

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI  
**B.E. in Robotics & Automation**  
**Scheme of Teaching and Examinations 2022**  
 Outcome Based Education (OBE) and Choice Based Credit System (CBCS)  
 (Effective from the academic year 2023-24)

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	BRA301	Fundamentals of Robotics & Applications	TD- ME, AU, IM PSB-ME	3	0	0		03	50	50	100	3
2	IPCC	BRA302	Strength of Material for Robotics System	TD: ME, AU, IM PSB- ME	3	0	2		03	50	50	100	4
3	IPCC	BRA303	Analog & Digital Electronic Circuits	TD: E&CE, TC, ET, EEE PSB-E&CE, EEE	3	0	2		03	50	50	100	4
4	PCC	BRA304	Manufacturing methods for robotics components	TD- ME, AU, IM PSB-ME	3	0	0		03	50	50	100	3
5	PCCL	BRAL305	Computer Aided Robotic System Drawing Any cad modeling software	TD- ME, AU, IM PSB-ME	0	0	2		03	50	50	100	1
6	ESC	BRA306x	ESC/ETC/PLC	TD: ME, CS&E, E&CE, EEE PSB:RESPECTIVE BOARD	3	0	0		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	BRA358x	Ability Enhancement Course/Skill Enhancement Course - III	If the course is a Theory					02	50	50	100	1
				2	0	0							
				If a course is a laboratory					03				
0	0	3											
9	MC	BNSK359	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		BPEK359	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK359	Yoga	Yoga Teacher									
<b>Total</b>									<b>550</b>	<b>350</b>	<b>900</b>	<b>20</b>	

**PCC:** Professional Core Course, **PCCL:** Professional Core Course laboratory, **UHV:** Universal Human Value Course, **MC:** Mandatory Course (Non-credit), **AEC:** Ability Enhancement Course, **SEC:** Skill Enhancement Course, **L:** Lecture, **T:** Tutorial, **P:** Practical **S= SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **K :** This letter in the course code indicates common to all the stream of engineering. **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course

#### Engineering Science Course (ESC/ETC/PLC)

BRA306A	Introduction to MATLAB & SIMULINK	BRA306C	Spreadsheet for Engineering
BRA306B	Data structure & Applications	BRA306D	Numerical Method for Engineering

#### Ability Enhancement Course – III

BRA358A	Introduction to Python programming	BRA358C	Virtual Reality App Development
BRA358B	Mobile Apps Development	BRA358D	Introduction to CNC Programming

**Professional Core Course (IPCC):** Refers to Professional Core Course Theory 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 (B.E./B.Tech.) 2022-23 may please be referred.

**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score 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 calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

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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	PCC	BRA401	Virtual Instrumentation	TD: ME, IP, AU PSB: ME	3	0	0		03	50	50	100	3
2	IPCC	BRA402	Microcontrollers for robotics (Including 32 bit MC)	TD: EE, E&CE, TC PSB: E&CE	3	0	2		03	50	50	100	4
3	IPCC	BRA403	Introduction Robot Kinematics & Dynamics	TD: ME, IP, AU PSB: ME	3	0	2		03	50	50	100	4
4	PCC	BRAL404	Robot Simulation and Programming	TD: BT, CHE, ME PSB: BT	0	0	2		03	50	50	100	1
5	ESC	BRA405x	ESC/ETC/PLC	TD: ME, CS&E, E&CE, EEE PSB: RESPECTIVE BOARD	3	0	0		03	50	50	100	3
6	AEC/ SEC	BRA456x	Ability Enhancement Course/Skill Enhancement Course- IV	TD and PSB: Concerned department	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	BOK407	Biology For Engineers	TD / PSB: BT, CHE,	3	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									
		BYOK459	Yoga	Yoga Teacher									
<b>Total</b>									<b>500</b>	<b>400</b>	<b>900</b>	<b>20</b>	

<b>PCC:</b> Professional Core Course, <b>PCCL:</b> Professional Core Course laboratory, <b>UHV:</b> Universal Human Value Course, <b>MC:</b> Mandatory Course (Non-credit), <b>AEC:</b> Ability Enhancement Course, <b>SEC:</b> Skill Enhancement Course, <b>L:</b> Lecture, <b>T:</b> Tutorial, <b>P:</b> Practical <b>S= SDA:</b> Skill Development Activity, <b>CIE:</b> Continuous Internal Evaluation, <b>SEE:</b> Semester End Evaluation. <b>K :</b> This letter in the course code indicates common to all the stream of engineering.			
<b>Ability Enhancement Course / Skill Enhancement Course - IV</b>			
BRA456A	Sensor & Actuator	BRA456C	Fuzzy logics for Robots
BRA456B	Smart Material	BRA456D	Introduction AGVS
<b>Engineering Science Course (ESC/ETC/PLC)</b>			
BRA405A	Introduction to AI ML	BRA405C	Application to OCTAVE
BRA405B	Application Raspberry Pi Control	BRA405D	Application to Arduino Uno and Types
<p><b>Professional Core Course (IPCC):</b> Refers to Professional Core Course Theory 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 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 (B.E./B.Tech.) 2022-23</p> <p><b>National Service Scheme /Physical Education/Yoga:</b> All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score 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 calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses is mandatory for the award of degree.</p>			

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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	HSMS	BRA501	Design of Machine Elements	TD: ME, IP, IM PSB: ME	3	0	0		03	50	50	100	3
2	IPCC	BRA502	Measurement System	TD: ME, IP, IM PSB: ME	3	0	2		03	50	50	100	4
3	PCC	BRA503	Electrical Machines And Power Systems	TD: CS&E, IS&E, E&CE PSB: E&CE	4	0	0		03	50	50	100	4
4	PCCL	BRAL504	Hydraulics and Pneumatics for Robotics	TD: CS&E, IS&E, E&CE PSB: CS&E	0	0	2		03	50	50	100	1
5	PEC	BRA515x	Professional Elective Course	TD and PSB: Concerned department	3	0	0		03	50	50	100	3
6	PROJ	BRA586	Mini Project	TD and PSB: Concerned department	0	0	4		03	100		100	2
7	AEC	BRMK557	Research Methodology and IPR	TD: Any Department PSB: As Defined by University	2	2	0		02	50	50	100	3
8	MC	BESK508	Environmental Studies	TD: Civil/ Environmental/Chemistry /Biotech PSB: Civil Engineering	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									
<b>Total</b>									<b>500</b>	<b>300</b>	<b>800</b>	<b>22</b>	
<b>Professional Elective Course</b>													

BRA515A	Java Programming	BRA515C	Image Processing for Robotics
BRA515B	Micro Robots	BRA515D	Wireless Networks and Sensor for Robots
<p><b>PCC:</b> Professional Core Course, <b>PCCL:</b> Professional Core Course laboratory, <b>UHV:</b> Universal Human Value Course, <b>MC:</b> Mandatory Course (Non-credit), <b>AEC:</b> Ability Enhancement Course, <b>SEC:</b> Skill Enhancement Course, <b>L:</b> Lecture, <b>T:</b> Tutorial, <b>P:</b> Practical <b>S= SDA:</b> Skill Development Activity, <b>CIE:</b> Continuous Internal Evaluation, <b>SEE:</b> Semester End Evaluation. <b>K :</b> The letter in the course code indicates common to al the stream of engineering. <b>PROJ:</b> Project /Mini Project. <b>PEC:</b> Professional Elective Course</p>			
<p><b>Professional Core Course (IPCC):</b> Refers to Professional Core Course Theory 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 (B.E./B.Tech.) 2022-23</p>			
<p><b>National Service Scheme /Physical Education/Yoga:</b> All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score 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 calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.</p>			
<p><b>Mini-project work:</b> Mini Project is a laboratory-oriented/hand on course that will provide a platform to students to enhance their practical knowledge and skills by the development of small systems/applications etc. Based on the ability/abilities of the student/s 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.</p>			
<p><b>CIE procedure for Mini-project:</b></p> <p><b>(i) Single discipline:</b> The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two faculty members of the Department, one of them being the Guide. The CIE marks awarded for the Mini-project work shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio of 50:25:25. The marks awarded for the project report shall be the same for all the batches mates.</p> <p><b>(ii) Interdisciplinary:</b> Continuous Internal Evaluation shall be group-wise at the college level with the participation of all the guides of the project. The CIE marks awarded for the Mini-project, shall be based on the evaluation of the 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.</p>			
<p><b>No SEE component for Mini-Project.</b></p>			
<p><b>Professional Elective Courses (PEC):</b> 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. The minimum number of students’ strengths for offering a professional elective is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.</p>			

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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	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	IPCC	BRA601	Design Automation with IoT	TD: EE, E&CE, ME PSB: ME	3	0	2		03	50	50	100	4
2	PCC	BRA602	PLC and SCADA	TD: EE, E&CE, ME PSB: ME	4	0	0		03	50	50	100	4
3	PEC	BRA613x	Professional Elective Course	Concerned Department	3	0	0		03	50	50	100	3
4	OEC	BRA654x	Open Elective Course	Concerned Department	3	0	0		03	50	50	100	3
5	PROJ	BRA685	Project Phase I	RA/AR/R&AI	0	0	4		03	100	--	100	2
6	PCCL	BRAL606	Computer Aided Modeling and Analysis lab	TD: EE, E&CE, ME PSB: ME	0	0	2		03	50	50	100	1
7	AEC/SDC	BRA657x	Ability Enhancement Course/ Skill Development Course V	RA/ME	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>													
BRA613A	Finite element Method			BRA613C	3D Printing								
BRA613B	Humanoid Robots			BRA613D	Thermal Engineering								
<b>Open Elective Course</b>													
BRA654A	Automotive Electronics			BRA654C	Medical Robots								
BRA654B	Computer Integrated Machining (CIM)			BRA654D	Biomedical application of Robots								

Ability Enhancement Course / Skill Enhancement Course-V			
BRA657A	Space Science Engineering & Application	BRA657C	Micro Aerial Vehicle
BRA657B	Total quality Management	BRA657D	Advanced Embedded System
<p><b>PCC:</b> Professional Core Course, <b>PCCL:</b> Professional Core Course laboratory, <b>UHV:</b> Universal Human Value Course, <b>MC:</b> Mandatory Course (Non-credit), <b>AEC:</b> Ability Enhancement Course, <b>SEC:</b> Skill Enhancement Course, <b>L:</b> Lecture, <b>T:</b> Tutorial, <b>P:</b> Practical <b>S= SDA:</b> Skill Development Activity, <b>CIE:</b> Continuous Internal Evaluation, <b>SEE:</b> Semester End Evaluation. <b>K :</b> The letter in the course code indicates common to al the stream of engineering. <b>PROJ:</b> Project /Mini Project. <b>PEC:</b> Professional Elective Course. <b>PROJ:</b> Project Phase -I, <b>OEC:</b> Open Elective Course</p>			
<p><b>Professional Core Course (IPCC):</b> Refers to Professional Core Course Theory 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 (B.E./B.Tech.) 2022-23</p>			
<p><b>National Service Scheme /Physical Education/Yoga:</b> All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score 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 calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.</p>			
<p><b>Professional Elective Courses (PEC):</b> 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. The minimum number of students’ strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.</p>			
<p><b>Open Elective Courses:</b> Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for 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. The minimum numbers of students’ strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.</p>			
<p><b>Project Phase-I :</b> Students have to discuss with the mentor /guide and with their help he/she has to complete the literature survey and prepare the report and finally define the problem statement for the project work.</p>			



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

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question and 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	IPCC	BRA701	Data Science	TD: CS&E, IS&E, EE PSB: CS&E	3	0	2		03	50	50	100	4
2	IPCC	BRA702	Industrial Data Network	TD: IP, E&CE, ME PSB: ME	3	0	2		03	50	50	100	4
3	PCC	BRA703	Robots for Agricultural Applications	TD: BT, E&CE, ME PSB: BT	4	0	0		03	50	50	100	4
4	PEC	BRA714x	<b>Professional Elective Course</b>	RA	3	0	0		03	50	50	100	3
5	OEC	BRA755x	<b>Open Elective Course</b>	RA	3	0	0		01	50	50	100	3
6	PROJ	BRA786	<b>Major Project Phase-II</b>	RA/AR/R&AI	0	0	12		03	100	100	200	6
										<b>400</b>	<b>300</b>	<b>700</b>	<b>24</b>

**Professional Elective Course**

BRA714A	Cloud Manufacturing	BRA714C	Micro and Nano Robots
BRA714B	Rehabilitation of Robots	BRA714D	Design of Robot and end effectors

**Open Elective Course**

BRA755A	Micro and Smart System Technology	BRA755C	Smart Sensor
BRA755B	Industry 4.0	BRA755D	Non distractive testing & Evaluation

**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

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

**(1)** Institutions can swap the VII and VIII Semester Schemes of Teaching and Examinations to accommodate research internships/ industry internships after the VI semester.

**(2)** Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether the VII

or VIII semesters is completed during the beginning of the IV year or the later part of IV years of the program.

**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. The minimum number of students' strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

**Open Elective Courses:**

Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for 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. The minimum numbers of students' strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.

**PROJECT WORK (21XXP75):** The objective of the Project work is

- (i) To encourage independent learning and the innovative attitude of the students.
- (ii) To develop interactive attitude, communication skills, organization, time management, and presentation skills.
- (iii) To impart flexibility and adaptability.
- (iv) To inspire team working.
- (v) To expand intellectual capacity, credibility, judgment and intuition.
- (vi) To adhere to punctuality, setting and meeting deadlines.
- (vii) To install responsibilities to oneself and others.
- (viii) To train students to present the topic of project work in a seminar without any fear, face the audience confidently, enhance communication skills, involve in group discussion to present and exchange ideas.

**CIE procedure for Project Work:**

**(1) 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, shall be based on the evaluation of the project work 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.

**(2) 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, shall be based on the evaluation of project work 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 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	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	PEC	BRA801x	<b>Professional Elective (Online Courses)</b>	Online Courses like, NPTEL/MOOCs/MEMS	3	0	0		03	50	50	100	3
2	OEC	BRA802x	<b>Open Elective (Online Courses)</b>	Online Courses like, NPTEL/MOOCs/MEMS	0	2	0		01	50	50	100	3
3	INT	BRA803	<b>Internship (Industry/Research) (14 - 20 weeks)</b>		0	0	12		03	100	100	200	10
										<b>200</b>	<b>200</b>	<b>400</b>	<b>16</b>

**Professional Elective Course (Online courses)**

BRA801A	Modern Robotics: Mechanics Planning, and Control	BRA801C	Robotics: Computational Motion Planning
BRA801B	Aerial Robotics	BRA801D	Robotics and Mechatronics

**Open Elective Courses (Online Courses)**

BRA802A	Introduction to Drones	BRA802C	Robotics and the Geometry of Motion
BRA802B	Artificial Intelligence and Machine Learning in Business	BRA802D	Understanding Robotics Architecture

**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** after the VI semester.
- Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether VII or VIII semester is completed during the beginning of IV year or later part of IV year of the program.

**Elucidation:**

At the beginning of IV years of the program i.e., after VI semester, VII semester classwork and VIII semester **Research Internship /Industrial Internship / Rural Internship** shall be permitted to be operated simultaneously by the University so that students have ample opportunity for an internship. In other words, a good percentage of the class shall attend VII semester classwork and a similar percentage of others shall attend to Research Internship or Industrial Internship or Rural Internship.

Research/Industrial /Rural Internship shall be carried out at an Industry, NGO, MSME, Innovation center, Incubation center, Start-up, center of Excellence (CoE), Study Centre established in the parent institute and /or at reputed research organizations/institutes.

The mandatory Research internship /Industry internship / Rural Internship is for 14 to 20 weeks. The internship shall be considered as a head of passing and shall be considered for the award of a degree. Those, who do not take up/complete the internship shall be declared to fail and shall have to complete it during the subsequent University examination after satisfying the internship requirements.

**Research internship:** A research internship is intended to offer the flavor of current research going on in the research field. It helps students get familiarized with the field and imparts the skill required for carrying out research.

**Industry internship:** Is an extended period of work experience undertaken by students to supplement their degree for professional development. It also helps them learn to overcome unexpected obstacles and successfully navigate organizations, perspectives, and cultures. Dealing with contingencies helps students recognize, appreciate, and adapt to organizational realities by tempering their knowledge with practical constraints.

**Rural Internship:** Rural development internship is an initiative of Unnat Bharat Abhiyan Cell, RGIT in association with AICTE to involve students of all departments studying in different academic years for exploring various opportunities in techno-social fields, to connect and work with Rural India for their upliftment.

The faculty coordinator or mentor has to monitor the student's internship progress and interact with them to guide for the successful completion of the internship.

The students are permitted to carry out the internship anywhere in India or abroad. University shall not bear any expenses incurred in respect of the internship.

With the consent of the internal guide and Principal of the Institution, students shall be allowed to carry out the internship at their hometown (**within or outside the state or abroad**), provided favorable facilities are available for the internship and the student remains regularly in contact with the internal guide. **University shall not bear any cost involved in carrying out the internship by students.** However, students can receive any financial assistance extended by the organization.

**Professional Elective /Open Elective Course:** These are ONLINE courses suggested by the respective Board of Studies. Details of these courses shall be made available for students on the VTU web portal.