Marwadi University

Supporting Documents for Criteria – 1.1.1

Relevant documents pertaining to Curricula developed and implemented have relevance to the local, national, regional and global developmental needs.

****Disclaimer:** We are providing samples since all of the supporting documents for this criteria exceed the 6MB upload limit. If necessary, we shall provide all/any supporting documents.

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1.1.1: Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the Institution

Contents

1] Meeting Minutes of Board of Studies approval of PO & PSO.

The process for designing the program curriculum

The department frames its program curriculum based on the vision and mission of the institution and the department. The curriculum is revised to help students to be industry ready.

The process flow for Curriculum Design is as follows:

Step 1: Based on University/Department vision and mission and the guidelines of regulatory bodies, the department (HOD and faculty members) formulates its PSOs, COs based on POs.

Step 2: The HOD along with all faculty members frames the outline of the curriculum based on norms of the guidelines of various regulatory bodies various regulatory bodies –University Grants Commission, All India Council for Technical Education, Pharmacy Council of India, Bar Council of India, Central Council of Physiotherapy, etc andreferring to the curriculum of premier institutions. Inputes from the stakeholders – students, alumni, employers and teachersare also considered during this step.

Step 3: Proposed curriculumplanned according to the POs and PSOs. Then, the syllabi of various courses are framed.

Step 4: Proposed Curriculum and syllabi are discussedin the Board of Studies (BOS) meeting. The recommendations and modifications suggested by BOS members are incorporated in curriculum and syllabi forwarded to the Faculty Board for further approval.

Step 5: The curriculum and syllabi are then passed for approval to the Academic Council.

Step 6: After the approval from Academic Council, the curriculum and syllabi are approved for implementation.

Step 7: Similar procedure is followed for amendments in syllabi of various courses upon receiving feedback from different stakeholders.

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Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

Board of studies held on 4th April 2016 for approval of B.Sc. and M.Sc. Microbiology semester 1 and semester 2 course syllabus to be implemented from coming academic term in Marwadi University

- **Minutes of Meeting**
  - Meeting initiated at 10:30AM by **Dr. Aakesh Sinha**(chairperson) and **Dr. Jyotindra Prajapati** (Principal, Faculty of Science, Marwadi University) in presence of external committee members: **Dr. Satya. P. Singh** (Head of Bioscience Department, Saurashtra University, Rajkot), **Dr. Neepa Pandhi** (Head of Microbiology Department, Shree M & N Virani Science College, Rajkot),**Dr. K J Patel** (Scientist, Baroda Agro chemical Ltd.) and internal committee members of Microbiology Department (Marwadi University, Rajkot) : **Dr. Amarpreetsingh Arora** and **Dr. Umesh Kumar**.

Following suggestions were suggested by BoS members and its reciprocal necessary changes are described below:

Suggestions by external BoS members	Changes made in the syllabus
Prof. S. P. Singh 1. As B.Sc. as it is starting of new course, for semester 1 and 2 basic course can be added in combination of language course and general science courses. 2. For M.Sc. the selection of courses needs to from basic to applied as it will help students for better transition from bachelor's courses to Masters courses. 3. Course outcome needs to be defined according to the subject content.	1. Two subjects of core microbiology covering the basic topics of microbiology were added in syllabus after thorough discussion with industrial and academic expert. The few subjects introduced has also relevance in employability and skill development (attached teaching scheme). Also combination of general science courses (Chemistry and Physics) and one language courses (English) was added in the syllabus of semester 1 and 2. 2. For M.Sc. as per recommendation, the core courses were added covering topics from basics in first semester and further applied part in second semester. 3. Course outcome is included in syllabus file. The B.Sc. and M.Sc. Microbiology course is following CBCS scheme.
Prof. Neepa Pandhi 1. For B.Sc. courses maximum 2-3 number of core courses can be offered along with the combination of other science subjects like chemistry and physics. 2. As B.Sc. Microbiology stream is offered to the students, Mathematics subject can be omitted and can be	1. Two subjects of core microbiology covering the basic topics of microbiology was added in syllabus. Also combination of general science courses (Chemistry and Physics) and one language courses (English) was added in the syllabus of semester 1 and 2. 2. Mathematics subject was not considered

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Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

replace by other language courses. 3. For M.Sc. courses needs to be add in combination covering topics of classical microbiology and applied microbiology. 4. Along with course outcome, Programme outcome and programme specific outcome also needs to be defined for both B.Sc. and M.Sc. Programme. 5. Student's feedback and faculty feedback system will be value addition for the curriculum change/revision.	as per suggestion of external subject expert. 4. For M.Sc. as per recommendation, the core courses were added covering topics from basics in first semester and further applied part in second semester. The few subjects introduced have also relevance in employability and skill development (attached teaching scheme). 3. Along with the course outcome, the programme outcome and programme specific outcome were added with syllabus. 4. Faculty feedback and student feedback will be considered for the curriculum enrichment.
Dr. K. J. Patel 1. For B.Sc. as per the industrial trends, biochemistry related topics will be better for starting the basis of subject. 2. For M.Sc., Biochemistry can be bifurcated in two semester like topics covering basis in first semester and applied in second semester.	1. As per recommendation by Industrial expert, Biomolecules subject was added in B.Sc. semester 2. 2. As per recommendation by Industrial expert, Fundamental biochemistry and Microbial metabolism subject was added in the semester 1 and semester 2 respectively.

Approval of the structured syllabus of B.Sc. and M.Sc.Microbiology as per the suggestions of BoS Members

Sr. No	Committee Member's	Affiliation	Signature
1	Dr. Aakesh Sinha Chairperson	Assistant Professor, Department of Environmental Engieering, Marwadi University, Rajkot. Email id: Aakesh.sinha@marwadieducation.edu.in	
2	Prof. S. P. Singh External Member	Professor and Head, Department of Biosciences, Saurashtra University, Rajkot (Gujarat) Email: satyapsingh@yahoo.com	
3	Dr. Neepa Pandhi External Member	Professor and Head Department of Microbiology Shree M & N Virani Science College, Rajkot. Email:neepa.pandhi@gmail.com	04/04/16
4	Dr. K.J. Patel External Member	Scientist, Baroda Agrochemical Ltd. Baroda. Email: kjpatel15@gmail.com	K. J. Patel
5	Dr. JyotindraPrajapati Internal member	Principal, Faculty of Science Marwadi University, Rajkot.	

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Board of Studies (2016-17)
Department of Microbiology

		Email: jyotindra.prajapati@marwadieducation.edu.in	
6	Dr. Umesh Kumar Internal Member	Head, Department of Environmental Engineering, Marwadi University, Rajkot. Email id:umesh.kumar@marwadieducation.edu.in	
7	Dr. Amarpreetsingh Arora Internal Member	Assistant Professor, Department of Environmental Engineering, Marwadi University, Rajkot. Email id: amarpreetsingh.arora@marwadieducation.edu.in	

Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

B.Sc. Microbiology Teaching and Examination Scheme Semester I

W.E.F. 2016-17

B. Sc. Year I (Semester-I)							Evaluation Scheme					
Subject Code	Subject Name	Type	Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
			Theory	Tutorial	Practical		ESE(E)	IA	CSE	Viva (V)	TW/Practicals (P)	
02MB0101	Introduction to Microbiology	BS	4	0	2	5	50	30	20	25	25	150
02MB0102	Basic Techniques in Microbiology	BS	4	0	2	5	50	30	20	25	25	150
02CY0101	Chemistry-I	BS	4	0	2	5	50	30	20	25	25	150
02PY0131	Physics-I	BS	3	0	2	4	50	30	20	25	25	150
02SL0101	English-I	HSS	3	0	2	4	50	30	20	0	0	100
	Total		**18**	**0**	**10**	**23**	**250**	**150**	**100**	**100**	**100**	**700**

*The highlighted subjects are relevance in employability and skill development.

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Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

B.Sc. Microbiology Teaching and Examination Scheme Semester II

W.E.F. 2016-17

B. Sc. Year I (Semester-II)							Evaluation Scheme					
Subject Code	Subject Name	Type	Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
			Theory	Tutorial	Practical		ESE(E)	IA	CSE	Viva (V)	TW/Practicals (P)	
02MB0151	Bacterial Systematics	BS	4	0	2	5	50	30	20	25	25	150
02MB0152	Biomolecules	BS	4	0	2	5	50	30	20	25	25	150
02CY0151	Chemistry-II	BS	4	0	2	5	50	30	20	25	25	150
02PY0181	Physics-II	BS	3	0	2	4	50	30	20	25	25	150
02SL0151	English-II	HSS	3	0	2	4	50	30	20	0	0	100
	Total		**18**	**0**	**10**	**23**	**250**	**150**	**100**	**100**	**100**	**700**

*The highlighted subjects are relevance in employability and skill development.

Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

Teaching and Examination Scheme
M.Sc. Microbiology Semester I
W.E.F 2016-17

M. Sc. Semester I							Evaluation Scheme					
Subject Code	Subject Name	Type	Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
			Theory	Tutorial	Practical		ESE (E)	IA	CSE	Viva (V)	Practicals(P)/TW	
02MB0401	Microbial Taxonomy	BS	4	0	3	6	50	30	20	25	25	150
02MB0402	Cell Biology	BS	4	0	3	6	50	30	20	25	25	150
02MB0403	Biostatistics and Bioinformatics	BS	4	0	2	5	50	30	20	25	25	150
02MB0404	Ecology and Evolution	BS	4	0	2	5	50	30	20	25	25	150
	Total		16	0	10	22	200	120	80	100	100	600

*The highlighted subjects are relevance in employability and skill development.

Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

Teaching and Examination Scheme
M.Sc. Microbiology Semester II
W.E.F 2016-17

M. Sc. Semester II

Subject Code	Subject Name	Type	Teaching Scheme (Hours)			Credits	Evaluation Scheme					
							Theory Marks			Tutorial/ Practical Marks		Total Marks
			Theory	Tutorial	Practical		ESE (E)	IA	CSE	Viva (V)	Practicals(P)/TW	
02MB0451	Bioanalytical Techniques	BS	4	0	3	6	50	30	20	25	25	150
02MB0452	Environmental Microbiology	BS	4	0	3	6	50	30	20	25	25	150
02MB0453	Fundamental Biochemistry	BS	4	0	3	6	50	30	20	25	25	150
02MB0454	Molecular Biology	BS	4	0	3	6	50	30	20	25	25	150
	Total		16	0	12	24	200	120	80	100	100	600

*The highlighted subjects are relevance in employability and skill development.

Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

Programme Outcomes of B.Sc. with Bloom's taxonomy

Sr. No.	Programme Outcome	Blooms Taxonomy
1	Prepare the graduates who have a thorough knowledge of the fundamental aspects of science and an awareness of its applications.	Remember/Knowledge
2	To understand and acquire knowledge of Basic science relevant to the discipline.	Understand
3	To utilise appropriate key skills and tools for solving scientific problems.	Analyze
4	To understand professional, ethical and social issues and responsibilities for the scientific community.	Understand
5	To apply the design and development principles in the construction of scientific systems of varying complexity.	Apply
6	To categorize the graduates with skills sets for job opportunities in Research organisations, Private and Government jobs and further academic study	Analyze
7	To prepare the graduates with efficiency to independently initiate starts ups/entrepreneurship ventures.	Evaluate
8	To Prepare/nurture graduates with holistic approach towards identification and development of solution to scientific challenges.	Analyze
9	To prepare graduates who will work and communicate effectively in inter-disciplinary environment	Higher order Thinking

Programme Educational Objectives (PEO) with Blooms Taxonomy (B.Sc. Microbiology)

Sr. No	Programme Educational Objective	Blooms Taxonomy
1	To enable students with fundamental and advanced understanding of underlying principles of microbial life.	Remember/Knowledge
2	To equip students with an understanding of microbial crosstalk for the betterment of environment, health and for the production of economically important products	Understand
3	To impart students with the necessary technical and experimental skills of microbiology, enhancing their employability in the private and government sectors..	Apply
4	Training students to qualify National and International competitive exams to build their career in the reputed institutes of global importance.	Analyze
5	To invoke critical thinking abilities in students by their involvement in projects and internships.	Higher order Thinking

Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

Programme Outcomes of M.Sc. with Bloom's taxonomy

Sr. No.	Programme Outcome	Blooms Taxonomy
1	Science Knowledge: Apply pure and interdisciplinary science knowledge for the solution of various scientific and engineering problems.	Remember/Knowledge
2	Problem analysis: Identify, formulate, review research literature, and analyze scientific problems reaching validated conclusions using basic principles of sciences.	Analyze
3	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	Apply
4	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern IT tools including prediction and modeling to complex scientific activities with an understanding of the limitations.	Analyze
5	The science and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.	Evaluate
6	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the scientific practice.	Understand
7	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	Understand
8	Communication: Communicate effectively on various activities with the Science community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	Higher order Thinking
9	Science projects and funding: Demonstrate knowledge for writing and managing scientific projects various disciplines and apply these to its own work, as a member and leader in a team, to manage funding for scientific projects from various funding agencies and NGOs.	Analyze
10	Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	Evaluate

Marwadi University

Minutes of Meeting
Board of Studies (2016-17)
Department of Microbiology

Programme Educational Objectives (PEO) with Blooms Taxonomy (M.Sc. Microbiology)

Sr. No	Programme Educational Objective	Blooms Taxonomy
1	To develop critical thinking aptitude in students for working in academics and life science industries.	Understand
2	To equip students with specialized laboratory skills applicable to analysis and research.	Apply
3	To strengthen student's skills for better employability and entrepreneurial ventures.	Analyze
4	To furnish students for interdisciplinary research projects and scientific writing.	Higher order Thinking

Programme specific Outcome (PSO) (B. Sc. Microbiology)

PSO1	Students will acquire fundamental and advanced understanding of the Life science and allied subjects.
PSO2	Students will comprehend the understanding of biologically relevant technical skills.

Programme specific Outcome (PSO) M. Sc. Microbiology

PSO1	Students will acquire the necessary technical skills of life science enhancing their employability in the private and government sectors.
PSO2	Students will develop critical thinking abilities by getting exposure to research projects and internships which will be instrumental for all round development.

FACULTY OF PHARMACY

Marwadi University

MINUTES OF THE MEETING-1

Board of Studies meeting for B. Pharmacy

Date: 17-05-2018, Thursday **Time:** 12:00 to 14:00 **Location:** MA655

MEETING CONVENED BY

Dr Vipul P. Patel
Principal, Faculty of Pharmacy, Marwadi University

THE COMMITTEE MEMBERS

Present	1.	Dr Vipul P. Patel	Chairperson	Internal-1	Academia
	2.	Dr B. N. Suhagia	Member	External-1	Academia
	3.	Dr M. M. Patel	Member	External-2	Academia
	4.	Mr K. D. Patel	Member	External-3	Pharma Industry
	5.	Dr Lalji Baldaniya	Member Secretary	Internal-2	Academia

Absent	1.	-	-	-	-

Dr Vipul Patel, Principal, Faculty of Pharmacy, Marwadi University, presided over the meeting and welcomed all the distinguished members of BoS.

AGENDA UNDER DISCUSSION

Agenda-1	**Introduction of a new program at UG level course, B. Pharm.**
Resolution	A thorough conversation about beginning a new B. Pharm. course was made. All committee members agreed and expressed appreciation for the efforts made to start a new course.
Agenda-2	**Discuss and approve program outcomes (PO), course outcomes (CO), and program-specific outcomes (PSO)**
Resolution	The committee members drafted, discussed and approved the programme outcomes (PO), course outcomes (CO), and programme-specific outcomes (PSO) that are included below as **Annexure-1**.
Agenda-3	**Review and discuss the syllabus of B. Pharm. Semester-1.**
Resolution	After referring syllabus and guidelines prescribed by the Pharmacy Council of India (PCI), New Delhi for the implementation of the B. Pharm. syllabus (CBCS – Choice-based credit system), all members agreed to follow the syllabus pattern for B. Pharm as per PCI rules and syllabus of B. Pharm. course regulations 2014. The detailed teaching and assessment scheme with credit hours is attached as **Annexure-2**.
Agenda-4	**Discuss and approve the examination pattern for B. Pharm. course.**
Resolution	The credit system, examination pattern and passing criteria were entirely adopted as per the guidelines of the Pharmacy Council of India **Annexure-3**.
Agenda-5	**Prepare and approve a list of the examination panel for B. Pharm. course.**
Resolution	A list of examiners for B. Pharm. subjects that was proposed, prepared, and approved by all committee members is included below as **Annexure-4**.
Agenda-6	**Any other agenda with the permission of the chairperson.**
Conclusion	The chairperson read out the extract of a decision made during the meeting, then forwarded it and recommended it to be put up in the academic council meeting for approval.

The meeting was concluded with a vote of thanks to all the members present.

Dr Vipul P. Patel

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MINUTES OF THE MEETING-2

Board of Studies meeting for B. Pharmacy

Date: 15-12-2018, Saturday **Time:** 11:00 to 13:00 **Location:** MA655

MEETING CONVENED BY

Dr Lalji Baldaniya
Principal, Faculty of Pharmacy, Marwadi University

THE COMMITTEE MEMBERS

Present	1.	Dr Lalji Baldaniya	Chairperson	Internal-1	Academia
	2.	Dr B. N. Suhagia	Member	External-1	Academia
	3.	Dr M. M. Patel	Member	External-2	Academia
	4.	Mr K. D. Patel	Member	External-3	Pharma Industry
	5.	Dr RP Burman	Member Secretary	Internal-2	Academia

Absent	1.	-	-	-	-

Dr Lalji Baldaniya, Principal, Faculty of Pharmacy, Marwadi University, presided over the meeting and welcomed all the distinguished members of BoS.

AGENDA UNDER DISCUSSION

Agenda-1	**Review of the minutes from the most recent meeting of the BoS.**
Resolution	Members unanimously approved the minutes of the first BoS meeting without any comments or suggestions.

Agenda-2	**Review and discuss the syllabus of B. Pharm. Semester-2.**
Resolution	After referring syllabus and guidelines prescribed by the Pharmacy Council of India (PCI), New Delhi for the implementation of the B. Pharm. syllabus (CBCS – Choice-based credit system), all members agreed to follow the syllabus pattern for B. Pharm as per PCI rules and syllabus of B. Pharm. course regulations 2014. The detailed teaching and assessment scheme with credit hours is attached as **Annexure-1**. Biochemistry and Pathophysiology were shifted from semester 2 to semester 3, while pharmaceutical engineering was shifted from semester 3 to semester 2. In order to evenly distribute the academic workload among staff members and students, it was deemed necessary to shift the subjects.

Agenda-3	**Measurement of course outcome (CO) attainment for implementation of outcome-based education (OBE).**
Resolution	Members of the committee approved and recommended that the B. Pharmacy course outcome attainment be calculated. Attainment was initially set as a minimum of 50%.

Agenda-4	**Any other agenda with the permission of the chairperson.**
Conclusion	The chairperson read out the extract of a decision made during the meeting, then forwarded it and recommended it to be put up in the academic council meeting for approval.

The meeting was concluded with a vote of thanks to all the members present.

Dr Lalji Baldaniya Baldania

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MINUTES OF THE MEETING-3

Board of Studies meeting for B. Pharmacy

Date: 08-06-2019, Saturday **Time:** 11:00 to 12:00 **Location:** MA655

MEETING CONVENED BY

Dr Lalji Baldaniya
Principal, Faculty of Pharmacy, Marwadi University

THE COMMITTEE MEMBERS

Present	1.	Dr Lalji Baldaniya	Chairperson	Internal-1	Academia
	2.	Dr B. N. Suhagia	Member	External-1	Academia
	3.	Dr M. M. Patel	Member	External-2	Academia
	4.	Dr Ramesh Parmar	Member	Internal-2	Academia
	5.	Dr Ashish Kyada	Member Secretary	Internal-3	Academia
	6.	Dr RP Burman	Member	Internal-4	Academia

Absent	1.	Mr K. D. Patel	Member	External-3	Pharma Industry

Dr Lalji Baldaniya, Principal, Faculty of Pharmacy, Marwadi University, presided over the meeting and welcomed all the distinguished members of BoS.

AGENDA UNDER DISCUSSION

Agenda-1	**Review of the minutes from the most recent meeting of the BoS.**
Resolution	Members unanimously approved the minutes of the second BoS meeting without any comments or suggestions.
Agenda-2	**Review and discuss the syllabus of B. Pharm. Semester-3.**
Resolution	After referring syllabus and guidelines prescribed by the Pharmacy Council of India (PCI), New Delhi for the implementation of the B. Pharm. syllabus (CBCS – Choice-based credit system), all members agreed to follow the syllabus pattern for B. Pharm as per PCI rules and syllabus of B. Pharm. course regulations 2014. The detailed teaching and assessment scheme with credit hours is attached as **Annexure-1**.
Agenda-3	**Course outcome (CO) attainment reviews and discussions.**
Resolution	A presentation and discussion about course outcome attainment were held with the BoS members. The members proposed raising the attainment goal for the academic year 2019–20 from 50% to 55% and discussing what measures are being made to do so at the next meeting **Annexure-2**.
Agenda-4	**Any other agenda with the permission of the chairperson.**
Conclusion	The chairperson read out the extract of a decision made during the meeting, then forwarded it and recommended it to be put up in the academic council meeting for approval.

The meeting was concluded with a vote of thanks to all the members present.

Dr Lalji Baldaniya

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MINUTES OF THE MEETING-5

Board of Studies meeting for B. Pharmacy

Date: 08-06-2020, Monday **Time:** 11:00 to 12:00

Location: Due to the corona pandemic a meeting was scheduled virtually on Google Meet.

MEETING CONVENED BY

Dr Lalji Baldaniya
Principal, Faculty of Pharmacy, Marwadi University

THE COMMITTEE MEMBERS

Present	1.	Dr Lalji Baldaniya	Chairperson	Internal-1	Academia
	2.	Dr B. N. Suhagia	Member	External-1	Academia
	3.	Dr M. M. Patel	Member	External-2	Academia
	4.	Mr K. D. Patel	Member	External-3	Pharma Industry
	5.	Dr Ramesh Parmar	Member	Internal-2	Academia
	6.	Dr Ashish Kyada	Member Secretary	Internal-3	Academia
	7.	Dr RP Burman	Member	Internal-4	Academia

Absent	1.	-	-	-	-

Dr Lalji Baldaniya, Principal, Faculty of Pharmacy, Marwadi University, presided over the meeting and welcomed all the distinguished members of BoS.

AGENDA UNDER DISCUSSION

Agenda-1 **Review of the minutes from the most recent meeting of the BoS.**

Resolution Members unanimously approved the minutes of the fourth BoS meeting without any comments or suggestions.

Agenda-2 **Review and discuss the syllabus of B. Pharm. Semester-5.**

Resolution After referring syllabus and guidelines prescribed by the Pharmacy Council of India (PCI), New Delhi for the implementation of the B. Pharm. syllabus (CBCS – Choice-based credit system), all members agreed to follow the syllabus pattern for B. Pharm as per PCI rules and syllabus of B. Pharm. course regulations 2014. The detailed teaching and assessment scheme with credit hours is attached as **Annexure-1**.

Agenda-3 **Course outcome (CO) attainment reviews and discussions.**

Resolution Members of the BOS from prior semesters were informed about the attainment of the course outcomes. By conducting additional remedial lessons, administering class assessments, engaging students in group discussions, etc., the attainment was raised in comparison. Despite suggesting a little increase of 4%, the members expressed satisfaction with the 56% accomplishment, attached as **Annexure-2**.

Agenda-4 **Any other agenda with the permission of the chairperson.**

Conclusion The chairperson read out the extract of a decision made during the meeting, then forwarded it and recommended it to be put up in the academic council meeting for approval.

The meeting was concluded with a vote of thanks to all the members present.

Dr Lalji Baldaniya Baldaniya

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MINUTES OF THE MEETING-7

Board of Studies meeting for B. Pharmacy

Date: 06-08-2021, Friday **Time:** 11:00 to 13:00

Location: Due to the corona pandemic a meeting was scheduled virtually on Google Meet.

MEETING CONVENED BY

Dr Lalji Baldaniya
Principal, Faculty of Pharmacy, Marwadi University

THE COMMITTEE MEMBERS

Present	1.	Dr Lalji Baldaniya	Chairperson	Internal-1	Academia
	2.	Dr B. N. Suhagia	Member	External-1	Academia
	3.	Dr M. M. Patel	Member	External-2	Academia
	4.	Dr Ramesh Parmar	Member	Internal-2	Academia
	5.	Dr Ashish Kyada	Member Secretary	Internal-3	Academia
	6.	Dr Mehul Rana	Member	Internal-4	Academia

Absent	1.	Mr K. D. Patel	Member	External-3	Pharma Industry

Dr Lalji Baldaniya, Principal, Faculty of Pharmacy, Marwadi University, presided over the meeting and welcomed all the distinguished members of BoS.

AGENDA UNDER DISCUSSION

Agenda-1 **Review of the minutes from the most recent meeting of the BoS.**

Resolution Members unanimously approved the minutes of the sixth BoS meeting without any comments or suggestions.

Agenda-2 **Review and discuss the syllabus of B. Pharm. Semester-7.**

Resolution After referring syllabus and guidelines prescribed by the Pharmacy Council of India (PCI), New Delhi for the implementation of the B. Pharm. syllabus (CBCS – Choice-based credit system), all members agreed to follow the syllabus pattern for B. Pharm as per PCI rules and syllabus of B. Pharm. course regulations 2014. The detailed teaching and assessment scheme with credit hours is attached as **Annexure-1**.

Agenda-3 **Review and discuss the guidelines of the practice school module**

Resolution The members deliberated on the guidelines of the practice school module and found it appropriate and approved it without any change. It is attached as **Annexure-2**.

Agenda-4 **Introduction of two open university elective subjects**

Resolution The members deliberated on the syllabus of the proposed two subjects as open university electives were found appropriate and approved it without any change. It is attached as **Annexure-3**.

Agenda-5 **Course outcome (CO) attainment reviews and discussions.**

Resolution A presentation and discussion about course outcome attainment were held with the BoS members. It was seen that the CO attainment of the course was attained due to continuing subject evaluation, engaging students in group discussions, etc. and it was recommended that the attainment be raised from 56 to 60%. It is attached as **Annexure-4**.

Agenda-6 **Any other agenda with the permission of the chairperson.**

Conclusion The chairperson read out the extract of a decision made during the meeting, then forwarded it and recommended it to be put up in the academic council meeting for approval.

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The meeting was concluded with a vote of thanks to all the members present.

Dr Lalji Baldaniya

Baldania

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Minutes of Meeting

Date: 14/07/2016	**Meeting No:** 01	
Start Time: 11:00 AM	**End Time:** 12:30 PM	**Total Time:** 1.5 Hours
Presented by	Prof. Jay B. Teraiya	

Agenda – 1	**Review of Vision & Mission of Computer Engineering Department**
Discussion & Resolution	• The department established the vision and mission through a consultative process involving the stakeholders considering the scope for growth of the department and future societal requirements keeping in view with the vision and mission of the university. • The department aims to empower the skills required in the industry to benefit the society. • The department aims to prepare students for their higher studies and research to contribute to the advanced technological needs of computer engineering. • Encourage faculty to update their knowledge and teaching-learning process through continuous learning by doing inter-disciplinary research and support the industry. • Vision & Mission of Computer Engineering Department attached in Annexure - I.
Agenda – 2	**Review of Program Outcome (PO) for B. Tech Computer Engineering**
Discussion & Resolution	• The PO of the program are defined by considering Graduate Attributes defined by NBA through Washington accord signed by India in 2014. • Computer engineering department describe that graduate are expected to understand the engineering principle to manage project in multidisciplinary environment and life-long learning.
Agenda – 3	**Review of Program Specific Outcome (PSO) of Computer Engineering Department**
Discussion & Resolution	• The department is committed to provide quality education in Computer Engineering to students to build their career and do quality research and thus contribute to the field of IT Industries which reflects in the PSO. • PO and PSO of Computer Engineering Department attached in Annexure - II.
Agenda – 4	**Review of curriculum structure of Computer Engineering UG Program**
Discussion & Resolution	• Contact hours for students should ideally be 25 to 30 hours per week. • 1st year course should be common for all soft branches of engineering. • Credit to be considered based on the following 1. Lecture 1 hour = 1 credit

	2. Lab / Tutorial 2 hours = 1 credit • For every tutorial / practical 1 contact hour, 0.5 credit weightage to be given. • Courses like Computer Programming and Computer Workshop emphasises on skill development. • Courses adding values to the skill of the students can be incorporated. • Teaching scheme of 1st year course attached in Annexure - III.
Agenda – 5	**Review of syllabus contents proposed**
Discussion & Resolution	• Percentage for continuous evaluation and end semester evaluation should either be 60:40 or 50:50 for theory and practical subject. • Passing criteria for theory and laboratory should be fixed separately and total marks/ overall result of the subject to be considered for passing. • Courses like computer programming and engineering graphics are providing more practical contact hour then theory hours are appreciable. • Course outcome as mentioned in the detailed syllabus are clearly resembling the PO of the Computer Engineering program. • More MOOC based value-added courses should be added to curriculum for better industry skill and more exposure of technical skill.
Agenda – 6	**Discussion on Program Outcome and Course Outcome attainment**
Discussion & Resolution	• Attainment level of Program Outcomes for the batch admitting in the A.Y. 2016-17 are discussed and details for the same are attached in the Annexure – IV. • Attainment level of Course Outcomes for the courses of first year for the A.Y. 2016-17 are discussed and details for the same are attached in the Annexure - IV.

Meeting Attendees:

Sr.	Expert Name	Expert Signature
1.	Dr. Nitul Dutta	
2.	Dr. R. B. Jadeja	
3.	Prof. Jay B. Teraiya	
4.	Dr. Ashish Kumar Srivastava	
5.	Dr. Nishant Doshi	
6.	Dr. Deepak Garg	
7.	Dr. Amit Ganatra	
8.	Dr. Apurva Shah	

Annexure III

Teaching and Examination Scheme of B. Tech. - COMPUTER ENGINEERING – Semester – I											
Subject Code	**Subject Name**	**Teaching Scheme (Hours)**			**Credits**	**Theory Marks**			**Tutorial/ Practical Marks**		**Total Marks**
		Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
01CE0102	COMPUTER WORKSHOP	0	0	2	1	0	0	0	25	25	50
01EE0101	ELEMENTS OF ELECTRICAL ENGINEERING	3	0	2	4	50	30	20	25	25	150
01GS0101	PHYSICS	3	0	2	4	50	30	20	25	25	150
01MA0101	ENGINEERING MATHEMATICS- I	4	2	0	5	50	30	20	25	25	150
01ME0101	ELEMENTS OF MECHANICAL ENGINEERING	3	0	2	4	50	30	20	25	25	150
01PE0101	PHYSICAL EDUCATION/SPORTS/YOGA	0	0	2	1	0	0	0	0	0	0
01SL0101	COMMUNICATION SKILLS	2	0	2	3	50	30	20	25	25	150
02PY0131	PHYSICS -1	4	0	0	4	50	30	20	25	25	150

Teaching and Examination Scheme of B. Tech. - COMPUTER ENGINEERING – Semester – II											
Subject Code	**Subject Name**	**Teaching Scheme (Hours)**			**Credits**	**Theory Marks**			**Tutorial/ Practical Marks**		**Total Marks**
		Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
01CE0101	COMPUTER PROGRAMMING	3	0	2	4	50	30	20	25	25	150
01CR0101	CAREER READINESS PROGRAM	2	0	0	2	50	30	20	0	0	100
01EC0101	BASICS OF ELECTRONICS ENGINEERING	3	0	2	4	50	30	20	25	25	150
01EC0102	DIGITAL ELECTRONICS	3	0	2	4	50	30	20	25	25	150
01EN0101	BASICS OF ENVIRONMENTAL STUDIES	2	0	0	2	50	30	20	0	0	100
01MA0151	ENGINEERING MATHEMATICS-II	4	2	0	5	50	30	20	25	25	150
01ME0103	ENGINEERING DRAWING	2	0	4	4	50	30	20	25	25	150

Annexure IV

Attainment of Program Outcomes:

- The attainment level of Program Outcomes for the batch admitting in the year 2016-17 is set to 60% based on the discussion with the committee members.
- It will be kept same for the subsequent batches admitting till the review of attainment levels for the first batch is carried out.

Attainment of Course Outcomes:

Attainment levels of Course Outcomes for the category of courses is set at the following levels based on the suggestions by committee members:

Course Category	Target level of Attainment for the Course Outcome
Program Core	55
Program Elective Course	60
General Courses - University Core (GN-UC)	50
General Courses - University Elective (GN-UE)	50
Basic Science Courses - University Core (BS-UC)	50
Engineering Science Courses - University Core (ES-UC)	50

1.1.1: Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the Institution

Contents

Marwadi University

DEPARTMENT OF MICROBIOLOGY

UNDERGRADUATE PROGRAM- BSc. Microbiology

Program Outcomes (POs)

Sr. No.	Program Outcome Statement
PO1	Prepare the graduates who have a thorough knowledge of the fundamental aspects of science and an awareness of its applications.
PO2	To understand and acquire knowledge of Basic science relevant to the discipline.
PO3	To utilise appropriate key skills and tools for solving scientific problems.
PO4	To understand professional, ethical and social issues and responsibilities for the scientific community.
PO5	To apply the design and development principles in the construction of scientific systems of varying complexity.
PO6	To categorize the graduates with skills sets for job opportunities in Research organisations, Private and Government jobs and further academic study
PO7	To prepare the graduates with efficiency to independently initiate starts ups/entrepreneurship ventures.
PO8	To Prepare/nurture graduates with holistic approach towards identification and development of solution to scientific challenges.
PO9	To prepare graduates who will work and communicate effectively in inter-disciplinary environment

Program Educational Objectives (PEOs)

Sr. No.	Program Educational Objectives Statement
PEO1	To enable students with fundamental and advanced understanding of underlying principles of microbial life.
PEO2	To equip students with an understanding of microbial crosstalk for the betterment of environment, health and for the production of economically important products
PEO3	To impart students with the necessary technical and experimental skills of microbiology, enhancing their employability in the private and government sectors..
PEO4	Training students to qualify National and International competitive exams to build their career in the reputed institutes of global importance.

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PEO5	To invoke critical thinking abilities in students by their involvement in projects and internships.

Program specific Outcomes (PSOs)

Sr. No.	Program Specific Outcomes Statement
PSO1	Students will acquire fundamental and advanced understanding of the Life science and allied subjects.
PSO2	Students will comprehend the understanding of biologically relevant technical skills.

Course Outcomes (COs)

On completion of the course students will be able to

COURSE COMPONENT	COURSE	COURSE OUTCOME
CORE I	**INTRODUCTION TO MICROBIOLOGY**	**CO1:** Acquire, articulate and recall history and scientific theories relevant to Microbiology. **CO2:** Understands the Classification of different types of microorganism. **CO3:** To study diversity of different microbial groups. **CO4:** To study application of microbiology in various fields.
CORE II	**BASIC TECHNIQUES IN MICROBIOLOGY**	**CO1:** Understand principles and different methods of sterilisation. **CO2:** Identify and understand use of different microscopy techniques. **CO3:** Understanding of basic structure, similarities and differences among various groups of microorganisms using different staining methods. **CO4:** Usage of various culture media and their applications.
CORE III	**FUNDAMENTAL BIOLOGY –I**	**CO1:** Identify, recognize, list and label the biological organism in nature. **CO2:** Understand and describe the structure, composition & properties of plants and animal systems. **CO3:** Predict an outcome using several pieces of information or concepts; and apply the information in a new context. **CO4:** Infer and understand the structure,

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		morphology and genetic components of organism and related it to the process as a whole.
CORE IV	**CHEMISTRY-I**	**CO1:** Understand the basic idea of atomic structure and its quantum mechanical concept. **CO2:** Be aware of the basic concepts of various types of chemical bonding. **CO3:** Obtain the basic idea of thermodynamics and analyse simple systems involving energy balance by applying the concept of thermodynamics. **CO4:** Get the idea of various thermochemical processes and their applications. **CO5:** Recognize the basic involvement of electronic configuration and their consequences on formation of orbital's.
ELECTIVE I	**READING AND WRITING FOR SCIENCE**	**CO1:** To understand the usage of language in terms of reading and writing for science; **CO2:** To analyze and understand the language in context of science.
ELECTIVE II	**SPEAKING AND PRESENTATION SKILLS**	**CO1:** To share information on familiar matters/issues in English; **CO2:** To make effective presentations in English; **CO3:** To gain confidence in speaking in English.
CORE V	**BIOMOLECULES**	**CO1:** Understand the concepts & properties of molecules and their reactions. **CO2:** Better understanding about the structure, composition & properties of various biomolecules like carbohydrate, nucleic acids lipids, proteins and vitamins etc. **CO3:** Better understanding about the biological roles of biomolecules. **CO4:** Developing concepts about biological functions &applications of biomolecules in various fields.
CORE VI	**CELL BIOLOGY**	**CO1:** Distinguish between Prokaryotic and Eukaryotic organization. **CO2:** Distinguish between Plant and Animal cells. **CO3:** Understand the structures and functions of various cellular organelles and its importance.

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		CO4: Explain the cell division and cell cycle regulation
CORE VII	**FUNDAMENTAL BIOLOGY –II**	**CO1:** Identify, recognize and define a variety of terms specific to the plant and animals biology (anatomy, physiology, growth, development and pathogenesis). **CO2:** Understand and describe the structure, growth and development of plants and animal systems. **CO3:** Predict an outcome using several pieces of information; and apply the information in scientific manner pertaining to provide solution towards animal and plant pathological problems. **CO4:** Acquire, understand and infer the ability to articulate the pathological processes to the pathogenesis of common plant and animal diseases.
CORE VIII	**CHEMISTRY-II**	**CO1:** Understand the basic idea of Water analysis and Adsorption. **CO2:** Be aware for the classification of elements and periodicity in property. **CO3:** Capable to explain division of s, p, d and f blocks and their electronic configuration. **CO4:** Obtain the basic idea of second law of Thermodynamics. **CO5:** Get the idea of various thermochemical processes and their applications. **CO6:** Get practical aspects of Water analysis.
CORE IX	**PROFESSIONAL ETHICS**	**CO1:** Understand the basics of human values **CO2:** Inculcate human values to grow as responsible human beings with proper personality **CO3:** Maintain ethical conduct and discharge their professional duties **CO4:** Resolve ethical confusions and contradictions and bring harmony at thought, behaviour and action level.
ELECTIVE III	**ENGLISH THROUGH FICTION**	**CO1:** To comprehend English used in Science-Fiction **CO2:** To use vocabulary of Science-Fiction

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		adequately **CO3:** To narrate and describe incident, event or experience confidently in English
ELECTIVE IV	**ENGLISH THROUGH MOVIES**	**CO1:** Further enhance their basic language skills; **CO2:** Identify and use different language functions in an audio-visual context; **CO3:** Learn to use film and its elements as tools for language learning.
CORE X	**MICROBIAL PHYSIOLOGY**	**CO1:** To study the classification of microorganisms according to their nutrition. **CO2:** Understand the methods of pure cultures, cultural characteristics and preservation. **CO3:** Apply their knowledge to differentiate type of growth requirement for specific microbial culture. **CO4:** To study the autotrophic and heterotrophic metabolism.
CORE XI	**MICROBIAL BIOCHEMISTRY**	**CO1:** Understand Enzymes along with its structure, function, mechanism, kinetics and regulation. **CO2:** Understand the mechanism of transport of ions and small molecules across cell membranes. **CO3:** Understand the complete oxidation from Glucose along with other associated pathways and regulation. **CO4:** Understand amino acid metabolism and its regulation.
CORE XII	**CAREER READINESS PROGRAM**	**CO1:** Appreciate English as their second Language and use the same in formal as well as in informal settings effectively. **CO2:** Will be alert while using English as their second language in terms of; Pronunciation, using different word class, using appropriate verb form, Using appropriate conjunction for the given situations, etc. **CO3:** Practice grammatical structures in short conversations and group discussions or classroom discussions **CO4:** Understand the importance of personal

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		and professional goals or benchmarks and create one for them. **CO5:** Students shall reflect on Self Analysis or realization as the key to mastering any discipline Students shall also value the impact of attitude in personal success.
CORE XIII	**CHEMISTRY-III**	**CO1:** Understand the behaviour and the involvement of the elements from periodic table while knowing the general chemistry. **CO2:** Be aware of the basics of cycloalkanes; their methods of preparation, properties and stability. **CO3:** Obtain the information regarding 's' and 'p' block elements and their applications. **CO4:** Understand the basic of hydrolysis, Ionic solids and there various studies.
CORE XIV	**ENVIRONMENTAL STUDIES**	**CO1:** Recognize the structure, composition and interrelationship of environment with humans and non-human communities that shape this planet. **CO2:** Understand types and importance of natural resources and Identify problems arise due to destruction of forest, over-use of energy resources. **CO3:** Understand the structural aspects of ecosystems, types of biodiversity and its conservation. **CO4:** To study types, causes, effects and control measures of environmental pollution.
CORE XV	**ENGLISH THROUGH NON-FICTION**	**CO1:** To develop listening skills and answer comprehensive questions by applying the knowledge gained from the text; **CO2:** To acquaint them with appropriate vocabulary and using the same vocabulary in different contexts; **CO3:** To develop reading skills, by means of reading of different forms text relevant to non-fiction; **CO4:** To develop writing skills focusing on the usage of language in the non-fictional text;

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		CO5: To construct a wide variety of sentences appropriate for non-fiction texts.
CORE XVI	**BACTERIAL SYSTEMATICS**	**CO1:** Understand the importance of Microbial Evolution, Taxonomy, and Diversity. **CO2:** Understand the basic and fundamental aspects of Archaea, Deinococci, Non-Proteobacteria and Proteobacteria along with its ecological role and importance. **CO3:** Understand the basic and fundamental aspects of the low G + C and high G + C gram positives along with its ecological role and importance. **CO4:** To understand the special features and specific adaptations in bacteria.
CORE XVII	**ENVIRONMENTAL MICROBIOLOGY**	**CO1:** To understand the soil structure, soil microflora and biogeochemical cycle. **CO2:** To correlate the role of microorganisms in aquatic ecosystem. **CO3:** Perform basic experiment related to microbiological examination of water and wastewater. **CO4:** To know different stages of waste water treatment and role of microorganisms in these processes.
CORE XVIII	**CHEMISTRY-IV**	**CO1:** Understand the properties of lanthanides and actinides series. Their effect and their application in nuclear studies. **CO2:** Be aware of the basics of active methylene compounds. **CO3:** Obtain the information regarding colloids and their applications. **CO4:** Understand the basic of wave mechanics and their construction.
CORE XIX	**CAREER READINESS PROGRAM**	**CO1:** Understand the nuances of dealing with public at large **CO2:** Exhibit professionalism in formal settings **CO3:** Perform effectively in entrance exams and Campus Recruitment drives. **CO4:** Communicate ideas effectively
CORE XX	**ENGLISH FOR**	**CO1:** To familiarize with workplace culture;

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	WORKPLACE	**CO2:** To share information and collect information; **CO3:** To express one's views and agree or disagree with others; **CO4:** To write workplace documents.
CORE XXI	**BIOINFORMATICS & BIOSTATISTICS**	**CO1:** Recognize importance of Biostatistics in interpreting the biological data and design suitable experiments and Understand the errors obtained between different sets of experiments and calculate it precisely. **CO2:** Comprehend the ways to utilize informatics system to derive useful biological information. **CO3:** Use Bioinformatics tools to analyze different protein or nucleotide sequences to reach meaningful conclusions. **CO4:** To suitably use the structural information available in order to design ways to manipulate molecular systems.
CORE XXII	**MOLECULAR BIOLOGY & GENETICS**	**CO1:** Learn about historical perspectives of central dogma of molecular biology. **CO2:** Explain how genetic information is maintained and encoded in cell. **CO3:** Differentiate between the function of various process involved in Central Dogma of Molecular Biology. **CO4:** Justify the application of Molecular Biology in Genetic Engineering.
CORE XXIII	**BIOCHEMICAL TECHNIQUES & INSTRUMENTATION**	**CO1:** To understand the basics principle in biochemical studies. **CO2:** To study different types of centrifuge with its applications and safety aspects in use of centrifuge. **CO3:** To apply their knowledge to detection and determination of molecules using spectroscopy. **CO4:** To study separation and detection methods of macromolecules
CORE XXIV	**MICROBIAL BIOTECHNOLOGY**	**CO1:** Developing concepts for genetic modification of microorganisms used in biotechnology processes and industrially or

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		environmentally useful processes. **CO2:** Demonstrating application of various fungi for manufacturing of specific biomolecules, enhanced biochemical process and bioconversions. **CO3:** Demonstrating application of various yeasts for manufacturing of specific biomolecules, enhanced biochemical process and bioconversions. **CO4:** Demonstrating application of various algae for manufacturing of specific biomolecules, enhanced biochemical process and bioconversions.
CORE XXV	**FERMENTATION TECHNOLOGY**	**CO1:** Methods for strain improvement and preservation of cultures. **CO2:** Criteria for selection of media for microbial growth. **CO3:** Design of various reactors used in Industries. **CO4:** Upstream as well as downstream processing involved in fermentation industries with specific examples.
CORE XXVI	**BASICS OF IMMUNOLOGY**	**CO1:** Explain functions of Immune System and differentiate between innate and adaptive immunity. **CO2:** Describe development, activation and functions of various cells and organs of Immune System. **CO3:** Apply knowledge of experimental immunological methods for disease diagnosis. **CO4:** Rationalize the disease conditions during Immune System malfunction.
CORE XXVII	**APPLIED MICROBIOLOGY**	**CO1:** To know the role of microorganisms in food and dairy industry. **CO2:** To apply their knowledge to use of microorganism in various industrial applications. **CO3:** To know the basics of plant tissue culture and agricultural microbiology. **CO4:** Understand the significance of microorganisms in environmental microbiology.

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CORE XXVIII	**MEDICAL MICROBIOLOGY**	**CO1:** Understanding of the normal and common pathogenic organisms associated with human infectious diseases. **CO2:** Enhanced understanding about the type of diseases caused by bacteria with mode of transmission and symptoms. **CO3:** Enhanced understanding about the type of diseases caused by virus and fungi with mode of transmissions and symptoms. **CO4:** Role and use of various antimicrobial agents and their mode of action.
CORE XXIX	**VALUE EDUCATION**	**CO1:** Understand importance of role of Values in developing self **CO2:** Inculcate right values, ethics, attitudes, manners and behaviors for life **CO3:** Respond and relate with expectations, competitions and power of networking
CORE XXX	**PROFESSIONAL ETHICS**	**CO1:** Understand the basics of human values **CO2:** Inculcate human values to grow as responsible human beings with proper personality **CO3:** Maintain ethical conduct and discharge their professional duties **CO4:** Resolve ethical confusions and contradictions and bring harmony at thought, behaviour and action level.

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B. Pharm

Bachelor of Pharmacy (B. Pharm)
Batch 2018-21
Program Outcomes (PO)

Marwadi University Rajkot

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Students of all undergraduate pharmacy degree programs at the time of graduation will be able to learn:

PO 1: Patient counselling and community service:
The students will be able to acquire adequate knowledge of patient counselling, drug interactions and latest advances in the field of pharmacy to serve the community better.

utilize and share this knowledge with practitioners for the betterment of health in society. Students will be able to continuously upgrade professional information and be conversant with the latest advances in the field of pharmacy to serve the community better.

PO 2: Domain knowledge of the field:
The students will be able to learn adequate knowledge, practical skills and basic principles related to pharmacy subjects.

PO 3: Professional skills required for pharmacy:
Students will be able to demonstrate skills necessary for the practice of a Pharmacy profession viz. the pharmaceutical legislation, Acts, laws and their implications, synthesis and analysis of medicinal agents, prescription analysis, quality assurance, and regulatory aspects, manufacturing, and storage of pharmaceutical products, and screening of various medicinal agents using animal models for pharmacological activity.

PO 4: Acquire practical skills:
Students will be able to learn practical aspects of APIs synthesis and analyze various pharmaceutical dosage forms as per standards of official books (e.g., WHO, USFDA, MHRA). They will learn pharmacological screening and biological standardization and in-vivo drug interactions, extraction of medicinal plants, the importance of various herbal formulations, Product detailing, marketing, distribution, and selling of pharmaceutical products.

PO 5: Professional assistance to physicians and marketing skills:
They will be able to explain and assist the physicians with prescription analysis and drug interaction. They will also be able to market the medicinal agents for diagnosis, prevention, and therapeutic purposes.

PO 6: Formulations and manufacturing of drugs:
The students will acquire in-depth knowledge of formulation, quality assurance, and storage of various pharmaceutical dosage forms including herbal medicines. The students will be able to understand the concept of community pharmacy and be able to participate in health care programs.

PO 7: Community pharmacy and social responsibility:

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FACULTY OF PHARMACY

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Students will be able to apply the current knowledge of Pharmacy in the best interest of the patients and the community by maintaining high standards of professional ethics.

B. Pharm

Bachelor of Pharmacy (B. Pharm)
Batch 2018-21
Program Specific Outcomes (PSO)

Marwadi University Rajkot

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Students after the completion of graduation in degree pharmacy programs able to:

PSO 1: To impart theoretical knowledge in Pharmaceutics, Pharmaceutical Chemistry, Pharmacology, Pharmacognosy fields as well as practical training and skills development among students through industrial training and research to meet the challenges of the pharmaceutical field

PSO 2: Capable to work in a diverse environment on various projects related to pharmaceutical research in the context of developing technologies in various disciplines as well as regulatory aspects of pharmaceuticals.

PSO 3: To prepare students for future jobs in Hospital Pharmacy, CHCs (Community Health Centres), District Hospitals, Tertiary & Teaching Hospitals, other public sector hospitals and Clinical Pharmacy etc. and develop entrepreneurship skills.

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FACULTY OF PHARMACY

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B. Pharm

Bachelor of Pharmacy (B. Pharm)
Batch 2018-21
Course Outcomes (CO)

Marwadi University Rajkot

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Students of all undergraduate pharmacy degree programs at the time of graduation will be able to learn:

Course Outcomes Semester-I B. Pharm		
Subject with code		**Course Outcome**
Human Anatomy and Physiology – I 13PH0101	CO1	Explain the gross morphology, structure and functions of various organs of the human body.
	CO2	Describe the various homeostatic mechanisms and their imbalances.
	CO3	Identify the various tissues and organs of different systems of human body.
	CO4	Perform the various experiments related to special senses and nervous system.
	CO5	Appreciate coordinated working pattern of different organs of each system.
Pharmaceutical Analysis 13PH0102	CO1	To understand the principles of Volumetric and electro chemical analysis
	CO2	To carryout various volumetric and electrochemical titrations
	CO3	To develop analytical skills
	CO4	To understand working of analytical instruments
Pharmaceutics - I 13PH0103	CO1	Know the history of profession of pharmacy
	CO2	Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
	CO3	Understand the professional way of handling the prescription
	CO4	Preparation of various conventional dosage forms
Pharmaceutical Inorganic Chemistry 13PH0104	CO1	know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
	CO2	understand the medicinal and pharmaceutical importance of inorganic compounds
	CO3	Able to know the properties and medicinal uses of inorganic compounds
	CO4	Understand the assay of inorganic drugs and pharmaceuticals
	CO5	Understand the concept related to acid and base.
Communication Skills 13CS0105	CO1	To understand the behavioural needs for ta pharmacist to function effectively in the areas of pharmaceutical operation
	CO2	Enable to communicate effectively (verbal & non-verbal)
	CO3	Able to effectively manage the team as a team player
	CO4	To trained for interview
	CO5	Able to develop leadership qualities and essentials
Remedial Mathematics 13MA101	CO1	This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform
	CO2	Understand matrices and Determinant

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	CO3	Analytical geometry, Calculus, differential equation and Laplace transform
Remedial Biology 13BI0101	CO1	Know the classification and salient feature of five kingdoms of life
	CO2	understand the basic components of anatomy and physiology of plant
	CO3	Know understand the basic components of anatomy and physiology of animal with special reference to human

Course Outcomes Semester-II B. Pharm		
Subject with code		**Course Outcome**
Human Anatomy and Physiology – II 13PH0201	CO1	Explain the gross morphology, structure and functions of various organs of the human body.
	CO2	Describe the various homeostatic mechanisms and their imbalances.
	CO3	Identify the various tissues and organs of different systems of human body.
	CO4	Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc. and also record blood pressure, heart rate, pulse and respiratory volume.
	CO5	Appreciate coordinated working pattern of different organs of each system
	CO6	Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
Pharmaceutical Organic Chemistry - I 13PH0202	CO1	Write the structure, name and the type of isomerism of the organic compound
	CO2	Write the reaction, name the reaction and orientation of reactions
	CO3	Account for reactivity/stability of compounds
	CO4	Identify/confirm the identification of organic compound
Pharmaceutical Engineering 13PH0203	CO1	To know various unit operations used in pharmaceutical industries
	CO2	To understand the material handling techniques
	CO3	To perform various processes involved in pharmaceutical manufacturing process.
	CO4	To carry out various test to prevent environmental pollution
	CO5	To appreciate and comprehend significance of plant lay out design for optimum use of resources.
	CO6	To appreciate the various preventive methods used for corrosion control in pharmaceutical industries
Environmental Sciences 13EN0201	CO1	Create the awareness about environmental problems among learners
	CO2	Impart basic knowledge about the environment and its allied problem
	CO3	develop an attitude of concern for the environment
	CO4	Motivate learner to participate in environment

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		protection and environment improvement
	CO5	acquire skills to help the concerned individuals in identifying and solving environmental problems
	CO6	strive to attain harmony with nature
Computer Applications in Pharmacy 13PH0204	CO1	Know the various types of application of computers in pharmacy
	CO2	Know the various types of databases
	CO3	Know the various applications of databases in pharmacy

Course Outcomes Semester-III B. Pharm		
Subject with code		**Course Outcome**
Pharmaceutical Organic Chemistry - II 13PH0301	CO1	The syllabus emphasizes on mechanisms and orientation of reactions.
	CO2	This subject deals with general methods of preparation and reactions of some organic compounds.
	CO3	Reactivity of organic compounds are also studied here.
	CO4	Chemistry of fats and oils are also included in the syllabus.
Physical Pharmaceutics – I 13PH0302	CO1	Understand various physicochemical properties of drug molecules in the designing the dosage forms
	CO2	Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
	CO3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
Biochemistry 13PH0303	CO1	Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes
	CO2	Understand the metabolism of nutrient molecules in physiological and pathological conditions
	CO3	Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins
Pathophysiology 13PH0304	CO1	Describe the etiology and pathogenesis of the selected disease states
	CO2	Name the signs and symptoms of the diseases
	CO3	Mention the complications of the diseases
Pharmacognosy and Phytochemistry -I 13PH0305	CO1	To understand the techniques in the cultivation and production of crude drugs
	CO2	To describe the crude drugs, their uses and chemical nature
	CO3	To explain the evaluation techniques for the herbal drugs
	CO4	To analyse the microscopic and morphological evaluation of crude drugs

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Course Outcomes Semester-IV B. Pharm		
Subject with code		**Course Outcome**
Pharmaceutical Organic Chemistry - III 13PH0401	CO1	understand the methods of preparation and properties of organic compounds
	CO2	explain the stereo chemical aspects of organic compounds and stereo chemical reactions
	CO3	know the medicinal uses and other applications of organic compounds
Medicinal Chemistry - I 13PH0402	CO1	Able to know the chemistry of drugs with respect to their Pharmacological activity
	CO2	Know the drug metabolic pathways, adverse effect and therapeutic value of drugs
	CO3	Know the Structural Activity Relationship (SAR) of different class of drugs
Physical Pharmaceutics - II 13PH0403	CO1	Understand various physicochemical properties of drug molecules in the designing the dosage forms
	CO2	Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
	CO3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms
Pharmacology - I 13PH0404	CO1	Understand the pharmacological actions of different categories of drugs
	CO2	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels
	CO3	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases
	CO4	Observe the effect of drugs on animals by simulated experiments
	CO5	Appreciate correlation of pharmacology with other bio medical sciences
	CO6	Understanding of general pharmacology concepts
Pharmaceutical Jurisprudence 13PH0405	CO1	To understand the Pharmaceutical legislation and their implications in the development and marketing of pharmaceuticals.
	CO2	To Understand Various Indian pharmaceutical Acts and Laws
	CO3	To study the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
	CO4	To study the code of ethics during the pharmaceutical practice.

Course Outcomes Semester-V B. Pharm		
Subject with code		**Course Outcome**
Medicinal Chemistry - II 13PH0501	CO1	To study the chemistry of drugs with respect to their pharmacological activity
	CO2	Know the drug metabolic pathways, adverse effect and therapeutic value of drugs
	CO3	To understand the Structural Activity Relationship of different class of drugs
	CO4	Understanding of the basic biological and

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		pharmacological interactions by using both natural products and synthetic molecules
	CO5	Able to write the chemical synthesis of selected drugs
Pharmacology - II 13PH0502	CO1	Upon completion of the course, the student shall be able to understand the mechanism of drug action and its relevance in the treatment of different diseases.
	CO2	Demonstrate the isolation of different organs/tissues from the laboratory animals by simulated experiments.
	CO3	Demonstrate the various receptor actions using isolated tissue preparation.
	CO4	Appreciate correlation of pharmacology with related medical sciences
Pharmacognosy and Phytochemistry - II 13PH0503	CO1	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
	CO2	To understand the preparation and development of herbal formulation
	CO3	To understand the herbal drug interactions
	CO4	To carryout isolation and identification of phyto-constituents
Pharmaceutical Microbiology 13PH0504	CO1	Understand methods of identification, cultivation and preservation of various microorganisms
	CO2	To understand the importance and implementation of sterlization in pharmaceutical processing and industry
	CO3	Learn sterility testing of pharmaceutical products
	CO4	Understand the cell culture technology and its applications in pharmaceutical industries
	CO5	Carried out microbiological standardization of Pharmaceuticals.
Pharmaceutical Biotechnology 13PH0505	CO1	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
	CO2	Genetic engineering applications in relation to production of pharmaceuticals.
	CO3	Importance of Monoclonal antibodies in Industries.
	CO4	Appreciate the use of microorganisms in fermentation technology.

Course Outcomes Semester-VI B. Pharm		
Subject with code		**Course Outcome**
Medicinal Chemistry - III 13PH0601	CO1	Understand the importance of drug design and different techniques of drug design.
	CO2	Understand the chemistry of drugs with respect to their biological activity.
	CO3	Know the metabolism, adverse effects and therapeutic value of drugs.
	CO4	Know the importance of SAR of drugs
Pharmacology - III 13PH0602	CO1	Understand the mechanism of drug action and its relevance in the treatment of respiratory, digestive and infectious diseases

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	CO2	Comprehend the principles of toxicology and treatment of various poisonings
	CO3	Appreciate the correlation of pharmacology with related medical sciences
Herbal Drug Technology 13PH0603	CO1	Understand raw material as a source of herbal drugs from cultivation to herbal drug product
	CO2	Know the WHO and ICH guidelines for the evaluation of herbal drugs.
	CO3	Know the herbal cosmetics, natural sweeteners, nutraceuticals.
	CO4	Appreciate patenting of herbal drugs, GMP.
Biopharmaceutics and Pharmacokinetics 13PH0604	CO1	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
	CO2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
	CO3	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
	CO4	Understand various pharmacokinetic parameters, their significance & applications.
Industrial Pharmacy - I 13PH0605	CO1	Know the various pharmaceutical dosage forms and their manufacturing Techniques.
	CO2	Know various considerations in the development of pharmaceutical dosage forms.
	CO3	Formulate solid, liquid, and semisolid dosage forms and evaluate them for their quality.

Course Outcomes Semester-VII B. Pharm		
Subject with code		**Course Outcome**
Instrumental Methods of Analysis 13PH0701	CO1	To understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
	CO2	To understand the chromatographic separation and analysis of drugs
	CO3	Perform quantitative & qualitative analysis of drugs using various analytical instruments.
Industrial Pharmacy - II 13PH0702	CO1	Know the process of pilot plant and scale-up of pharmaceutical dosage forms.
	CO2	Understand the process of technology transfer from lab scale to commercial batch.
	CO3	Know different Laws and Acts that regulate the pharmaceutical industry.
	CO4	Understand the approval process and regulatory requirements for drug products.
Pharmacy Practice 13PH0703	CO1	Know about Hospital and its organization, hospital & community Pharmacy, detect, assess and report adverse drug reactions.
	CO2	Know various drug distribution methods in a hospital, hospital formulary, therapeutic drug monitoring, medication adherence and able to do

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		medication history interview and counsel the patients
	CO3	Know the functions of Therapeutic Drug Committee, role of pharmacist in education and training, do patient counselling in community pharmacy & communication skills of a pharmacist (with prescribers & patients)
	CO4	Know pharmaceutical care services, monitor drug therapy through medication chart review/clinical review, role of clinical pharmacist, appreciate the concept of rational use of OTC drugs
	CO5	Appreciate the pharmacy stores management and inventory control, interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states.
Novel Drug Delivery Systems 13PH0704	CO1	To understand various approaches for the development of novel drug delivery systems.
	CO2	To understand the criteria for the selection of drugs and polymers for the development of novel drug delivery systems, their formulation and evaluation.
Quality Assurance 13PH0705	CO1	Understand the cGMP aspects in a pharmaceutical industry.
	CO2	Appreciate the importance of documentation.
	CO3	Understand the scope of quality certifications applicable to pharmaceutical industries.
	CO4	Understand the responsibilities of QA & QC departments.
Practice School report 13PH0706	CO1	Provide opportunity for the students to enhance their knowledge and technical skills required for various pharmaceutical jobs
	CO2	Ignite scientific temper through collaborative and integrated learning under the guidance of professionals
	CO3	Develop skills required for scientific literature review, finding research gaps, etc
	CO4	Understand of how the concepts learned in the classroom will be applicable in the real-life scenario
	CO5	Sensitize students to the expectation of the work environment, their strengths and weaknesses.

Course Outcomes Semester-VIII B. Pharm		
Subject with code		**Course Outcome**
Biostatistics and Research Methodology 13PH0801	CO1	Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment).
	CO2	Know the various statistical techniques to solve statistical problems.
	CO3	Appreciate statistical techniques in solving the problems.
Social and Preventive Pharmacy 13PH0802	CO1	Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
	CO2	Have a critical way of thinking based on current

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		healthcare development.
	CO3	Evaluate alternative ways of solving problems related to health and pharmaceutical issues.
Pharma Marketing Management 13PH0803	CO1	Understand general concepts and scope of marketing, Consumer & Industry buying buying behaviour, Market research, prescribing motivation
	CO2	Understanding of concepts related to product line, product mix decisions, product life cycle, portfolio analysis; product positioning
	CO3	Understanding of concepts relating to methods of product promotion
	CO4	Understanding of pharmaceutical marketing channels & role of professional sales representative
	CO5	Understanding of pricing methods and strategies, issues in price management in the pharmaceutical industry
Pharmaceutical Regulatory Science 13PH0804	CO1	Know about the process of drug discovery and development.
	CO2	Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
	CO3	Know the regulatory approval process and their registration in Indian and international markets.
Pharmacovigilance 13PH0805	CO1	History, national and international scenario, importance of safety monitoring
	CO2	Dictionaries, coding, detection and reporting of adverse drug reaction and their assessment
	CO3	classification of disease and drugs, methods to generate safety data, evaluation of drug safety in special population
	CO4	Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India.
	CO5	ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning and CIOMS requirements for ADR reporting.
	CO6	Writing case narratives of adverse events and their quality.
Quality Control and Standardization of Herbals 13PH0806	CO1	Know WHO guidelines for quality control of herbal drugs.
	CO2	Know Quality assurance in the herbal drug industry.
	CO3	Know the regulatory approval process and their registration in Indian and international markets.
	CO4	Appreciate EU and ICH guidelines for quality control of herbal drugs.
Computer-Aided Drug Design 13PH0807	CO1	Design and discovery of lead molecules.
	CO2	The role of drug design in the drug discovery process.
	CO3	The concept of QSAR and docking.
	CO4	Various strategies to develop a new drug-like molecule.
	CO5	The design of new drug molecules using molecular

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		modelling software.
Cell and Molecular Biology 13PH0808	CO1	Understand cell and molecular biology history.
	CO2	understand composition, cellular functioning and chemical foundations of cell biology.
	CO3	understand protein structure, cell structure and its function.
	CO4	understand DNA properties, cell cycle and basic molecular genetics
Cosmetic Science 13PH0809	CO1	Know the regulations about cosmetics and cosmetic excipients.
	CO2	know the preparations of various skincare products like creams, antiperspirants, deodorants, hair care products etc.
	CO3	know about the role of herbs in sunscreens.
Experimental Pharmacology 13PH0810	CO1	Appreciate the applications of various commonly used laboratory animals.
	CO2	Appreciate and demonstrate the various screening methods used in preclinical research.
	CO3	Appreciate and demonstrate the importance of biostatistics and research methodology.
	CO4	Design and execute a research hypothesis independently.
Advanced Instrumentation Techniques 13PH0811	CO1	Understand the advanced instrument used and its applications in drug analysis.
	CO2	Understand the chromatographic separation and analysis of the drug.
	CO3	Understand the calibration of various analytical instruments.
	CO4	Know analysis of drugs using various analytical instruments.
Dietary Supplements and Nutraceuticals 13PH0812	CO1	Understand the need for supplements by the different groups of people to maintain a healthy life.
	CO2	Understand the outcome of deficiencies in dietary supplements.
	CO3	Appreciate the components in dietary supplements and their application.
	CO4	Appreciate the regulatory and commercial aspects of dietary supplements including health claims.
Project Work 13PH0813	CO1	Provide an opportunity to explore the area of interest
	CO2	Develop the technical skills required for research work
	CO3	Develop skills required for literature review, finding research gaps, and writing a scientific report of minor research project

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Program Outcomes (PO) & Program Specific Outcomes (PSO) and CO(Course Outcome)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	Students shall demonstrate skills, the knowledge and competence in the analysis, design and development of computer-based systems addressing industrial and social issues.
PSO2	Students shall have competence to take challenges associated with future technological issues associated with security, wearable devices, augmented reality, Internet of Anything etc.

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Course OutCome

Semester1	
Course Title	**COMPUTER WORKSHOP**
Course Code	**01CE0102**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the basic concept and structure of computer hardware and networking.	
CO2 : Identify the existing configuration of the computers and peripherals.	
CO3 : Upgrading the system as and when required.	
CO4 : Apply their knowledge about computer peripherals to identify / rectify problems onboard.	
CO5 : Integrate the PCs into local area network and re-install operating system and various application programs.	
CO6 : Manage data backup and restore operations on computer and update application software.	
Course Title	**CAREER READINESS PROGRAM**
Course Code	**01CR0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understands how to use different tools of language in order to communicate effectively. (Understanding)	
CO2 : Applies appropriate grammatical structures and a wide range of vocabulary in spoken and written discourse. (Applying)	
CO3 : Choose appropriate alternatives in personal and professional life. (Analyze)	
CO4 : Displaying the best of the professional attitude and behavior. (Implying)	
Course Title	**BASICS OF ELECTRONICS ENGINEERING**
Course Code	**01EC0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the Voltage current and operation of semiconductor devices, circuits and operational Amplifier.	
CO2 : Apply basic fundamentals of semiconductor devices and operational amplifier to illustrate/show the operation of application.	
CO3 : Apply the basic knowledge of simulation tool & Circuit level concepts to synthesize real life problems.	
CO4 : Analyze the behavior of Electronics circuits containing Semiconductor device, Operational Amplifier or Verify using Modern tools.	
CO5 : Design, implement and analyze of electronic circuits to solve the problem with in society.	
Course Title	**ELEMENTS OF ELECTRICAL ENGINEERING**
Course Code	**01EE0101**

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Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Recognize importance of electrical energy and its day to day applications	
CO2 : Interpret the role of resistor, capacitor and inductor and their behavior under various system conditions	
CO3 : Qualitatively compare AC and DC system as well as single phase and three phase systems in AC.	
CO4 : Analyze and solve DC Circuits, AC Single phase and Three Phase Circuits	
CO5 : Explain the need of batteries, its characteristics and charging methods.	
CO6 : Choose the most appropriate protective devices based on the appliance used and safety requirements.	
Course Title	**ENGINEERING MATHEMATICS- I**
Course Code	**01MA0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Expand functions using Maclaurin's and Taylor's series.	
CO2 : apply and solve first order differential equations to real life problems	
CO3 : .Verify Euler's theorem and Modified Euler's theorem for given function of several variables.	
CO4 : Apply partial differentiation to evaluate equations of tangent plane and normal line for given surface.	
CO5 : Apply the concepts of convergence and divergence of infinite series in problem of science, technology and engineering.	
CO6 : Apply the method of Lagrange's multiplier to solve the problems of constrained optimization.	
Course Title	**ELEMENTS OF MECHANICAL ENGINEERING**
Course Code	**01ME0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand basic terminologies and fundamentals of mechanical system by correlating science concept.	
CO2 : Apply the governing laws of mechanical engineering to find solution of different systems.	
CO3 : Identify the broad context of Mechanical engineering problems and identifying possible contributing factors.	
CO4 : Identify functional characteristics of various mechanisms.	
CO5 : Analyze the various energy conversion cycles and systems.	
Course Title	**COMMUNICATION SKILLS**
Course Code	**01SL0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : After completion of this course, student will be able to comprehend texts based on science and technology.	

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CO2 : After completion of this course, student will be able to develop the ability to interpret informative and analytical texts.	
CO3 : After completion of this course, student will be able to evolve an understanding of components of academic writing.	
CO4 : After completion of this course, student will be able to explain technical concepts in written form.	
CO5 : After completion of this course, student will be able to compose written texts for the purposes of academic writing.	
Course Title	**READING & WRITING FOR TECHNOLOGY**
Course Code	**01SL0102**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To enhance reading skills for academic purposes	
CO2 : To evolve appropriate writing competence for academic purposes	
CO3 : To carry out reading and writing tasks in the context of technology and technology related content	
CO4 : To express their ideas in formal, academic written form	
Course Title	**SPEAKING & PRESENTATION SKILLS**
Course Code	**01SL0103**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Develop speaking competence for academic purpose	
CO2 : Speak on a given topic in the context of technology	
CO3 : Express ideas in an organized way for conversations and interactions related to academic requirements	
CO4 : Enhance the ability to make a presentation on a given topic	
Semester2	
Course Title	**COMPUTER PROGRAMMING**
Course Code	**01CE0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Express programming problems logically through flow charts and algorithms (Understand).	
CO2 : Identify various conditional control structures and jumping structures and use them. (Remember)	
CO3 : Express and Distinguish various loops in C language (Analyze).	
CO4 : Demonstrate the usage of concepts like strings, arrays, pointers, Structures(Apply)	
CO5 : Select the appropriate user defined function category.(Evaluate)	
CO6 : Develop the programs on dynamic memory allocations and Files.(Create)	

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Course Title	**CAREER READINESS PROGRAM**
Course Code	**01CR0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understands how to use different tools of language in order to communicate effectively. (Understanding)	
CO2 : Applies appropriate grammatical structures and a wide range of vocabulary in spoken and written discourse. (Applying)	
CO3 : Choose appropriate alternatives in personal and professional life. (Analyze)	
CO4 : Displaying the best of the professional attitude and behavior. (Implying)	
Course Title	**DIGITAL ELECTRONICS**
Course Code	**01EC0102**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Develop understanding of basic digital circuits like logic gates, logic families, flip flops and memory devices	
CO2 : Use knowledge of various number systems and binary codes to solve conversion problems.	
CO3 : Apply concepts of Boolean algebra and other minimization techniques for digital circuit design.	
CO4 : Design digital circuits using different combinational and sequential logic.	
CO5 : Implement various combinational and sequential circuits using appropriate hardware/simulation.	
Course Title	**BASICS OF ENVIRONMENTAL STUDIES**
Course Code	**01EN0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand and realize the multidisciplinary nature of Environment & its components.	
CO2 : Know the importance of natural resources for the sustainable development of life.	
CO3 : Understand the effect of growing population on the Environment.	
CO4 : Classify the different types of pollution and measure to control pollution	
CO5 : Learn about the Environmental issues faced globally and various steps taken globally to solve such Environmental issues.	
Course Title	**PHYSICS**
Course Code	**01GS0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To Interpret the mechanics of various types of sound waves -what they look like, how they are produced, interact with other sound waves and materials.	
CO2 : To Describe the basic physical principles and applications of ultrasonic sound.	

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CO3 : To Discuss construction, principle of optical fiber communication. Analyze the structure and properties of lasers to their performance and intended applications .	
CO4 : To Utilize the concept of superconductivity, magnetic and advanced engineering materials and their behaviors under various system conditions.	
CO5 : To Explain the need of NDT and its methodologies. Illustrate the properties and mechanisms of nano physics.	
CO6 : To demonstrate in the laboratory the ability to collect, analyze data and to prepare coherent reports of his or her findings	
Course Title	**ENGINEERING MATHEMATICS-II**
Course Code	**01MA0151**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Explain the linear dependence of vectors of different vector space.	
CO2 : Understand role of mathematical modeling in taking care of different issues related to heat transfer, mechanics, momentum, etc.	
CO3 : Understand the role of multiple integral in finding volume of three dimensional objects, finding area between to two curves, finding moment of inertia etc.	
CO4 : Understand the key role of vector integral calculus in finding flux in vector field, finding potential function, etc.	
CO5 : Check the convergence and divergence of various functions which are expandable in infinite terms.	
CO6 : Gain the fundamental knowledge about special function like Beta and Gamma and its applications.	
Course Title	**ENGINEERING DRAWING**
Course Code	**01ME0103**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Interpret engineering drawings using fundamental technical mathematics.	
CO2 : Comprehend the theory of projection.	
CO3 : To improve their visualization skills so that they can apply these skills in developing new products.	
CO4 : To improve their technical communication skill in the form of communicative drawings	
CO5 : Construct basic and intermediate geometry.	
CO6 : To know, understand and able to define the conventions and the methods of engineering drawing.	
Semester3	
Course Title	**DATA STRUCTURE**
Course Code	**01CE0301**
Course Outcomes: After Successful completion of the above course, students will be able to:	

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CO1 : differentiate Linear and Non-Linear data structures (Understand)	
CO2 : implement Linear and Non-Linear data structures such as Array, Stack, Queue, Linked List, Tree (Apply)	
CO3 : perform different Graph traversal methods Depth First Search, Breadth First Search (Apply)	
CO4 : implement sorting and searching techniques such as Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Sequential search, Binary search (Apply)	
CO5 : Apply Hash functions and Collision Resolution by Open Addressing and Chaining (Apply)	
CO6 : choose efficient data structure for a given problem (Evaluate)	
Course Title	**DESIGN THINKING AND PROBLEM SOLVING SKILLS**
Course Code	**01CE0304**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the importance of Design Thinking.(Understand)	
CO2 : Evaluate the quality of your information and your emotions; keep thinking straight. (Evaluate)	
CO3 : Identify skills and personality traits of successful problem solving. (Apply)	
CO4 : Apply standard problem-solving heuristics to aid in problem solving. (Apply)	
CO5 : Apply problem-solving techniques to programming activities. (Apply)	
CO6 : Formulate and successfully communicate the solutions to problems. (Create)	
Course Title	**DATABASE MANAGEMENT SYSTEM**
Course Code	**01CE1302**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Know the various views of Database	
CO2 : Learn different models of Database	
CO3 : Normalize the data in various normal forms	
CO4 : Query processing and optimization	
CO5 : Database Security	
CO6 : Structured Query Language (SQL) and PL/SQL	
Course Title	**OBJECT ORIENTED DESIGN AND PROGRAMMING**
Course Code	**01CE1303**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Identify the potential benefits of object-oriented programming features and compare them with structure-oriented programming features. (understand)	
CO2 : Appy various object-oriented Features and Concepts to designing programs and to solve various computing problems using C++ language. (apply)	
CO3 : Analyze programs based on exception handling and using advanced features like STL for faster development. (analysis)	

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CO4 : Apply Different concepts of object-oriented programming to develop real-world applications. (Apply)	
Course Title	**PROFESSIONAL ETHICS**
Course Code	**01CR0302**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Express the basics of human values.	
CO2 : Articulate human values and grow as responsible human beings in the society	
CO3 : Develop ethical conduct and deliver their professional duties.	
CO4 : Analyze ethical confusions and contradictions to bring harmony at thought, behaviour and action level	
Course Title	**DATA COMMUNICATION AND NETWORKING**
Course Code	**01IT0301**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand various concepts of signals, data communication, networking, layered architecture. (Understand)	
CO2 : Distinguish and relate various physical Medias, interfacing standards and adapters. (Analyze)	
CO3 : Use various concepts and methods for enhancement of channel capacity (Apply)	
CO4 : Analyze various modulation technique in analog and digital careery system. (Analyze)	
CO5 : Explain Physical layer techniques associated with LAN, MAN and WAN (Apply)	
CO6 : Analyze short range and long range wireless technologies. (Analyze)	
Course Title	**DISCRETE MATHEMATICS AND GRAPH THEORY**
Course Code	**01MA0231**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand graphs, Logic and Lattices.	
CO2 : Apply abstract concept of Predicate in design of computing machines, data structures for programming languages.	
CO3 : Apply concept of Boolean algebra in switching theory and building basic electronic circuits.	
CO4 : Apply concepts of Kruskal's algorithm to find the shortest possible distance between two objects.	
CO5 : Apply concepts of graph theory in data mining and networking.	
Semester4	
Course Title	**OPERATING SYSTEM**
Course Code	**01CE0401**

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Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understanding the role of operating system with its function and services. (Understanding)	
CO2 : Compare Various Algorithm used for CPU Scheduling, Memory management and Disk Scheduling Algorithm. (Evaluate)	
CO3 : Apply Various Concepts related with Deadlock to solve Problems. (Apply)	
CO4 : Analyze Protection and Security Mechanism in Operating System. (Analyze)	
Course Title	**COMPUTER ORGANIZATION AND ARCHITECTURE**
Course Code	**01CE0402**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand and describe the basics of various architectural units of the Computer System	
CO2 : To be able to apply the knowledge of combinational and sequential logical circuits to mimic a simple computer architecture.	
CO3 : To be able to apply logic to create assembly language programs for different microoperations.	
CO4 : To be able to Demonstrate ALU operations and instruction level parallelism.	
CO5 : To be able to Identify and differentiate various methods for I/O mechanisms.	
CO6 : To be able to identify and differentiate various types of memory and memory mapping techniques.	
Course Title	**OBJECT ORIENTED PROGRAMMING WITH JAVA**
Course Code	**01CE0403**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand object oriented programming concepts in java	
CO2 : Comprehend building blocks of OOPs language, inheritance, package and interfaces.	
CO3 : Identify exception handling methods and collection framework.	
CO4 : Implement file handling and multithreading in object oriented programs.	
CO5 : Develop GUI based application using applet, awt and swing.	
Course Title	**HUMAN CENTRIC DESIGN APPROACH**
Course Code	**01CE0405**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the Human Centric approach for design.	
CO2 : Understand significance of the empathy and solution based on empathy	
CO3 : Importance of design thinking when addressing social change	
CO4 : Generate the innovative ideas and will convert in new solutions	
CO5 : Build a possible prototype solutions	
Course Title	**COMPUTER NETWORK**

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Course Code	**01IT0401**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : (Remember) Describe the importance of computer networks and various performance metrics.	
CO2 : (Understand) Distinguish and relate various protocols in layered architecture of computer networks.	
CO3 : (Apply) Explain various topological and routing strategies for IP based networks.	
CO4 : (Apply) Prepare client server application using socket programming	
CO5 : (Analysis) Compare various devices and protocols that builds computer network.	
CO6 : (Evaluate) Measure of network parameters.	
Course Title	**STATISTICAL AND NUMERICAL METHODS**
Course Code	**01MA1281**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the basic concepts of probability and distribution to realize the logic of data sciences	
CO2 : Apply the concept of Data representation and Analysis in various field of engineering like image processing etc.	
CO3 : Apply concept of Correlation and Regression in result analysis and Business forecasting using EXCEL.	
CO4 : Analyse errors for accuracy and precision of solutions to hike up the level of accuracy in daily calculations.	
CO5 : Apply curve fitting and interpolation techniques to approximate a function into any known curve to analyse their behaviours.	
CO6 : Apply Numerical integration to obtain aproximate solutions to mathematical problems	
Semester5	
Course Title	**OBJECT ORIENTED PROGRAMMING WITH JAVA**
Course Code	**01CE0403**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand object oriented programming concepts in java	
CO2 : Comprehend building blocks of OOPs language, inheritance, package and interfaces.	
CO3 : Identify exception handling methods and collection framework.	
CO4 : Implement file handling and multithreading in object oriented programs.	
CO5 : Develop GUI based application using applet, awt and swing.	
Course Title	**HUMAN CENTRIC DESIGN APPROACH**
Course Code	**01CE0405**

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Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the Human Centric approach for design.	
CO2 : Understand significance of the empathy and solution based on empathy	
CO3 : Importance of design thinking when addressing social change	
CO4 : Generate the innovative ideas and will convert in new solutions	
CO5 : Build a possible prototype solutions	
Course Title	**MICROPROCESSOR FUNDAMENTALS & PROGRAMMING**
Course Code	**01CE0501**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the architecture and pin diagram of 8085 and advance Microprocessor. (Understand)	
CO2 : Implement Memory and I/O interfacing in 8085 Microprocessor. (Apply)	
CO3 : Sketch Timing diagram after getting brief with the addressing mode, byte and machine cycle of instructions.(Apply)	
CO4 : Apply the concepts of instruction to write, Debug & Simulate assembly language program of 8085 microprocessors. (Apply)	
CO5 : Analyze time delay generation, counter and waveform generation (Analyze).	
Course Title	**ADVANCED JAVA PROGRAMMING**
Course Code	**01CE0502**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Describe the components of J2EE Architecture, MVC Framework and Multi-tier Application and Various Network Protocol (Understand)	
CO2 : To make use of Servlet and JSP API in the process of enterprise application deployment. (Apply)	
CO3 : Implement components such as Session, Filters, JSTL, Beans. (Apply)	
CO4 : Distinguish Application Server, Web Container, JDBC and ORM tools.(Analyse)	
CO5 : Design and Development of web application having collaboration of Servlets, JSPs, JSF, Spring and Hibernate base upon the requirement. (Create)	
Course Title	**DESIGN AND ANALYSIS OF ALGORITHM**
Course Code	**01CE0503**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Learn and understand asymptotic notations for performance of different algorithms. (Understand)	
CO2 : Derive and solve recurrences describing the performance of divide-and-conquer algorithms (Evaluate)	
CO3 : Design optimal solution by applying various methods like Dynamic Programming and Greedy Method. (Application)	

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CO4 : Summarize the certain graph algorithms and their analysis.(Application)	
CO5 : Apply pattern matching algorithms (Application)	
CO6 : Differentiate polynomial and non-polynomial problems. (Analysis)	
Course Title	**THEORY OF AUTOMATA AND FORMAL LANGUAGES**
Course Code	**01CE0504**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Gain the knowledge of basic kinds of finite automata and their capabilities.(Knowledge)	
CO2 : To understanding of regular and context-free languages(Comprehension)	
CO3 : To understand the time and space complexity for p and np problems.(Comprehension)	
CO4 : To apply proved results using proof by induction, proof by contradiction, proof by construction, proof by case exhaustion.(Application)	
CO5 : Gain the knowledge of describe and change language to regular expressions and grammars.(Application)	
CO6 : Constructing the Turing machine for Recursive languages.(Analysis)	
Course Title	**IMAGE PROCESSING**
Course Code	**01CE0507**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To understand the formation of digital image and its various formats.[Understand]	
CO2 : Implement various filtering techniques in spatial domain and frequency domain.[Apply]	
CO3 : Implement the colour and gray level image enhancement techniques[Apply]	
CO4 : Create Matlab program to apply morphological operators and Image Segmentation.[Apply]	
Course Title	**REVERSE ENGINEERING**
Course Code	**01CE0508**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand the problem in the existing process.	
CO2 : Collect the large number of data/ information for the product	
CO3 : Depth analyze of the products and extraction of real time data	
CO4 : Understand the principles behind the design of the product, ways to redesign and improve the performance of the system.	
Course Title	**CAREER READINESS PROGRAM**
Course Code	**01CR0101**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understands how to use different tools of language in order to communicate effectively. (Understanding)	

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CO2 : Applies appropriate grammatical structures and a wide range of vocabulary in spoken and written discourse. (Applying)	
CO3 : Choose appropriate alternatives in personal and professional life. (Analyze)	
CO4 : Displaying the best of the professional attitude and behavior. (Implying)	
Course Title	**SEMINAR**
Course Code	**01IT0502**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Analyzing, Construct/create, and evaluate information presented in technical and/or scientific journals.	
CO2 : Examine best methods and implement them for developing and presenting a quality scientific presentation on recent trends using various presentation software like PowerPoint, Prezi (http://prezi.com), etc.	
CO3 : Create 5-10 minute video presentation to be delivered via YouTube based upon the analysis and learning f one journal article or recent technology for a second seminar presentation.	
CO4 : Practice critical evaluation of peer students' work.	
Course Title	**ADVANCED COMPUTER NETWORK**
Course Code	**01IT0503**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Describe concepts of scaling networks and wireless LAN (Analyze)	
CO2 : Implement OSPF operations, configuration and troubleshoot (Apply)	
CO3 : Implement EIGRP operations, configuration and troubleshoot (Apply)	
CO4 : Implement PPP operations, configuration and troubleshoot (Apply)	
CO5 : Design ACL for IPv4 and IPv6 with advance configuration (Create)	
Course Title	**ENGINEERING MATHEMATICS-II**
Course Code	**01MA0151**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Explain the linear dependence of vectors of different vector space.	
CO2 : Understand role of mathematical modeling in taking care of different issues related to heat transfer, mechanics, momentum, etc.	
CO3 : Understand the role of multiple integral in finding volume of three dimensional objects, finding area between to two curves, finding moment of inertia etc.	
CO4 : Understand the key role of vector integral calculus in finding flux in vector field, finding potential function, etc.	
CO5 : Check the convergence and divergence of various functions which are expandable in infinite terms.	
CO6 : Gain the fundamental knowledge about special function like Beta and Gamma and its applications.	

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Semester6	
Course Title	**COMPILER DESIGN**
Course Code	**01CE0601**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To be able to describe compiler and different phases. Using this translate program from source code to executable code and files. (Knowledge)	
CO2 : Able to explain lexical analysis phase and their connection to language definition through regular expressions and grammars. (Comprehensive)	
CO3 : Able to explain the syntax analysis phase and differentiate among various parsing techniques and grammar transformation techniques. (Comprehensive)	
CO4 : Able to apply formal attributed grammars for specifying the syntax and semantics of programming languages. (Application)	
CO5 : To be able to calculate the effectiveness of optimization and differences between machine dependent and independent translation. (Application)	
CO6 : Able to use the powerful compiler generation tools such as Lex and YACC. (Analysis)	
Course Title	**.NET TECHNOLOGIES**
Course Code	**01CE0602**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To develop applications with Dot-Net framework	
CO2 : To create Console based C# application	
CO3 : To create GUI based desktop application using C# Win-form application	
CO4 : To create basic database application using ADO.net technology	
CO5 : To Design and develop basic applications using WPF	
Course Title	**CYBER SECURITY [DEPARTMENT ELECTIVE - 2]**
Course Code	**01CE0604**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understanding the basic technical, social and law suits aspect of Cyber Security (Remember)	
CO2 : Integrate the ethical hacking process and scripting (Create)	
CO3 : The students can use basic security tools to enhance cyber security. (Analyse)	
CO4 : Understand the security management methods and auditing. (Evaluation)	
CO5 : Apply the security principles to system design. (Apply)	
Course Title	**DESIGN ENGINEERING AND PROJECT MANAGEMENT**
Course Code	**01CE0606**
Course Outcomes: After Successful completion of the above course, students will be able to:	

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CO1 : Understand the importance of Design Engineering.	
CO2 : Identify various Design Engineering approaches.	
CO3 : Apply various methodologies to design the product and in testing the product.	
CO4 : Understand various Project Management Processes.	
CO5 : Demonstrate effective project execution and control techniques that result in successful projects.	
Course Title	**PROFESSIONAL ETHICS**
Course Code	**01CR0302**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Express the basics of human values.	
CO2 : Articulate human values and grow as responsible human beings in the society	
CO3 : Develop ethical conduct and deliver their professional duties.	
CO4 : Analyze ethical confusions and contradictions to bring harmony at thought, behaviour and action level	
Course Title	**BUSINESS BENCHMARK**
Course Code	**01CR0601**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Contrast and understand short pieces of business correspondence reports or proposals. (Understanding)	
CO2 : Read and Categorize the extracts from business publications. Ask for information required. (Analyzing)	
CO3 : Listen to, understand and contribute to discussions in meetings. (Remembering)	
CO4 : Prepare the presentation on a familiar topic. (Applying)	
Course Title	**DIGITAL ELECTRONICS**
Course Code	**01EC0102**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Develop understanding of basic digital circuits like logic gates, logic families, flip flops and memory devices	
CO2 : Use knowledge of various number systems and binary codes to solve conversion problems.	
CO3 : Apply concepts of Boolean algebra and other minimization techniques for digital circuit design.	
CO4 : Design digital circuits using different combinational and sequential logic.	
CO5 : Implement various combinational and sequential circuits using appropriate hardware/simulation.	
Course Title	**BASICS OF ENVIRONMENTAL STUDIES**
Course Code	**01EN0101**

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Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand and realize the multidisciplinary nature of Environment & its components.	
CO2 : Know the importance of natural resources for the sustainable development of life.	
CO3 : Understand the effect of growing population on the Environment.	
CO4 : Classify the different types of pollution and measure to control pollution	
CO5 : Learn about the Environmental issues faced globally and various steps taken globally to solve such Environmental issues.	
Course Title	**SOFTWARE ENGINEERING**
Course Code	**01IT0601**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand various software engineering principles and their application (Understand)	
CO2 : Demonstrate use of various Agile methodologies for software development (Apply)	
CO3 : Apply various modelling techniques for designing system requirement (Apply)	
CO4 : Identify different types of risk and evaluate its impact on software system(Evaluate)	
CO5 : Distinguish different testing strategies and Create test cases. (Create)	
CO6 : Able to understand and apply the basic project management practices in real life projects (Apply)	
Course Title	**WEB TECHNOLOGY**
Course Code	**01IT0602**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To understand and compare the fundamentals of Web hosting and domain name services. (Analyze)	
CO2 : To understand various non-browser specific web design principles. (Understand)	
CO3 : To understand the need and be able to develop HTML and CSS pages with valid structure as well as content. (Evaluate)	
CO4 : To understand and be able to develop JavaScript/jQuery code to access the DOM structure of web document and object properties. (Apply)	
CO5 : To develop dynamic web pages with usage of server-side scripting PHP and MySQL. (Evaluate)	
Course Title	**ENGINEERING DRAWING**
Course Code	**01ME0103**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Interpret engineering drawings using fundamental technical mathematics.	
CO2 : Comprehend the theory of projection.	
CO3 : To improve their visualization skills so that they can apply these skills in developing new products.	
CO4 : To improve their technical communication skill in the form of communicative drawings	

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CO5 : Construct basic and intermediate geometry.	
CO6 : To know, understand and able to define the conventions and the methods of engineering drawing.	
Semester7	
Course Title	**MOBILE COMPUTING**
Course Code	**01CE0701**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To understand the concepts of Mobile Communication.	
CO2 : To analyze next-generation Mobile Communication System.	
CO3 : To understand the network and transport layers of Mobile Communication.	
CO4 : Analyze various protocols of all layers for mobile and ad hoc wireless communication networks.	
CO5 : To understand IP and TCP layers of Mobile Communication.	
Course Title	**ARTIFICIAL INTELLIGENCE**
Course Code	**01CE0702**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Assess critically the techniques presented and to apply them to real world problems(Analyze)	
CO2 : Mindful of the significant difficulties confronting AI and the multifaceted nature of run of the mill issues inside the field(remember)	
CO3 : Comprehend the significant zones and difficulties of AI(Understanding)	
CO4 : Apply fundamental AI calculations to take care of issues(Apply)	
CO5 : Get a learning of utilizations in various zones of registering including the web and human communication(Evaluate)	
Course Title	**ANDROID PROGRAMMING**
Course Code	**01CE0704**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Demonstrate the Understanding of fundamental of Android Programming (Understand)	
CO2 : Build their ability to develop software with reasonable complexity on mobile platform (Apply)	
CO3 : Discover the life cycles of Activities, Applications ,intents and fragments(Evaluate)	
CO4 : Design the Android apps by using Java Concepts.(Apply)	
Course Title	**PROGRAMMING WITH PYTHON**
Course Code	**01CE0705**

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Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Apply various fundamentals for problem solving using python.	
CO2 : Implement modular programming and differentiate mutability of various datatypes.	
CO3 : Create object-oriented solution by applying various concept like polymorphism, inheritance and package with python programming	
CO4 : Implement exception handling and data structure concepts.	
Course Title	**DATA MINING AND INFORMATION RETRIEVAL**
Course Code	**01CE0707**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand different indexing techniques on real data set. (Understand)	
CO2 : Demonstrate different classification methods on real and synthetic data set. (Apply)	
CO3 : Discover knowledge using various Data Mining methods for given system/application. (Apply)	
CO4 : Analyze various data warehousing techniques used in industry. (Analyze)	
Course Title	**COMPUTATIONAL INTELLIGENCE**
Course Code	**01CE0709**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Recognize and depict soft computing methods and their roles to build intelligent systems. (Knowledge)	
CO2 : Apply fuzzy principles and thinking to deal with vulnerability and tackle realtime issues. (Apply)	
CO3 : Apply genetic algorithms to generate optimized results for a particular problem. (Apply)	
CO4 : Apply neural networks to design classification problems. (Apply)	
CO5 : Evaluate and compare solutions by various soft computing approaches for a given problem. (Evaluate)	
Course Title	**ADVANCED WEB TECHNOLOGIES**
Course Code	**01IT0701**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Apply Object Oriented concepts in developing PHP applications (Apply)	
CO2 : Use various third party APIs and advance concepts of PHP to develop Applications (Apply)	
CO3 : Create and deploy scalable web based system using Laravel (Create)	
CO4 : Develop server side web applications using Node.js (Create)	
Course Title	**MAJOR PROJECT – I**
Course Code	**01IT1703**

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Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : To analyze real world problems and design solutions for those problems (Analyze)	
CO2 : To identify practical aspect of studied technologies (Evaluate)	
CO3 : To use latest software / hardware as per requirement (Apply)	
CO4 : To develop complete solutions for read world problems (Create)	
CO5 : To use different testing methodologies for implemented work (Apply)	
CO6 : To present and document implemented work effectively (Create)	
Semester8	
Course Title	**BIG DATA AND ANALYTICS**
Course Code	**01CE0802**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Gain Understanding about Big Data Technology and its Tools. (Understand)	
CO2 : Understand and apply extracting useful pattern from large datasets. (Apply)	
CO3 : Implementation of Big data mining techniques using different software. (Create)	
CO4 : Understand how data analytics and data science maps to current industry.(Analyze)	
CO5 : Understanding and implementing Algorithms in an optimized way using various Big Data Tools. (Apply)	
Course Title	**CLOUD COMPUTING**
Course Code	**01CE0803**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand and analyze the architecture of Cloud (Analyze).	
CO2 : Identify and apply deployment and management options of AWS Cloud Architecture (Apply).	
CO3 : Design architectures to decouple infrastructure and reduce interdependencies (Create).	
CO4 : Formulate policy based scenarios in Cloud simulators (Create).	
CO5 : Define Cloud Computing and memorize the different Cloud service and deployment models (Remembering)	
CO6 : Use and Examine different cloud computing services and its Basics(Understanding)	
Course Title	**MACHINE LEARNING**
Course Code	**01CE0804**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand machine-learning concepts.(Understand)	
CO2 : Understand Optimization theory and concepts.(Understand)	

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CO3 : Understand and analyse different method of Gardient Descent. (Analyze)	
CO4 : Apply concept of Supervised and Unsupervised learning.(Apply)	
CO5 : Apply the concepts of machine leaning and optimization in designing intelligent systems.(Apply)	
Course Title	**BUSINESS INTELLIGENCE**
Course Code	**01CE0805**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Graduates will learn concept, process, and practice of the data science and how methodologies are applied to visualize information from raw data. (Apply)	
CO2 : Encourage and motivate students for learning BI involving predictive and statistical approach. (Understand)	
CO3 : Understand and analyze BI concepts and techniques. (Analyze)	
CO4 : Understand and apply BI Techniques for various situations. (Apply)	
CO5 : Implement BI techniques by using various tools and Create data visualization. (Create)	
Course Title	**MAJOR PROJECT – II**
Course Code	**01IT0801**
Course Outcomes: After Successful completion of the above course, students will be able to:	
CO1 : Understand, analyze and solve Medium / Large scale industrial / social problems (Analyse)	
CO2 : Demonstrate the application of various engineering subjects to solve industrial / social problems (Apply)	
CO3 : Communicate in the way industry demands in oral and documented way. (Create)	
CO4 : Demonstrate teamwork and leadership qualities. (Apply)	
CO5 : Demonstrate professional and ethical conduct as per industrial expectations. (Evaluate)	

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