

B.E. in Biomedical and Robotic Engineering [BR]

III SEMESTER													
Sl. No	Course & Course Code		Course Title	Teaching Dept.	Paper Setting Board	Teaching Hours/week			Examination				Credits
						Theory/Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	BSC	21MAT31	Engineering Mathematics-III	Basic Science	Basic Science	2	2	0	03	50	50	100	3
2	PCC	21BR32	Analog Circuit Design	BM & RE	BM & RE	3	2	0	03	50	50	100	4
3	PCC	21BR33	Digital Circuit Design	BM & RE	BM & RE	3	2	0	03	50	50	100	4
4	PCC	21BR34	Basics of Human Anatomy and Physiology	BM & RE	BM & RE	3	0	0	03	50	50	100	3
5	PCC	21BR35	Fundamentals of Robotics	BM & RE	BM & RE	3	2	0	03	50	50	100	4
6	IPCC	21BRL36	Analog and Digital Circuit Design Lab	BM & RE	BM & RE	0	0	3	03	50	50	100	2
7	CEE	21CIV37	Environmental Studies	CEE	CEE	1	0	0	NA	50	-	50	1
8	UHV	21UHV38	Universal Human Values and Professional Ethics	Basic Science	Basic Science	1	0	0	NA	50	-	50	1
Total						16	08	03	18	400	300	700	22
Note: BSC: Basic Science Courses, PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, PEC: Professional Elective Course, OEC: Open Elective Course, CEE: Civil Environmental Engineering, MP: Mini Project, INT: Internship, AEC: Ability Enhancement Course. UHV: Universal Human Values, HSMC: Humanity, Social Science and Management Courses. NCMC: Non-credit mandatory course,													
Course prescribed to lateral entry Diploma holders admitted to III semester of Engineering programs													
10	NCMC	21MATDIP31	Additional Mathematics-1	Basic Science	Basic Science	2	1	0	-	50	-	50	0
11	NCMC	21KANDIP32	Technical Kannada	Basic Science	Basic Science	0	2	0	-	50	-	50	0
(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 programs, shall attend the classes during the respective semesters to complete all the formalities of the course. 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 has to fulfil the requirements during subsequent semester/s. (b) These Courses shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree													
Credit Definition: ➤ 1-hour lecture(L) per week per semester = 1 Credit ➤ 2-hour tutorial (T) per week per semester = 1 Credit ➤ 2-hour Practical/Drawing (P) per week per semester = 1 Credit				➤ Four-credit courses are to be designed for 50 hours of Teaching-Learning process. ➤ Three credit courses are to be designed for 40 hours of Teaching-Learning process. ➤ Two credit courses are to be designed for 25 hours of Teaching-Learning process. ➤ One credit courses is to be designed for 15 hours of Teaching-Learning process.									
AICTE Activity Points to be earned by students admitted to BE/B.Tech., 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 forthe award of degree through AICTE Activity Point Programme. Students transferred from other Universities to the fifth semester are required to earn 50 Activity Points from the year of entry toUoM. 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, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) do not affect SGPA/CGPA and shall not be considered for vertical progression. In case students fail to earn the prescribed activity Points, an Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.													



MYSORE UNIVERSITY SCHOOL OF ENGINEERING

Scheme of Teaching and Examination 2021-2022 (As per NEP-2020)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-2022)



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IV SEMESTER													
Sl. No	Course & Course Code		Course Title	Teaching Dept.	Paper Setting Board	Teaching Hours/week			Examination				Credits
						Theory/Lecture	Tutorial	Practical/ Drawing	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	BSC	21MAT41	Engineering Mathematics-IV	Basic Science	Basic Science	2	2	0	03	50	50	100	3
2	PCC	21BR42	Signal Conditioning and Data Acquisition Circuits	BM & RE	BM & RE	3	2	0	03	50	50	100	4
3	PCC	21BR43	Biomedical Transducers and Instrumentation	BM & RE	BM & RE	3	0	0	03	50	50	100	3
4	IPCC	21BR44	Microcontroller and Embedded Systems	BM & RE	BM & RE	3	0	2	03	50	50	100	4
5	PCC	21BR45	Control Systems	BM & RE	BM & RE	3	2	0	03	50	50	100	4
6	IPCC	21BRL46	Signal Conditioning and Biomedical Transducers Lab	BM & RE	BM & RE	0	0	3	03	50	50	100	2
7	HSMC	21CPH47	Constitution of India, Professional Ethics and Cyber Law	Basic Science	Basic Science	1	0	0	NA	50	-	50	1
8	AEC	21AEC48	Ability Enhance Course-II	BM & RE	BM & RE	1	0	0	NA	50	-	50	1
9	INT	21INT49	Summer Internship-I	(To be carried out during the intervening vacations of IV and V semesters)					-	-	-	-	-
Total						16	06	05	18	400	300	700	22

Note: BSC: Basic Science Courses, PCC: Professional Core Courses, IPCC: Integrated Professional Core Courses, PEC: Professional Elective Course, OEC: Open Elective Course, MP: Mini Project, INT: Internship, AEC: Ability Enhancement Course. UHV: Universal Human Values, HSMC: Humanity, Social Science and Management Courses. NCMC: Non-credit mandatory course,

Summer Internship-I (21INT59): shall be carried out at industrial (State and Central Government /Non-government organizations (NGOs)/Micro, Small and Medium Enterprise (MSME)/Innovation centers/ Incubation centers. The internship can also be Rural internship. All the students admitted shall have to undergo a mandatory internship of 04 weeks during the intervening vacation of IV and V semesters. A University Viva-Voce examination (Presentation followed by Question & Answer session) shall be conducted during V semester and the prescribed credit shall be included in the V semester. The 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. (The faculty coordinator or mentor has to monitor the students' internship progress and interact to guide them for the successful completion of the internship.)
Summer Internship-I: SEE shall be through seminar and viva-voce.

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

11	NCMC	21MATDIP41	Additional Mathematics-II	Basic Science	Basic Science	02	01	-	-	50	-	50	0
12	NCMC	21ENGDIP42	Technical English	Basic Science	Basic Science	-	2	-	-	50	-	50	0

(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 programs, shall attend the classes during the respective semesters to complete all the formalities of the course. 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 has to fulfil the requirements during subsequent semester/s.

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

Credit Definition:

- 1-hour lecture (L) per week per semester = **1 Credit**
- 2-hour tutorial (T) per week per semester = **1 Credit**
- 2-hour Practical/Drawing (P) per week per semester = **1 Credit**

- **Four-credit** courses are to be designed for **50** hours of Teaching-Learning process.
- **Three credit** courses are to be designed for **40** hours of Teaching-Learning process.
- **Two credit** courses are to be designed for **25** hours of Teaching-Learning process.
- **One credit** courses is to be designed for **15** hours of Teaching-Learning process.

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

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SEMESTER V													
Sl. No	Course & Course Code		Course Title	Teaching Dept.	Paper Setting Board	Teaching Hours/week			Examination				Credits
						Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Total Marks	
1	HSMC	21BR51	Management and Entrepreneurship	BM & RE	BM & RE	3	0	0	03	50	50	100	3
2	IPCC	21BR52	Digital Signal Processing	BM & RE	BM & RE	3	0	2	03	50	50	100	4
3	PCC	21BR53	Biomedical Instrumentation	BM & RE	BM & RE	3	0	0	03	50	50	100	3
4	IPCC	21BR54	Robot Programming	BM & RE	BM & RE	3	0	2	03	50	50	100	4
5	PEC	21BR55X	Professional Elective -1	BM & RE	BM & RE	3	0	0	03	50	50	100	3
6	OEC	21BR56X	Open Elective -A	BM & RE	BM & RE	3	0	0	03	50	50	100	3
7	AEC	21BRL57	Programming in Matlab	BM & RE	BM & RE	0	0	2	NA	50	-	50	1
8	PCC	21BRL58	Biomedical Instrumentation Lab	BM & RE	BM & RE	0	0	4	03	50	50	100	2
9	INT	21INT59	Summer Internship-I	Completed during the vacation of IV and V semesters					NA	50	-	50	1
Total						18	00	10	24	450	350	800	24

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

Professional Elective-1 (21BR55X)

Course Code	Course Title
21BR551	Pattern Recognition
21BR552	Communication Systems
21BR553	Hospital Design, Planning, and Management
21BR554	Embedded System Design

Open Elective-A (21BR56X)

21BR561	Fundamentals of Biomedical Transducers and Medical Instrumentation
21BR562	Biosafety and Healthcare
21BR563	Fundamentals of Robotics and its Programming
21BR564	Fundamentals of Augmented and Virtual Reality

Credit Definition:

- 1-hour lecture(**L**) per week per semester = **1 Credit**
- 2-hour tutorial (**T**) per week per semester = **1 Credit**
- 2-hour Practical/Drawing (**P**) per week per semester = **1 Credit**

- **Four-credit** courses are to be designed for **50** hours of Teaching-Learning process.
- **Three credit** courses are to be designed for **40** hours of Teaching-Learning process.
- **Two credit** courses are to be designed for **25** hours of Teaching-Learning process.
- **One credit** courses are to be designed for **15** hours of Teaching-Learning process.

Students can select any one of the open electives offered by any Department.

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.

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

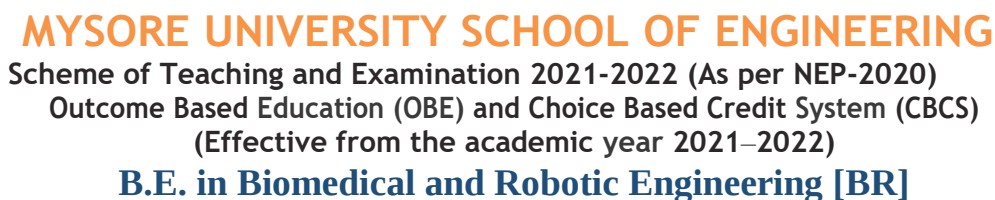
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VII-SEMESTER													
Sl No	Course & Course Code		Course Title	Teaching Dept.	Paper Setting Board	Teaching Hours/Week			Examination				Credits
						Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	21BR71	Biomedical DSP	BM & RE	BM & RE	3	0	0	03	50	50	100	3
2	PCC	21BR72	Artificial Intelligence and Machine Learning for Health Care	BM & RE	BM & RE	3	0	0	03	50	50	100	3
3	PEC	21BR73X	Professional Elective – 3	BM & RE	BM & RE	3	0	0	03	50	50	100	3
4	PEC	21BR74X	Professional Elective – 4	BM & RE	BM & RE	3	0	0	03	50	50	100	3
5	PCC	21BRL75	Biomedical DSP Lab	BM & RE	BM & RE	0	0	2	03	50	50	100	1
6	Project	21BRP76	Project Work Phase – 1	BM & RE	BM & RE	0	2	2	00	100	-	100	2
7	AEC	21AEC77	Ability Enhancement Course-III	BM & RE	BM & RE	1	0	0	NA	50	-	50	1
8	INT	21INT78	Summer Internship-II	(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)									
Total						13	02	04	15	400	250	650	16
Note: PCC: Professional Core Courses, PEC: Professional Elective Course, INT: Internship, AEC: Ability Enhancement Course.													
Professional Elective-3													
Course Code		Course Title											
21BR731		Scientific and Analytical Instrumentation											
21BR732		Database Management System in Health Care											
21BR733		Medical Imaging System											
21BR734		Biomaterials and Artificial Organs											
Professional Elective-4													
21BR741		Bio-MEMS											
21BR742		Computer Communication Network in Health Care											
21BR743		Augmented and Virtual Reality Development in Health Care											
21BR744		Medical Robots											
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, 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, an Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of the degree only after the release of the Eighth semester Grade Card.													



VIII-SEMESTER														
Sl. No	Course & Course Code		Course Title	Teaching Dept.	Paper Setting Board	Teaching Hours/Week			Examination				Credits	
						Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIE Marks	SEE Marks	Total Marks		
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1	Project	21BRP81	Project Work Phase-2	BM & RE	BM & RE	Two contact hours/ week for interaction between the faculty and students.			-	100	100	200	8	
2	Seminar	21BRS82	Technical Seminar	BM & RE	BM & RE	One contact Hour/ week for interaction between the faculty and students.			-	100	-	100	2	
3	INT	21INT83	Summer Internship-II	(Completed during the intervening vacations of VI and VII semesters and /or VII and VIII semesters)						-	100	-	100	4
Total						--	--	--	-	300	100	400	14	
Note: INT: Internship														
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).														