>	<b>04</b>	<b>18</b>	<b>340</b>	<b>360</b>	<b>700</b>	<b>20</b>

Note: PCC: Professional core, PEC: Professional Elective, OEC: Open Elective, INT: Internship.

**Professional Elective - 2**

Course code under 18CS73X	Course Title
18CS731	Software Architecture and Design Patterns
18CS732	High Performance Computing
18CS733	Advanced Computer Architectures
18CS734	User Interface Design

**Professional Electives – 3**

Course code under 18CS74X	Course Title
18CS741	Digital Image Processing
18CS742	Network management
18CS743	Natural Language Processing
18CS744	Cryptography
18CS745	Robotic Process Automation Design & Development

**Open Elective –B (Not for CSE/ ISE Programs)**

18CS751	Introduction to Big Data Analytics
18CS752	Python Application Programming
18CS753	Introduction to Artificial Intelligence
18CS754	Introduction to Dot Net framework for Application Development

Students can select any one of the open electives offered by any Department (Please refer to the list of open electives under 18CS75X).

Selection of an open elective is not allowed provided,

- The candidate has studied the same course during the previous semesters of the programme.
- The syllabus content of open elective is similar to that of Departmental core courses or professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the programme.

Registration to electives shall be documented under the guidance of Programme Coordinator/ Adviser/Mentor.

**Project work:** Based on the ability/abilities of the students and recommendations of the mentor, a single discipline or a multidisciplinary project can be assigned to an individual student or to a group having not more than 4 students. In extraordinary cases, like the funded projects requiring students from different disciplines, the project student strength can be 5 or 6.

**CIE procedure for Project Work Phase - 1:**

(i) **Single discipline:** The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide. The CIE marks awarded for the project work phase -1, shall be based on the evaluation of the project work phase -1 Report (covering Literature Survey, Problem identification, Objectives and Methodology), project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the Project report shall be the same for all the batch mates.

(ii) **Interdisciplinary:** Continuous Internal Evaluation shall be group wise at the college level with the participation of all guides of the college. Participation of external guides, if any, is desirable. The CIE marks awarded for the project work phase -1, shall be based on the evaluation of project work phase -1 Report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**Internship:** All the students admitted to III year of BE/B.Tech shall have to undergo mandatory internship of 4 weeks during the vacation of VI and VII semesters and /or VII and VIII semesters. A University examination shall be conducted during VIII semester and the prescribed credit shall be included in VIII semester. Internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take up/complete the internship shall be declared fail and shall have to complete during subsequent University examination after satisfying the internship requirements.

**AICTE activity Points:** In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.



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**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**Scheme of Teaching and Examination 2018 – 19**  
**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Effective from the academic year 2018 – 19)**

VIII SEMESTER												
Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P					
1	PCC	18CS81	Internet of Things	CS / IS	3	--	--	03	40	60	100	3
2	PEC	18CS82X	Professional Elective – 4	CS / IS	3	--	--	03	40	60	100	3
3	Project	18CSP83	Project Work Phase – 2	CS / IS	--	--	2	03	40	60	100	8
4	Seminar	18CSS84	Technical Seminar	CS / IS	--	--	2	03	100	--	100	1
5	INT	18CS185	Internship	(Completed during the intervening vacations of VI and VII semesters and for VII and VIII semesters.)				03	40	60	100	3
<b>TOTAL</b>					<b>06</b>	<b>--</b>	<b>04</b>	<b>15</b>	<b>260</b>	<b>240</b>	<b>500</b>	<b>18</b>

Note: PCC: Professional Core, PEC: Professional Elective, OEC: Open Elective, INT: Internship.

**Professional Electives – 4**

Course code under 18CS82X	Course Title
18CS821	Mobile Computing
18CS822	Storage Area Networks
18CS823	NoSQL, Database
18CS824	Multicore Architecture and Programming

**Project Work CIE procedure for Project Work Phase - 2:**

(i) **Single discipline:** The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide. The CIE marks awarded for the project work phase -2, shall be based on the evaluation of project work phase -2 Report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

(ii) **Interdisciplinary:** Continuous Internal Evaluation shall be group wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work phase -2, shall be based on the evaluation of project work phase -2 Report, project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**SEE for Project Work Phase - 2:**

(i) **Single discipline:** Contribution to the project and the performance of each group member shall be assessed individually in semester end examination (SEE) conducted at the department.

(ii) **Interdisciplinary:** Contribution to the project and the performance of each group member shall be assessed individually in semester end examination (SEE) conducted separately at the departments to which the student/s belong to.

**Internship:** Those, who have not pursued /completed the internship shall be declared as fail and have to complete during subsequent University examination after satisfying the internship requirements

**AICTE activity Points:** In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card. Activity points of the students who have earned the prescribed AICTE activity Points shall be sent the University along with the CIE marks of 8th semester. In case of students who have not satisfied the AICTE activity Points at the end of eighth semester, the column under activity Points shall be marked NSAP (Not Satisfied Activity Points).



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**Outcome Based Education (OBE) and Choice Based Credit System (CBCS)**  
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## III SEMESTER

Sl. No	Course and Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination			Credits	
				Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
				L	T	P	S					
1	BSC 21MAT31	Transform Calculus, Fourier Series and Numerical Techniques	Maths	3	0	0		03	50	50	100	3
2	IPCC 21CS32	Data Structures and Applications	Any CS Board Department	3	0	2		03	50	50	100	4
3	IPCC 21CS33	Analog and Digital Electronics		3	0	2		03	50	50	100	4
4	PCC 21CS34	Computer Organization and Architecture		3	0	0		03	50	50	100	3
5	PCC 21CSL35	Object Oriented Programming with JAVA Laboratory		0	0	2		03	50	50	100	1
6	UHV 21UH36	Social Connect and Responsibility	Any Department	0	0	1		01	50	50	100	1
7	HSMC 21KSK37/47	Samskrutika Kannada	TD and PSB: HSMC	1	0	0		01	50	50	100	1
	HSMC 21KBK37/47	Balake Kannada										
	HSMC 21CIP37/47	Constitution of India and Professional Ethics										
8	AEC 21CS38X/21 CSL38X	Ability Enhancement Course - III	TD: Concerned department PSB: Concerned Board	If offered as Theory Course				01	50	50	100	1
				1	0	0						
				If offered as lab. course				02				
				0	0	2						
<b>Total</b>									<b>400</b>	<b>400</b>	<b>800</b>	<b>18</b>

9	Scheduled activities for III to VIII semesters	NMDC 21NS83	National Service Scheme (NSS)	NSS	All students have to register for any one of the course namely National Service Scheme, Physical Education (PE)(Sports and Athletics) and Yoga with the concerned coordinator of the course during the first week of III semester. The activities shall be carried out from (for 5 semesters) between III semester to VIII semester. SEE in the above courses shall be conducted during VIII semester examinations and the accumulated CIE marks shall be added to the SEE marks. Successful completion of the registered course is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the colander prepared for the NSS, PE and Yoga activities.							
		NMDC 21PE83	Physical Education (PE) (Sports and Athletics)	PE								
		NMDC 21YO83	Yoga	Yoga								

**Course prescribed to lateral entry Diploma holders admitted to III semester B.E./B.Tech programs**

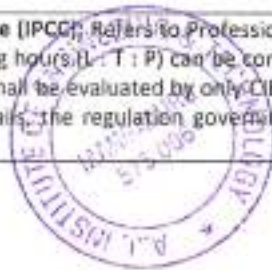
1	NCMC 21MATDIP31	Additional Mathematics - I	Maths	02	02	--	--	---	100	---	100	0
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Note: BSC: Basic Science Course, IPCC: Integrated Professional Core Course, PCC: Professional Core Course, INT –Internship, HSMC: Humanity and Social Science & Management Courses, AEC–Ability Enhancement Courses. UHV: Universal Human Value Course.

L –Lecture, T – Tutorial, P- Practical/ Drawing, S – Self Study Component, CIE: Continuous Internal Evaluation, SEE: Semester End Examination. TD-Teaching Department, PSB: Paper Setting department

21KSK37/47 Samskrutika Kannada is for students who speak, read and write Kannada and 21KBK37/47 Balake Kannada is for non-Kannada speaking, reading, and writing students.

Integrated Professional Core Course (IPCC): Refers to Professional Theory Core Course Integrated with Practicals of the same course. Credit for IPCC can be 04 and its Teaching-Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering (Technology) (BE/B.Tech.) 2021-22 may be referred.



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## IV SEMESTER

Sl. No	Course and Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
				Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
				L	T	P	S					
1	BSC 21CS41	Mathematical Foundations for Computing	Maths	2	2	0		03	50	50	100	3
2	IPCC 21CS42	Design and Analysis of Algorithms	Any CS Board Department	3	0	2		03	50	50	100	4
3	IPCC 21CS43	Microcontroller and Embedded System		3	0	2		03	50	50	100	4
4	PCC 21CS44	Operating System		2	2	0		03	50	50	100	3
5	AEC 21BE45	Biology For Engineers	BT, CHE, PHY	2	0	0		02	50	50	100	2
6	PCC 21CSL46	Python Programming Laboratory	Any CS Board Department	0	0	2		03	50	50	100	1
7	HSMC 21KSK37/47	Sanskrutika Kannada	HSMC	1	0	0		01	50	50	100	1
	HSMC 21KSK37/47	Balake Kannada										
	HSMC 21CIP37/47	Constitution of India & Professional Ethics										
8	AEC 21CS48X/21CS48LX	Ability Enhancement Course- IV	TD and PSB: Concerned department	If offered as theory Course				01	50	50	100	1
				1	0	0						
				If offered as lab. course				02				
0	0	2										
9	UHV 21UH49	Universal Human Values	Any Department	1	0	0		01	50	50	100	1
10	INT 21INT49	Inter/Intra Institutional Internship	Evaluation By the appropriate authorities	Completed during the intervening period of II and III semesters by students admitted to first year of BE./B.Tech and during the intervening period of III and IV semesters by Lateral entry students admitted to III semester.				3	100	--	100	2
<b>Total</b>									<b>550</b>	<b>450</b>	<b>1000</b>	<b>22</b>

**Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs**

1	NCMC 21MATDIP41	Additional Mathematics - II	Maths	02	02	--	--	--	100	--	100	0
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Note: BSC: Basic Science Course, IPCC: Integrated Professional Core Course, PCC: Professional Core Course, AEC -Ability Enhancement Courses, HSMC: Humanity and Social Science and Management Courses, UHV- Universal Human Value Courses.

L -Lecture, T - Tutorial, P- Practical/ Drawing, S - Self Study Component, CIE: Continuous Internal Evaluation, SEE: Semester End Examination.

21KSK37/47 Sanskrutika Kannada is for students who speak, read and write Kannada and 21KSK37/47 Balake Kannada is for non-Kannada speaking, reading, and writing students.

Integrated Professional Core Course (IPCC)- Refers to Professional Theory Core Course Integrated with Practical's of the same course. Credit for IPCC can be 04 and its Teaching - Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from practical part of IPCC shall be included in the SEE question paper. For more details the regulation governing the Degree of Bachelor of Engineering /Technology (BE/B.Tech.) 2021-22 may be referred.



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## V SEMESTER

Sl. No	Course and Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
				Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	T	P	S					
1	BSC 21CS51	Automata Theory and compiler Design	Any CS Board Department	3	0	0		03	50	50	100	3
2	IPCC 21CS52	Computer Networks		3	0	2		03	50	50	100	4
3	PCC 21CS53	Database Management Systems		3	0	0		03	50	50	100	3
4	PCC 21CS54	Artificial Intelligence and Machine Learning		3	0	0		03	50	50	100	3
5	PCC 21CSL55	Database Management Systems Laboratory with Mini Project		0	0	2		03	50	50	100	1
6	AFC 21XX56	Research Methodology & Intellectual Property Rights	TD: Any Department PSB: As identified by university	2	0	0		02	50	50	100	2
7	HSMC 21CIV57	Environmental Studies	TD: Civil/ Environmental /Chemistry/ Biotech. PSB: Civil Engg	1	0	0		1	50	50	100	1
8	AEC 21CS58X/21 CSL58X	Ability Enhancement Course-V	Concerned Board	If offered as Theory courses				01	50	50	100	1
				1	0	0						
				If offered as lab. courses				02				
				0	0	2						
<b>Total</b>									<b>400</b>	<b>400</b>	<b>800</b>	<b>18</b>

## Ability Enhancement Course - IV

21CSL581	Angular JS and Node JS	21CS583	
21CS582	C# and .Net Framework	21CS584	

Note: BSC: Basic Science Course, PCC: Professional Core Course, IPCC: Integrated Professional Core Course, AEC –Ability Enhancement Course INT – Internship, HSMC: Humanity and Social Science & Management Courses.

L –Lecture, T – Tutorial, P- Practical/ Drawing, S – Self Study Component, CIE: Continuous Internal Evaluation, SEE: Semester End Examination.

**Integrated Professional Core Course (IPCC):** refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching – Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). Theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by CIE only and there shall be no SEE. For more details the regulation governing the Degree of Bachelor of Engineering /Technology (BE/B.Tech.) 2021-22 may be referred.



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## VI SEMESTER

Sl. No	Course and Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (P5B)	Teaching Hours /Week				Examination			Credits	
				Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
				L	T	P	S					
1	HSMC 21CS61	Software Engineering and Project Management	Any CS Board Department	2	2	0		03	50	50	100	3
2	IPCC 21CS62	Fullstack Development		3	0	2		03	50	50	100	4
3	PCC 21IS63	Software Testing		3	0	0		03	50	50	100	3
4	PEC 21XX64x	Professional Elective Course-I		3	0	0		03	50	50	100	3
5	OEC 21XX65x	Open Elective Course-I	Concerned Department	3	0	0		03	50	50	100	3
6	PCC 21ISL66	Software Testing Laboratory	Any CS Board Department	0	0	2		03	50	50	100	1
7	MP 21ISM67	Mini Project		Two contact hours /week for interaction between the faculty and students.				--	100	--	100	2
8	INT 21INT68	Innovation/Entrepreneurship /Societal Internship	Completed during the intervening period of IV and V semesters.					--	100	--	100	3
								<b>Total</b>	<b>500</b>	<b>300</b>	<b>800</b>	<b>22</b>

## Professional Elective - I

21CS641	Agile Technology	21IS643	Data Mining and Data warehousing
21CS642	Advanced JAVA Programming	21CS644	Data science and Visualization

## Open Electives – I offered by the Department to other Department students

21CS651	Introduction to Data Structures	21CS653	Introduction to Cyber Security
21CS652	Introduction to Database Management Systems	21CS654	Programming in JAVA

**Note:** HSMC: Humanity and Social Science & Management Courses, IPCC: Integrated Professional Core Course, PCC: Professional Core Course, PEC: Professional Elective Courses, OEC—Open Elective Course, MP—Mini Project, INT—Internship.

L—Lecture, T—Tutorial, P - Practical / Drawing, S— Self Study Component, CIE: Continuous Internal Evaluation, SEE: Semester End Examination.

**Integrated Professional Core Course (IPCC):** Refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching – Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by CIE only and there shall be no SEE. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (BE/B.Tech) 2021-22 may be referred.

## Professional Elective Courses (PEC):

A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of engineering. Each group will provide an option to select one course out of five courses. The minimum students' strength for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the programme is less than 10.

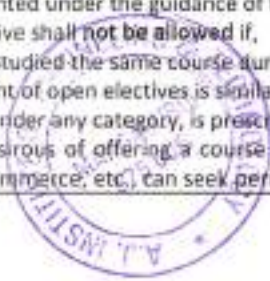
## Open Elective Courses:

Students belonging to a particular stream of Engineering and Technology are not entitled for the open electives offered by their parent Department. However, they can opt an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor.

Selection of an open elective shall **not be allowed** if,

- The candidate has studied the same course during the previous semesters of the program.
- The syllabus content of open electives is similar to that of the Departmental core courses or professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the program.

In case, any college is desirous of offering a course (not included in the Open Elective List of the University) from streams such as Law, Business (MBA), Medicine, Arts, Commerce, etc., can seek permission, at least one month before the commencement of the semester, from the University by



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Swappable VII and VIII SEMESTER

**VII SEMESTER**

Sl. No	Course and Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
				Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	T	P	S					
1	PCC 21IS71	Cryptography and Network Security	Any CS Board Department	3	0	0		3	50	50	100	3
2	PCC 21CS72	Cloud Computing		2	0	0		3	50	50	100	2
3	PEC 21XX73X	Professional elective Course-II		3	0	0		3	50	50	100	3
4	PEC 21XX74X	Professional elective Course-III		3	0	0		3	50	50	100	3
5	O/E 21XX75X	Open elective Course-II	Concerned Department	3	0	0		3	50	50	100	3
6	Project 21ISP76	Project work		Two contact hours /week for interaction between the faculty and students.				3	100	100	200	10
<b>Total</b>								<b>350</b>	<b>350</b>	<b>700</b>	<b>24</b>	

**VIII SEMESTER**

Sl. No	Course and Course Code	Course Title	Teaching Department	Teaching Hours /Week				Examination				Credits
				Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	T	P	S					
1	Seminar 21IS81	Technical Seminar		One contact hour /week for interaction between the faculty and students.				--	100	--	100	01
2	INT 21INT82	Research Internship/ Industry Internship		Two contact hours /week for interaction between the faculty and students.				03 (Batch wise )	100	100	200	15
3	NCC 21NS83 21PE83 21YO83	National Service Scheme (NSS)	NSS	Completed during the intervening period of III semester to VIII semester.				--	50	50	100	0
		Physical Education (PE) (Sports and Athletics)	PE									
		Yoga	Yoga									
<b>Total</b>								<b>250</b>	<b>150</b>	<b>400</b>	<b>16</b>	

**Professional Elective - II**

21CS731	Object oriented Modelling and Design	21CS734	Blockchain Technology
21CS732	Digital Image Processing	21CS735	Internet of Things
21IS733	User Interface Design		

**Professional Elective - III**

21CS741	Software Architecture and Design Patterns	21CS744	Robotic Process Automation Design and Development
21IS742	File structures	21CS745	NOSQL Database
21CS743	Deep Learning		



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III SEMESTER													
Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC/BS C	BCS301	Mathematics for Computer Science	TD: Maths PSB: Maths	3	2	0		03	50	50	100	4
2	IPCC	BCS302	Digital Design & Computer Organization	TD: IS PSB: CS	3	0	2		03	50	50	100	4
3	IPCC	BCS303	Operating Systems	TD: IS PSB: CS	3	0	2		03	50	50	100	4
4	PCC	BCS304	Data Structures and Applications	TD: IS PSB: CS	3	0	0		03	50	50	100	3
5	PCCL	BCSL305	Data Structures Lab	TD: IS PSB: CS	0	0	2		03	50	50	100	1
6	ESC	BCS306x	ESC/ETC/PLC	TD: IS PSB: CS	2	0	2		03	50	50	100	3
7	UHV	BSCK307	<b>Social Connect and Responsibility</b>	Any Department	0	0	2		01	100	---	100	1
8	AEC/ SEC	BCS358x	Ability Enhancement Course/Skill Enhancement Course – III	TD : Concerned department PSB: CS	If the course is a Theory				01	50	50	100	1
					1	0	0						
					If a course is a laboratory				02				
		0	0	2									
9	MC	BNSK359	<b>National Service Scheme (NSS)</b>	NSS coordinator	0	0	2			100	---	100	0
		BPEK359	<b>Physical Education (PE) (Sports and Athletics)</b>	Physical Education Director									
		BYOK359	<b>Yoga</b>	Yoga Teacher									
<b>Total</b>									<b>550</b>	<b>350</b>	<b>900</b>	<b>21</b>	

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IV SEMESTER													
Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credit
					Theory Lecture	Tutorial	Practical / Drawings	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PCC/BS C	BCS401	Analysis & Design of Algorithms	TD: IS PSB: CS	3	0	0		03	50	50	100	3
2	IPCC	BIS402	Advanced Java	TD: IS PSB: CS	3	0	2		03	50	50	100	4
3	IPCC	BCS403	Database Management Systems	TD: IS PSB: CS	3	0	2		03	50	50	100	4
4	PCCL	BCSL404	Analysis & Design of Algorithms Lab	TD: IS PSB: CS	0	0	2		03	50	50	100	1
5	ESC	BCS405x	ESC/ETC/PLC	TD: IS/Maths PSB: IS/Maths	2	2	0		03	50	50	100	3
6	AEC/SEC	BCS456x	Ability Enhancement Course/Skill Enhancement Course- IV	TD: Concerned department PSB: CS	If the course is Theory				01	50	50	100	1
					1	0	0						
					If the course is a lab				02				
0	0	2											
4	BSC	BBOK407	Biology For Engineers (Information Technology in Biology)	TD / PSB: BT, CHE,	2	0	0		03	50	50	100	3
7	UHV	BUHK408	Universal human values course	Any Department	1	0	0		01	50	50	100	1
9	MC	BNSK459	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	100	0	
		BPEK459	Physical Education (PE) Sports and Athletics	Physical Education Director									



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V SEMESTER													
Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			C red it s	
					The ory Lect ure	T u t o r i a l	Prac tical / Dra win g	SDA	Dur ation in hou rs	CIE Mar ks	SEE Mark s		Total Mar ks
1	HSMS	BIS501	Software Engineering & Project Management (This course must be pertaining to economics and management of the concerned degree program. The course syllabus should have both economics and management topics and the course title should bear the word Management.)	TD: IS PSB: IS	3	0	0		03	50	50	100	3
2	IPCC	BIS502	Computer Networks	TD: IS PSB: IS	3	0	2		03	50	50	100	4
3	PCC	BIS503	Theory of Computations	TD: IS PSB: IS	3	2	0		03	50	50	100	4
4	PCCL	BISL504	Data Visualization Lab	TD: IS PSB: IS	0	0	2		03	50	50	100	1
5	PEC	BIS515x	Professional Elective Course	TD: IS PSB: IS	3	0	0		03	50	50	100	3
6	PROJ	BIS586	Mini Project	TD: IS PSB: IS	0	0	4		03	100		100	2
7	AEC	BRMK557	Research Methodology and IPR	TD: HSM PSB : HSM	2	2	0		02	50	50	100	3
8	MC	BESK508	Environmental Studies	TD: HSM PSB : HSM	2	0	0		02	50	50	100	2
9	MC	BNSK559	National Service Scheme (NSS)	NSS coordinator	0	0	2			100		100	0
		BPEK559	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK559	Yoga	Yoga Teacher									



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VI SEMESTER													
Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	IPCC	BIS601	Full Stack Development	TD: IS PSB: IS	3	0	2		03	50	50	100	4
2	PCC	BIS602	Machine Learning	TD: IS PSB: IS	4	0	0		03	50	50	100	4
3	PEC	BIS613x	Professional Elective Course	TD: IS PSB: IS	3	0	0		03	50	50	100	3
4	OEC	BIS654x	Open Elective Course	TD: IS PSB: IS	3	0	0		03	50	50	100	3
5	PROJ	BIS685	Project Phase I	TD: IS PSB: IS	0	0	4		03	100	--	100	2
6	PCCL	BISL606	Machine Learning lab	TD: IS PSB: IS	0	0	2		03	50	50	100	1
7	AEC/SDC	BIS657x	Ability Enhancement Course/Skill Development Course V	TD and PSB: Concerned department	If the course is offered as a Theory				01	50	50	100	1
					1	0	0						
					If course is offered as a practical								
					0	0	2						
8	MC	BNSK658	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	--	100	0
		BPEK658	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK658	Yoga	Yoga Teacher									
									<b>Total</b>	<b>500</b>	<b>300</b>	<b>800</b>	<b>18</b>
<b>Professional Elective Course</b>													
BIS613A		Blockchain Technology		BIS613C		Compiler Design							
BIS613B		Internet of Things		BIS613D		Cloud Computing							
<b>Open Elective Course</b>													



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VII SEMESTER (Swappable VII and VIII SEMESTER)													
Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks		Total Marks
1	IPCC	BIS701	Big Data Analytics	TD: IS PSB: IS	3	0	2		03	50	50	100	4
2	IPCC	BIS702	Parallel Computing	TD: IS PSB: IS	3	0	2		03	50	50	100	4
3	PCC	BIS703	Information & Network Security	TD: IS PSB: IS	4	0	0		03	50	50	100	4
4	PEC	BIS714x	Professional Elective Course	TD: IS PSB: IS	3	0	0		03	50	50	100	3
5	OEC	BIS755x	Open Elective Course	TD: IS PSB: IS	3	0	0		01	50	50	100	3
6	PROJ	BIS786	Major Project Phase-II	TD: IS PSB: IS	0	0	12		03	100	100	200	6
										400	300	700	24
<b>Professional Elective Course</b>													
BIS714A		Deep Learning		BIS714C		Embedded Systems							
BIS714B		Software Quality Assurance		BIS714D		Distributed File Systems							
<b>Open Elective Course</b>													
BIS755A		Introduction to DBMS		BIS755C		Software Engineering							
BIS755B		Introduction to Algorithms		BIS755D									
<p>PCC: Professional Core Course, PCCL: Professional Core Course laboratory, PEC: Professional Elective Course, OEC: Open Elective Course PR: Project Work, L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation. TD- Teaching Department, PSB: Paper Setting department, OEC: Open Elective Course, PEC: Professional Elective Course. PROJ: Project work</p>													
<p><b>Note: VII and VIII semesters of IV years of the program</b>  <b>(1) Institutions can swap the VII and VIII Semester Schemes of Teaching and Examinations to accommodate research internships/ industry internships after the VI</b></p>													



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question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**SEE procedure for Project Work:** SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25.

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**VIII SEMESTER (Swappable VII and VIII SEMESTER)**

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	PEC	BIS801x	Professional Elective (Online Courses) Only through NPTEL	PSB: IS	3	0	0		03	50	50	100	3
2	OEC	BIS802x	Open Elective (Online Courses) Only through NPTEL	PSB: IS	3	0	0		01	50	50	100	3
3	INT	BIS803	Internship (Industry/Research) (14 - 20 weeks)		0	0	12		03	100	100	200	10
										200	200	400	16

**Professional Elective Course (Online courses)**

BIS801A BOS will publish courses based on the availability

BIS801C

BIS801B

BIS801D

**Open Elective Courses (Online Courses)**

BIS802A BOS will publish courses based on the availability

BIS802C

BIS802B

BIS802D

L: Lecture, T: Tutorial, P: Practical S= SDA: Skill Development Activity, CIE: Continuous Internal Evaluation, SEE: Semester End Evaluation. TD- Teaching Department, PSB: Paper Setting department, OEC: Open Elective Course, PEC: Professional Elective Course. PROJ: Project work, INT: Industry Internship / Research Internship / Rural Internship

**Note: VII and VIII semesters of IV years of the program Swapping Facility**

- Institutions can swap VII and VIII Semester Scheme of Teaching and Examinations to accommodate research internships/ Industry Internships/Rural Internship

