

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELAGAVI**

**BE ELECTRICAL AND ELECTRONICS ENGINEERING
Scheme of Teaching and Examinations
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2018 – 19)**

Approved by BOS held on 24/5/2019

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 (Common to all Branches)	Mathematics	2	2	--	03	40	60	100	3
2	PCC	18EE32	Electric Circuit Analysis	EEE	3	2	--	03	40	60	100	4
3	PCC	18EE33	Transformers and Generators	EEE	3	0	--	03	40	60	100	3
4	PCC	18 EE 34	Analog Electronic Circuits	EEE	2	2	--	03	40	60	100	3
5	PCC	18 EE 35	Digital System Design	EEE	3	0	--	03	40	60	100	3
6	PCC	18 EE 36	Electrical and Electronic Measurements	EEE	3	0	--	03	40	60	100	3
7	PCC	18 EE L37	Electrical Machines Laboratory -1	EEE	--	2	2	03	40	60	100	2
8	PCC	18 EE L38	Electronics Laboratory	EEE	--	2	2	03	40	60	100	2
9	HSMC	18KVK39/49	Vyavaharika Kannada (Kannada for communication)/	HSMC	--	2	--	--	100	--	100	1
		18KAK39/49	Aadalitha Kannada (Kannada for Administration)									
		OR										
		18CPC39	Constitution of India, Professional Ethics and Cyber Law									
TOTAL					16	10	04	24	420	480	900	24
					OR	OR		OR	OR	OR		
					17	12		26	360	540		

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

18KVK39Vyavaharika Kannada (Kannada for communication) is for non-Kannada speaking, reading and writing students and 18KAK39 Aadalitha 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 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

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.

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IVSEMESTER												
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	18 EE42	Power Generation and Economics	EEE	3	0	--	03	40	60	100	3
3	PCC	18 EE43	Transmission and Distribution	EEE	3	2	--	03	40	60	100	4
4	PCC	18 EE44	Electric Motors	EEE	3	0	--	03	40	60	100	3
5	PCC	18 EE45	Electromagnetic Field Theory	EEE	2	2	--	03	40	60	100	3
6	PCC	18 EE46	Operational Amplifiers and Linear ICs	EEE	3	0	--	03	40	60	100	3
7	PCC	18 EEL47	Electrical Machines Laboratory -2	EEE	--	2	2	03	40	60	100	2
8	PCC	18 EEL48	Op- amp and Linear ICs Laboratory	EEE	--	2	2	03	40	60	100	2
9	HSMC	18KVK39/49	Vyavaharika Kannada (Kannada for communication)/	HSMC	--	2	--	--	100	--	100	1
		18KAK39/49	Aadalitha Kannada (Kannada for Administration)									
		OR										
		18CPH49	Constitution of India, Professional Ethics and Cyber Law		1	--	--	02	40	60		
TOTAL					16	10		24	420	480	900	24
					OR	OR	04	OR	OR	OR		
					17	12		26	360	540		

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

18KVK39/49Vyavaharika Kannada (Kannada for communication) is for non-Kannada speaking, reading and writing students and 18KAK39/49 Aadalitha 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 students have to fulfill 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

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: 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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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	PCC	18 EE51	Management and Entrepreneurship	EEE	3	0	--	03	40	60	100	3
2	PCC	18 EE52	Microcontroller	EEE	3	2	--	03	40	60	100	4
3	PCC	18 EE53	Power Electronics	EEE	3	2	--	03	40	60	100	4
4	PCC	18 EE54	Signals and Systems	EEE	3	--	--	03	40	60	100	3
5	PCC	18 EE55	Electrical Machine Design	EEE	3	--	--	03	40	60	100	3
6	PCC	18 EE56	High Voltage Engineering	EEE	3	--	--	03	40	60	100	3
7	PCC	18 EEL57	Microcontroller Laboratory	EEE	--	2	2	03	40	60	100	2
8	PCC	18 EEL58	Power Electronics Laboratory	EEE	--	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
TOTAL					18	10	4	26	360	540	900	25

Note: PCC: Professional Core, HSMC: Humanity and Social Science.

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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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	18 EE61	Control Systems	EEE	3	2	--	03	40	60	100	4
2	PCC	18 EE62	Power System Analysis – 1	EEE	3	2	--	03	40	60	100	4
3	PCC	18 EE63	Digital Signal Processing	EEE	3	2	--	03	40	60	100	4
4	PEC	18 EE64X	Professional Elective -1	EEE	3	--	--	03	40	60	100	3
5	OEC	18 EE65X	Open Elective -A	EEE	3	--	--	03	40	60	100	3
6	PCC	18 EEL66	Control System Laboratory	EEE	--	2	2	03	40	60	100	2
7	PCC	18 EEL67	Digital Signal Processing Laboratory	EEE	--	2	2	03	40	60	100	2
8	MP	18 EEMP68	Mini-project		--	--	2	03	40	60	100	2
9	Internship	--	Internship	To be carried out during the vacation/s of VI and VII semesters and /or VII and VIII semesters.								
TOTAL					15	10	06	24	320	480	800	24

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

Professional Elective -1

Course code under 18XX64X	Course Title
18 EE641	Introduction to Nuclear Power
18 EE642	Electrical Engineering Materials
18 EE643	Computer Aided Electrical Drawing
18 EE644	Embedded System
18 EE645	Object Oriented Programming using C++
18EE646	Electric Vehicles Technologies
18EE647	Sensors and Transducers

Open Elective -A

Students can select any one of the open electives offered by other Departments except those that are offered by the parent Department (Please refer to the list of open electives under 18XX65X).

Selection of an open elective shall not be allowed if,

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 the 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/ Advisor/Mentor.

Mini-project work:

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.

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 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 ⁶earning 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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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
					L	T	P					
1	PCC	18 EE71	Power System Analysis – 2	EEE	2	2	--	03	40	60	100	3
2	PCC	18 EE72	Power System Protection	EEE	3	--	--	03	40	60	100	3
3	PEC	18 EE73X	Professional Elective - 2	EEE	3	--	--	03	40	60	100	3
4	PEC	18 EE74X	Professional Elective - 3	EEE	3	--	--	03	40	60	100	3
5	OEC	18 EE75X	Open Elective -B	EEE	3	--	--	03	40	60	100	3
6	PCC	18 EEL76	PSS laboratory	EEE	--	2	2	03	40	60	100	2
7	PCC	18 EEL77	Relay & HV lab	EEE	--	2	2	03	40	60	100	2
8	Project	18 EEP78	Project Work Phase - 1	EEE	--	--	2	--	100	--	100	1
9	Internship	--	Internship	(If not completed during the vacation of VI and VII semesters, it shall be carried out during the vacation of VII and VIII semesters)								
TOTAL					14	06	06	21	380	420	800	20

Note: PCC: Professional core, PEC: Professional Elective.

Professional Elective - 2

Course code under 18XX73X	Course Title
18EE731	Solar and Wind Energy
18EE732	Micro and Nano Scale Sensors and Transducers
18 EE733	Integrated of Distribution Generation.
18 EE734	Advanced Control Systems
18 EE735	Reactive Power Control in Electric Power Systems

Professional Electives - 3

Course code under 18 EE74X	Course Title
18 EE741	Industrial Drives and Application
18 EE742	Utilization of Electrical Power
18 EE743	AI Techniques for Electrical and hybrid Electric Vehicles
18 EE744	Smart Grid
18 EE745	Artificial Neural Network With Applications to Power Systems

Open Elective -B

Students can select any one of the open electives offered by other Departments except those that are offered by the parent Department (Please refer to the list of open electives under 18XX75X).

Selection of an open elective shall not be allowed if,

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 the 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/ Advisor/Mentor.

Project work:

Based on the ability/abilities of the student/s 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 guide/s, 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 (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.

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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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	18EE81	Power System Operation and Control	EEE	3	--	--	03	40	60	100	3
2	PEC	18EE82X	Professional Elective - 4	EEE	3	--	--	03	40	60	100	3
3	Project	18EEP83	Project Work Phase - 2		--	--	2	03	40	60	100	8
4	Seminar	18EES84	Technical Seminar		--	--	2	03	100	--	100	1
5	Internship	18EEI85	Internship	Completed during the vacation/s of VI and VII semesters and /or VII and VIII semesters.)				03	40	60	100	3
TOTAL					06	--	04	15	260	240	500	18

Note: PCC: Professional Core, PEC: Professional Elective.

Professional Electives - 4

Course code under 18XX82X	Course Title
18EE821	FACTs and HVDC Transmission
18EE822	Electrical Estimation and Costing
18EE823	Big Data Analytics in Power Systems
18EE824	Power System Planning
18EE825	Electrical Power Quality

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).

**B.E ELECTRICAL AND ELECTRONICS ENGINEERING
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SEMESTER - VI**

OPEN ELECTIVE - A

Course Code	18EE65X	CIE Marks	40
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	60
Credits	03	Exam Hours	03

Students can select any one of the open electives offered by other Departments except those that are offered by the parent Department (For syllabus, please refer to the concerned Programme syllabus book or VTU website vtu.ac.in may be visited.).

Selection of an open elective shall not be allowed if,

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 the 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/ Advisor/Mentor.

SI No	Board and the Department offering the Electives	Course		Course Title
		SI No	code under 18EE65X	
	Electrical and Electronics Engineering	1	18EE651	Industrial Servo Control Systems
		2	18EE652	PLC and SCADA
		3	18EE653	Renewable Energy Resources
		4	18EE654	Introduction to Data Analytics

**B.E ELECTRICAL AND ELECTRONICS ENGINEERING Outcome
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SEMESTER - VII**

OPEN ELECTIVE - B

Course Code	18EE75X	CIE Marks	40
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	60
Credits	03	Exam Hours	03

Students can select any one of the open electives offered by other Departments except those that are offered by the parent Department (For syllabus, please refer to the concerned Programme syllabus book or VTU website vtu.ac.in may be visited.).

Selection of an open elective shall not be allowed if,

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 the 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/ Advisor/Mentor.

SI No	Board and the Department offering the Electives	Course		Course Title
		SI No	code under 18EE75X	
	Electrical and Electronics Engineering	1	18EE751	Carbon Capture and Storage
		2	18EE752	Electric Vehicles
		3	18EE753	Disasters Management
		4	18EE754	Electrical Energy Conservation and Auditing

