Dr. M.G.R.
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University with Graded Autonomy Status
Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu. India.

Curriculum – 2017 Regulation – BMI

Semester: 3

Theory:

Course Code	Course Title	C	L	T/SLr	P/R	Ty / Lb/ ETL
BMA17006	Mathematics III for Electrical Engineers	4	3	1/0	0/0	Ty
BEI17001	Circuit Theory	4	3	1/0	0/0	Ty
BBI17001	Electric Field and Machines	4	3	1/0	0/0	Ty
BBI17002	Human Anatomy	3	3	0/0	0/0	Ty
BEC17I06	Analog and Digital IC's	3	3	0/0	0/0	Ty

Practical:

Course Code	Course Title	C	L	T/SLr	P/R	Ty/Lb/ETL
BBI17ET1	Advancement In Electronics *	3	1	0/2	1/1	ETL
BBI17L01	Human Anatomy Laboratory	1	0	0/0	3/0	Lb
BBI17L02	Electric Circuits Laboratory	1	0	0/0	3/0	Lb
BEC17IL4	Analog and Digital IC's Laboratory	1	0	0/0	3/0	Lb

Credits Sub Total: 24

Semester: 4

Theory:

Course Code	Course Title	C	L	T/SLr	P/R	Ty / Lb/ ETL
BMA17011	Numerical Methods For Electrical Engineers	4	3	1/0	0/0	Ty
BEI17007	Transducer Engineering	4	3	1/0	0/0	Ty
BBI17003	Human Physiology	4	3	1/0	0/0	Ty
BBI17004	Medical Physics	3	3	0/0	0/0	Ty
BBT17I02	Bio-Chemistry	3	3	0/0	0/0	Ty

C : Credits L : Lecture T : Tutorial S.Lr : Supervised Learning P : Problem / Practical R : Research
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab
*   Internal evaluation (Departmental level Refer Annexure for evaluation methodology)

B.Tech. –Biomedical Instrumentation

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Maduravoyal, Chennai 600 095

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Practical:

BSK17ET1	Soft Skill 1	2	1	0/1	1/0	ETL
BBI17ET2	Bio-Mechanics*	3	1	0/2	1/1	ETL
BBI17L03	Human physiology Laboratory	1	0	0/0	3/0	Lb
BEI17L03	Transducer Laboratory	1	0	0/0	3/0	Lb
BBT17IL2	Bio- Chemistry Laboratory	1	0	0/0	3/0	Lb
BBI17TSX	Technical Skill 1 (Evaluation)	1	0	0/0	2/0	Lb

Credits Sub Total: 27

Semester: 5
Theory:

Course Code	Course Title	C	L	T/SLr	P/R	Ty / Lb/ ETL
BBI17005	Bio-Control Systems	4	3	1/0	0/0	Ty
BBI17006	Bio-Medical Signal processing	4	3	1/0	0/0	Ty
BBI17007	Bio-Medical Instrumentation	3	3	0/0	0/0	Ty
BBI17008	Bio-Materials and Artificial Organs	3	3	0/0	0/0	Ty
BEE17I02	Microprocessor, Microcontroller and its Applications	3	3	0/0	0/0	Ty

Practical:

BBI17ET3	Measurement and Instrumentation*	3	1	0/2	1/1	ETL
BBI17L04	Electrical and Electronics Measurements Laboratory	1	0	0/0	3/0	Lb
BBI17L05	Bio- Signal Acquisition Laboratory	1	0	0/0	3/0	Lb
BEE17IL3	Microprocessor, Microcontroller and its Applications Laboratory	1	0	0/0	3/0	Lb
BBI17TSX	Technical Skill 2 (Evaluation)	1	0	0/0	3/0	Lb
BBI17L06	Inplant Training (Evaluation)	1	0	0/0	2/0	Lb

Credits Sub Total: 25

C: Credits L: Lecture T: Tutorial S.Lr : Supervised Learning P : Problem / Practical R : Research
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Semester: 6
Theory:

Course Code	Course Title	C	L	T/SLr	P/R	Ty / Lb/ ETL
BBI17009	Pathology and Microbiology	4	3	1/0	0/0	Ty
BBI17010	Medical Image Processing	3	3	0/0	0/0	Ty
BBI17EXX	Elective 1	3	3	0/0	0/0	Ty
BEC17I07	Communication System and IOT	3	3	0/0	0/0	Ty
BBI17OEX	Open Elective (Interdisciplinary)	3	3	0/0	0/0	Ty

Practical:

BSK17ET2	Soft Skill 2	2	1	0/1	1/0	ETL
BBI17L07	Bio-Medical Signal and Image Processing Laboratory	1	0	0/0	3/0	Lb
BBI17L08	Bio-Medical Instrumentation Laboratory - I	1	0	0/0	3/0	Lb
BBI17L09	Pathology and Microbiology Laboratory	1	0	0/0	3/0	Lb
BBI17L10	Mini Project (Evaluation)	1	0	0/0	0/2	Lb
BBI17TSX	Technical Skill 3 (Evaluation)	1	0	0/0	2/0	Lb

Credits Sub Total: 23

Semester: 7
Theory:

Course Code	Course Title	C	L	T/SLr	P/R	Ty / Lb/ ETL
BBI17011	Bio-Medical Equipments	4	3	1/0	0/0	Ty
BBI17012	Virtual Instrumentation for Medical Application	4	3	1/0	0/0	Ty
BBI17EXX	Elective 2	3	3	3	0/0	0
BBI17EXX	Elective 3	3	3	3	0/0	0
BMG17003	Total Quality Management	3	3	3	0/0	0

Credits L : Lecture T : Tutorial S.Lr : Supervised Learning P : Problem / Practical R : Research
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Practical:

		C	L	T/SLr	P/R	Ty / Lb/ ETL
BBI17ESX	Elective (Special - Based on Current Technology) *	3	1	0/2	1/1	ETL
BBI17L11	Bio-Medical Instrumentation Laboratory - II	1	0	0/0	3/0	Lb
BBI17L12	Virtual Instrumentation Laboratory for Medical Application	1	0	0/0	3/0	Lb
BBI17L13	Project Phase – 1	2	0	0/0	0/2	Lb
BFL17001	Foreign Language (Evaluation)	2	1	1	0/0	

Credits Sub Total: 26

Semester: 8
Theory:

Course Code	Course Title	C	L	T/SLr	P/R	Ty / Lb/ ETL
BBI17EXX	Elective 4	3	3	0/0	0/0	Ty
BBI17EXX	Elective 5	3	3	0/0	0/0	Ty
BMG17005	Entrepreneurship Development	3	3	0/0	0/0	Ty

Practical:

		C	L	T/SLr	P/R	Ty / Lb/ ETL
BBI17L14	Project (Phase – II)	10	0/0	0/0	10	Lb

Credits Sub Total: 19

C : Credits L : Lecture T : Tutorial S.Lr : Supervised Learning P : Problem / Practical R : Research
Ty/Lb/ETL : Theory/Lab/Embedded Theory and Lab
* Internal evaluation (Departmental level Refer Annexure for evaluation methodology)
4 Credit papers should compulsorily have either P/R component.

Credit Summary
Semester : 1   : 18
Semester : 2   : 23
Semester : 3   : 24
Semester : 4   : 27
Semester : 5   : 25
Semester : 6   : 23
Semester : 7   : 26
Semester : 8   : 19

Total Credits : 185

B.Tech. –Biomedical Instrumentation

Elective 1

Course Code	Course Title	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BBI17E01	Troubleshooting of Bio-Medical Equipments	3	3	0/0	0/0	Ty
BBI17E02	Rehabilitation Engineering	3	3	0/0	0/0	Ty
BBI17E03	Human Assist Devices	3	3	0/0	0/0	Ty

Elective 2

Course Code	Course Title	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BBI17E04	Laser and Ultrasonic Application in Medicine	3	3	0/0	0/0	Ty
BBI17E05	Computer based Medical Instrumentation	3	3	0/0	0/0	Ty
BBI17E06	Biomedical MEMS and Nano Technology	3	3	0/0	0/0	Ty

Elective 3

Course Code	Course Title	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BBI17E07	Radiological Equipments	3	3	0/0	0/0	Ty
BBI17E08	Biological Effects of Radiation	3	3	0/0	0/0	Ty
BBI17E09	Computer in Medicine	3	3	0/0	0/0	Ty

Elective 4

Course Code	Course Title	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BBI17E10	Medical Informatics	3	3	0/0	0/0	Ty
BBI17E11	Fibre Optic and Laser Instruments	3	3	0/0	0/0	Ty
BBI17E12	Diagnostic and Therapeutic Equipments I	3	3	0/0	0/0	Ty

Elective 5

Course Code	Course Title	C	L	T/S Lr	P/R	Ty / Lb/ ETL
BBI17E13	Recent Advances Applied to Hospital Engineering	3	3	0/0	0/0	Ty
BBI17E14	Diagnostic and Therapeutic Equipments II	3	3	0/0	0/0	Ty
BBI17E15	System Theory Applied to Biomedical Engineering	3	3	0/0	0/0	Ty

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Subject Code: BSK17ET1	Subject Name :SOFT SKILLS – I CAREER and CONFIDENCE BUILDING	T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None	Ty	1	0/1	1/0	2

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :
➢ To create awareness in students, various top companies helping them improve their skill set matrix, leading to develop a positive frame of mind.
➢ To help students be aware of various techniques of candidate recruitment and help them prepare CV's and resume.
➢ To help student how to face various types of interview, preparing for HR, technical interviews.
➢ To help students improve their verbal reading, narration and presentation skills by performs various mock sessions.

COURSE OUTCOMES (COs) : (3- 5)
Students will be able to

CO1	Be aware of various top companies leading to improvement in skills amongst them.
CO2	Be aware of various candidate recruitment techniques like group discussion, interviews and be able to prepare CV's and resumes.
CO3	Prepare for different types of interviews and be prepared for HR and technical interviews.
CO4	Improve their verbal, written and other skills by performing mock sessions.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	M	M	H	M	H	M	H
CO2	L	L	L	L	L	M	M	H	M	H	M	H
CO3	L	L	L	L	L	M	M	H	M	H	M	H
CO4	L	L	L	L	L	M	M	H	M	H	M	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	L	L	H	L	L			
CO2	L	L	H	L	L			
CO3	L	L	H	L	L			
CO4	L	L	H	L	L			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
			✓						✓			
Approval												

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SOFT SKILLS – I CAREER AND CONFIDENCE BUILDING

UNIT I   **6 Hrs**
Creation of awareness of top companies / improving skill set matrix / Development of positive frame of mind / Creation of self-awareness

UNIT II   **6 Hrs**
Group discussions / Do's and don'ts – handling group discussions / what evaluators look for interpersonal relationships / Preparation of Curriculum Vitae / Resume

UNIT III   **6 Hrs**
Interview – awareness of facing questions – Do's and don'ts of personal interview / group interview, enabling students to prepare for different proce3dures such as HR interviews and Technical Interviews / self-introductions

UNIT IV   **6 Hrs**
Verbal aptitude, Reading comprehension / narration / presentation / Mock Interviews

UNIT V   **6 Hrs**
Practical session on Group Discussion and written tests on vocabulary and reading comprehension

Total Number of Hours: 30 Hrs

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Subject Code: BEI17TSX	Subject Name : TECHNICAL SKILL I		T / L/ ETL	L	T / S.Lr	P/ R	C
			0	0	0	1	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The objective is to develop the technical skill of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop the technical skills required in the field of study
CO2	Bridge the gap between the skill requirements of the employer or industry and the competency of the students.
CO3	Enhance the employability of the students.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	M	H	M	H	M
CO2	H	H	M	H	H	H	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	H	H	H	H	H			
CO2	H	H	H	H	H			
CO3	H	H	H	H	H			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
								✔				

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Subject Code: BEI17TSX	Subject Name : TECHNICAL SKILL II		T / L/ ETL	L	T / S.Lr	P/ R	C
			0	0	0	1	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The objective is to develop the technical skill of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop the technical skills required in the field of study
CO2	Bridge the gap between the skill requirements of the employer or industry and the competency of the students.
CO3	Enhance the employability of the students.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	M	H	M	H	M
CO2	H	H	M	H	H	H	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	H	H	H	H	H			
CO2	H	H	H	H	H			
CO3	H	H	H	H	H			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
								✓				

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Subject Code: BBI17L06	Subject Name : INPLANT TRAINING		T / L/ ETL	L	T / S.Lr	P/ R	C
			L	0	0/0	2/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The main objective of the Inplant training is to provide a short-term work experience in an Industry/ Company/ Organization

COURSE OUTCOMES (COs) : (3- 5)

CO1	To get an insight of an industry / organization/company pertaining to the domain of study.
CO2	To acquire skills and knowledge for a smooth transition into the career.
CO3	To gain field experience and get linked with the professional network.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	L	L	L	L	H	H	H	H	H	H	H
CO2	H	M	H	H	M	H	H	H	H	H	H	M
CO3	H	H	H	H	M	H	H	H	H	H	H	M

COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5			
CO1												
CO2												

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
								✓				

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Subject Code:	Subject Name : SOFT SKILLS – II		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Soft Skills - I						1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The main objective is to strengthen the logical and arithmetic reasoning skills of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Recognize and apply arithmetic knowledge in a variety of contexts.
CO2	Ability to identify and critically evaluate philosophical arguments and defend them from criticism.
CO3	Define data and interpret information from graphs.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	L	L	H	M	H	H
CO2	M	M	M	H	L	H	L	H	H	H	H	L
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5			
CO1												
CO2												

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
									✓			
Approval												

B.Tech. –Biomedical Instrumentation

UNIT I LOGICAL REASONING I

Logical Statements – Arguments – Assumptions – Courses of Action

UNIT II LOGICAL REASONING II

Logical conclusions – Deriving conclusions from passages – Theme detection

UNIT III ARITHMETICAL REASONING I

Number system – H.C.F and L.C.M – Problem on ages – Percentage – Profit and Loss – Ratio and Proportion – Partnership

UNIT IV ARITHMETICAL REASONING II

Time and Work – Time and Distance – Clocks – Permutations and Combinations – Heights and Distances – Odd man out and Series

UNIT V DATA INTERPRETATION

Tabulation – Bar graphs – Pie graphs – Line graphs

Reference Books:
1. R.S.Agarwal, A modern approach to Logical Reasoning, S.Chand and Co., (2017).
2. R.S.Agarwal, A modern approach to Verbal and Non verbal Reasoning, S.Chand and Co., (2017).
3. R.S.Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand and Co., (2017).
4. A.K.Gupta, Logical and Analytical Reasoning, Ramesh Publishing House, (2014).
5. B.S.Sijwali, Indu sijwali, A new approach to Reasoning (Verbal and Non verbal), Arihant Publishers, (2014).

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Subject Code: BBI17L10	Subject Name : **MINI PROJECT**		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL		L	1	0/0	2/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : To acquire hands-on experience in converting a novel idea / technique into a working model / prototype involving multi-disciplinary skills and / or knowledge and working in at team.

COURSE OUTCOMES (COs) : (3- 5)

CO1	To conceptualize a novel idea / technique into a product
CO2	To develop a multi-disciplinary thinking and enable teamwork
CO3	Ideate and develop a prototype

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	M	H	H	H	M	L	H	M
CO2	H	H	H	M	H	M	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	H	H	M	H	H

COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5			
CO1												
CO2												

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
							✓					
Approval												

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Subject Code: BEI17TSX	Subject Name : **TECHNICAL SKILL III**		T / L/ ETL	L	T / S.Lr	P/ R	C
			L	0	0/0	2/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The objective is to develop the technical skill of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop the technical skills required in the field of study
CO2	Bridge the gap between the skill requirements of the employer or industry and the competency of the students.
CO3	Enhance the employability of the students.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	M	H	M	H	M
CO2	H	H	M	H	H	H	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
								✓				

Approval	

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Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu. India.

Subject Code:	Subject Name : **PROJECT PHASE - 1**		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL		L	0	0/0	0/2	2

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE: The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.
CO2	To encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions
CO3	To refine research skills and demonstrate their proficiency in communication skills.
CO4	To take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	H	L	M	M	H	H
CO2	H	H	H	H	H	H	H	M	M	M	H	H
CO3	H	H	H	H	H	H	H	M	M	H	H	M
CO4	H	M	H	H	H	H	M	H	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	H	H	H	H	H			
CO2	H	H	H	H	H			
CO3	H	H	H	H	H			
CO4	H	H	H	H	H			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
							✓					
Approval												

B.Tech. –Biomedical Instrumentation

Subject Code: BFL17001	Subject Name : FOREIGN LANGUAGE		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL			1	1	0/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE :   To recognize the cultural values, practices, and heritage of the foreign country, communicate effectively in a foreign language and interact in a culturally appropriate manner with native speakers of that language.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Achieve functional proficiency in listening, speaking, reading, and writing.
CO2	Develop an insight into the nature of language itself, the process of language and culture acquisition.
CO3	Decode, analyze, and interpret authentic texts of different genres.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	H	L	H	M	H	H	L
CO2	M	L	L	L	L	H	L	H	H	H	H	L
CO3	L	L	M	M	L	H	M	H	M	H	H	L

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	L	L	L	L	L			
CO2	L	L	L	L	L			
CO3	L	L	L	L	L			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
			✔									

Approval	

B.Tech. –Biomedical Instrumentation

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Subject Code:	Subject Name : **ENTREPRENUERSHIP DEVELOPMENT**		L	T	P	C
BMG17005	Prerequisite: Basic Knowledge as Management Concepts		3	0	0	3

L : Lecture T : Tutorial   P : Project C: Credits

OBJECTIVE: The student will learn:
  ➤ The course aims to acquaint the students with challenges of starting new ventures and enable then to investigate, understand and internalize the process of setting up a business

COURSE OUTCOMES (COs) :

CO1	Understand the basics of entrepreneurial development
CO2	Explain the requisites of starting a small scale industry
CO3	Propose a plan for new venture
CO4	Comprehend role of government in entrepreneurship

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	H			M	L	H	L	H	H	H
CO2		H			L			M		M	H	M
CO3	H	H	H			M		M	M	H	M	M
CO4		M		M	L		H			M	L	M

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills	Management Science		
										✓		

Approval	

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ENTREPRENUERSHIP DEVELOPMENT

UNIT I INTRODUCTION 9 Hrs

Nature and Development of Entrepreneurship; Entrepreneurial Decision Process; Role of entrepreneurship in economic development; Entrepreneurial process; managerial vs. entrepreneurial approach and emergence of entrepreneurship - Entrepreneurial background; Skills and characteristics of successful entrepreneurs; Motivation; Role Models and Support Systems

UNIT II BUSINESS IDEA 9 Hrs

Generating business idea – sources of new ideas, methods of generating ideas, creative problem solving, opportunity recognition; Environmental scanning, competitor and industry analysis; Feasibility study – market feasibility, technical/operational feasibility, financial feasibility; Drawing a business plan; Using and Implementing the Business plan.

UNIT III MARKETING PLAN 9 Hrs

Marketing plan – Marketing research for the new venture; Steps in preparing marketing plan; Contingency planning; Organizational plan – Forms of Business; Designing the organization; Building management team and Successful Organizational Culture; Role of Board of Directors; Board of Advisors; Financial plan – Operating and capital Budgets; Pro forma income statements; Pro forma cash flow; Pro forma balance sheet; Break even analysis; Pro forma Sources and Applications of Funds.

UNIT IV ASSESSMENT OF RISK 9 Hrs

Assessment of Risk; Sources of finance – Debt or Equity Financing, Internal or External Funds; Personal Funds, Family and Friends; Commercial Banks – types of loans, Cash flow financing, Bank lending decisions; Venture Capital – Nature, overview, process, locating and approaching Venture Capitalists.

UNIT V ENTREPRENEURIAL STRATEGY FOR GENERATING AND EXPLOITING NEW ENTRIES; STRATEGIES FOR GROWING THE VENTURE 9 Hrs

Entrepreneurial strategy for generating and exploiting new entries; Strategies for growing the venture; Growth implications on Economy, Firm and Entrepreneur. Other routes for growth – Franchising, Joint Ventures, Acquisitions and Mergers: Going Public – Advantages and Disadvantages, Alternatives to Going Public.

Total Number of Hours: 45 Hrs

Reference Books:
1. Hisrich, Robert D., Michael Peters and Dean Shephered, Entrepreneurship, Tata McGraw Hill, New Delhi., 9th Edition, 2012, ISBN-13: 978-0078029196, ISBN-10: 0078029198
2. Vasant Desai, The Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House., 11th Edition, 2005, ISBN: 8178660598
3. Prasana Chandra, Projects – planning, analysis selection, Implementation and reviews, Tata McGraw-Hill Publishing Company, 7th Edition, 2009, ISBN-10: 0070077932, ISBN-13, 9780070077935
4. Charantimath, Poornima, Entrepreneurship Development and Small Business Enterprises, Pearson Education, New Delhi, 5th Edition, 2009, ISBN: 978-81-7758-260-4
5. K.Ramachandran, Essentials of Business Communication, McGraw Hill Education (India) Private Limited, 9th Edition, 2013, ISBN-13: 978-1-111-82122-7, ISBN-10: 1-111-82122-4

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Subject Code:	Subject Name : PROJECT PHASE - 2		T / L/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: NIL		L	0	0/0	10	10

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE: The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.

COURSE OUTCOMES (COs) : (3- 5)

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CO2	To encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions
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Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	H	H	H	H	H	H	H	H	H	H	H
CO3	H	H	H	H	H	H	H	H	H	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	H

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
							✓					
Approval												

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Curriculum – 2018 Regulation - BMI

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
		I SEMESTER					
1	BEN18001	Technical English - I	Ty	1	0/0	2/0	2
2	BMA18001	Mathematics - I	Ty	3	1/0	0/0	4
3	BPH18001	Engineering Physics - I	Ty	2	0/1	0/0	3
4	BCH18001	Engineering Chemistry - I	Ty	2	0/1	0/0	3
5	BES18001	Basic Electrical and Electronics Engineering	Ty	2	0/1	0/0	3
6	BES18002	Basic Mechanical and Civil Engineering	Ty	2	0/1	0/0	3
		PRACTICALS*					
1	BES18L01	Basic Engineering Workshop	Lb	0	0/0	2/0	1
2	BES18ET1	Orientation to Entrepreneurship and Project Lab	ETL	0	0/0	2/0	1

Credits Sub Total: 20

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
		II SEMESTER					
1	BMA18003	Mathematics – II	Ty	3	1/0	0/0	4
2	BPH18002	Engineering Physics –II	Ty	2	0/1	0/0	3
3	BCH18002	Engineering Chemistry – II	Ty	2	0/1	0/0	3
4	BES18003	Environmental Science*	Ty	NON CREDIT COURSE			
		PRACTICALS*					
1	BEN18ET1	Communication Lab	ETL	1	0/0	2/0	1
2	BES18ET2	Basic Engineering Graphics	ETL	1	0/0	2/0	2
3	BES18L02	Integrated Physical Science Lab	Lb	0	0/0	2/0	1
4	BES18ET3	C Programming And Lab	ETL	1	0/0	2/0	2

Credits Sub Total: 16

TOTAL CREDITS: 36

C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research
Ty/Lb/ETL: Theory /Lab/Embedded Theory and Lab   * Internal Evaluation

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S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
		III SEMESTER					
1	BBI18001	Human Anatomy and Physiology	Ty	3	1/0	0/0	4
2	BEI18002	Circuit Theory	Ty	3	1/0	0/0	4
3	BEE18003	Electromagnetic Field Theory	Ty	3	0/0	0/0	3
4	BBI18002	Medical Physics	Ty	3	0/0	0/0	3
5	BEC18I06	Analog and Digital ICs	Ty	3	0/0	0/0	3
		PRACTICALS*					
1	BHS20ET5	Universal Human Values 2: Understanding Harmony	ETL	2	1/0	0/0	3
2	BBI18L01	Human Anatomy and Physiology Lab	Lb	0	0/0	3/0	1
3	BEI18L02	Electric Circuits Lab	Lb	0	0/0	3/0	1
4	BEC18IL4	Analog and Digital ICs Lab	Lb	0	0/0	3/0	1

Credits Sub Total: 23

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
		IV SEMESTER					
1	BMA18011	Numerical Methods for Electrical Engineers	Ty	3	1/0	0/0	4
2	BEI18005	Transducer Engineering	Ty	3	1/0	0/0	4
3	BBI18003	Pathology and Microbiology	Ty	3	0/0	0/0	3
4	BBT18I02	Bio-Chemistry	Ty	3	0/0	0/0	3
5	BHS18NC1/ BHS18NC2	The Indian Constitution*/ The Indian Traditional Knowledge*	Ty	2	0/0	0/0	NC
		PRACTICALS*					
1	BBI18ET1	Advancement in Electronics *	ETL	1	0/1	3/0	3
2	BBI18L02	Pathology and Microbiology Lab	Lb	0	0/0	3/0	1
3	BEI18L03	Transducer Lab	Lb	0	0/0	3/0	1
4	BBT18IL2	Bio- Chemistry Lab	Lb	0	0/0	3/0	1
5	BBI18TS1	Technical Skill 1	Lb	0	0/0	3/0	1
6	BEN18SK1	Soft Skill I (Career and Confidence Building)	ETL	0	0/0	3/0	1

Credits Sub Total: 22

C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research
Ty/Lb/ETL: Theory /Lab/Embedded Theory and Lab   * Internal Evaluation

B.Tech. –Biomedical Instrumentation

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S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
		V SEMESTER					
1	BBI18004	Diagnostic and Therapeutic Equipments - I	TY	3	1/0	0/0	4
2	BBI18005	Biomedical Instrumentation	Ty	3	0/0	0/0	3
3	BXX18EXX	Elective I	TY	3	0/0	00	3
4	BXX18OEX	Open Elective 1	TY	3	0/0	00	3
		PRACTICALS*					
1	BEI18ET1	Measurements and Instrumentation	ETL	1	0/1	3/0	3
2	BBI18L03	Biomedical Instrumentation Lab	Lb	0	0/0	3/0	1
3	BBI18L04	Diagnostic and Therapeutic Equipments - I Lab	Lb	0	0/0	3/0	1
4	BEI18L05	Microprocessor, Microcontroller and its Applications Lab	Lb	0	0/0	3/0	1
5	BBI18TS2	Technical Skill 2	Lb	0	0/0	3/0	1

Credits Sub Total: 20

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/Lb/ETL	L	T/SLr	P/R	C
		VI SEMESTER					
1	BBI18006	Diagnostic and Therapeutic Equipments II	Ty	3	1/0	0/0	4
2	BBI18007	Troubleshooting of Biomedical Equipments	Ty	3	1/0	0/0	4
3	BXX18EXX	Elective II	Ty	3	0/0	0/0	3
4	BXX18OEX	Open Elective 2	Ty	3	0/0	0/0	3
		PRACTICALS*					
1	BBI18ET2	Bio-Mechanics	ETL	1	0/1	3/0	3
2	BBI18L05	Troubleshooting of Biomedical Equipments Lab	Lb	0	0/0	3/0	1
3	BBI18L06	Diagnostic and Therapeutic Equipments II Lab	Lb	0	0/0	3/0	1
4	BEN18SK2	Soft Skill II (Qualitative and Quantitative Skills)	ETL	0	0/0	3/0	1
5	BBI18L07	Mini Project/In plant Training/Industrial training	Lb	0	0	3/0	1
6	BBI18TS3	Technical Skill 3	Lb	0	0/0	3/0	1

Credits Sub Total: 22

C: Credits L: Lecture T: Tutorial S. Lr : Supervised Learning P : Problem / Practical R : Research Ty/Lb/ETL: Theory/Lab/Embedded Theory and Lab *Internal evaluation

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S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
VII SEMESTER							
1	BBI18008	Medical Image Processing	Ty	3	1/0	0/0	4
2	BXX18EXX	Elective III	Ty	3	0/0	0/0	3
3	BXX18EXX	Elective IV	Ty	3	0/0	0/0	3
4	BMG18009	Total Quality Management for Biomedical Engineers	Ty	3	0/0	0/0	3
PRACTICALS*							
1	BBI18ET3	Virtual Instrumentation for Medical Application	ETL	1	0/1	3/0	3
2	BBI18L08	Bio- Signal Acquisition Lab	Lb	0	0/0	3/0	1
3	BBI18L09	Biomedical Image Processing Lab	Lb	0	0/0	3/0	1
4	BBI18L10	Project Phase – I	Lb	0	0/0	3/3	2
5	BHS18FLX	Foreign Language	Lb	0	0/0	3/0	1
6	BXX18OLX	Open Lab	Lb	0	0/0	3/0	1

Credits Sub Total: 22

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
VIII SEMESTER							
1	BBI18010	Medical Waste Management	Ty	3	1/0	0/0	4
2	BBI18011	Bioprocess Technology	Ty	3	0/0	0/0	3
PRACTICALS*							
1	BBI18L11	Project Phase – II	Lb	0	0/0	12/12	8

Credits Sub Total: 15

C: Credits L: Lecture T: Tutorial S.Lr: Supervised Learning P: Problem / Practical R: Research Ty/Lb/ETL: Theory /Lab/Embedded Theory and Lab   * Internal Evaluation

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ELECTIVE -I

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
1	BBI18E01	Bio Control System	Ty	3	0/0	0/0	3
2	BBI18E02	Rehabilitation Engineering	Ty	3	0/0	0/0	3
3	BBI18E03	Biomaterials and Implantable Devices	Ty	3	0/0	0/0	3
4	BEI18E05	Embedded System	Ty	3	0/0	0/0	3

ELECTIVE -II

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
1	BBI18E04	Laser and Ultrasonic Application in Medicine	Ty	3	0/0	0/0	3
2	BBI18E05	Computer based Medical Instrumentation	Ty	3	0/0	0/0	3
3	BBI18E06	Biomedical MEMS and Nano Technology	Ty	3	0/0	0/0	3
4	BBI18E07	Computer Networks	Ty	3	0/0	0/0	3

ELECTIVE –III

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
1	BBI18E08	Neuroscience for Biomedical Applications	Ty	3	0/0	0/0	3
2	BBI18E09	Biological Effects of Radiation	Ty	3	0/0	0/0	3
3	BBI18E10	Drug Delivery Systems	Ty	3	0/0	0/0	3
4	BEI18E12	Artificial Intelligence and Expert Systems	Ty	3	0/0	0/0	3

ELECTIVE –IV

S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
1	BBI18E11	Medical Informatics	Ty	3	0/0	0/0	3
2	BEI18E16	Principles of Robotics	Ty	3	0/0	0/0	3
3	BBI18E12	Biomedical Signal processing	Ty	3	0/0	0/0	3
4	BBI18E13	Bio-Materials and Artificial Organs	Ty	3	0/0	0/0	3

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S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
		ELECTIVE –V					
1	BBI18E14	Recent Advances Applied to Hospital Engineering	Ty	3	0/0	0/0	3
2	BBI18E15	Hospital Management	Ty	3	0/0	0/0	3
3	BBI18E16	System Theory Applied to Biomedical Engineering	Ty	3	0/0	0/0	3
4	BBI18E17	Special Transducer and Instrumentation	Ty	3	0/0	0/0	3

CREDIT SUMMARY

Semester: 1   :   **20 Credits**

Semester: 2   :   **16 Credits**

Semester: 3   :   **23 Credits**

Semester: 4   :   **22 Credits**

Semester: 5   :   **20 Credits**

Semester: 6   :   **22 Credits**

Semester: 7   :   **22 Credits**

Semester: 8   :   **15 Credits**

TOTAL CREDITS -   **160**

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S.NO.	SUBJECT CODE	SUBJECT NAME	Ty/ Lb/ ETL	L	T/ SLr	P/R	C
		OPEN ELECTIVE					
1	BEE18OE1	Electrical Safety for Engineers	Ty	3	0/0	0/0	3
2	BEE18OE2	Energy Conservation Techniques	Ty	3	0/0	0/0	3
3	BEE18OE3	Electric Vehicle Technology	Ty	3	0/0	0/0	3
4	BEE18OE4	Biomedical Instrumentation	Ty	3	0/0	0/0	3
5	BEE18OE5	Introduction to Power Electronics	Ty	3	0/0	0/0	3
6	BEE18OE6	Industrial Instrumentation	Ty	3	0/0	0/0	3
7	BEE18OE7	Solar Energy Conversion System	Ty	3	0/0	0/0	3
8	BEE18OE8	Wind Energy Conversion System	Ty	3	0/0	0/0	3
9	BEE18OE9	Energy Storage Technology	Ty	3	0/0	0/0	3
		OPEN LAB					
1	BEE18OL1	Transducer LAB	Lb	0	0/0	3/0	1
2	BEE18OL2	PLC and SCADA LAB	Lb	0	0/0	3/0	1
3	BEE18OL3	Electrical Maintenance LAB	Lb	0	0/0	3/0	1
4	BEE18OL4	Power Electronics LAB	Lb	0	0/0	3/0	1
5	BEE18OL5	Bio Medical Instrumentation LAB	Lb	0	0/0	3/0	1

Subject Code : BES18ET1	Subject Name : ORIENTATION TO ENTREPRENEURSHIP AND PROJECT LAB	Ty / Lb/ ETL	L	T/SLr	P/R	C
	Prerequisite : None	ETL	0	0/0	2/0	1

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory / Lab / Embedded Theory and Lab

OBJECTIVES :
- Understand how entrepreneurship Education transforms individuals into successful leaders.
- Identify individual potential &S have career dreams
- Understand difference between ideas & opportunities
- Identify components & create action plan.
- Use brainstorming in a group to generate ideas.

COURSE OUTCOMES (Cos) : (3 – 5)

CO1	Develop a Business plan & improve ability to recognize business opportunity
CO2	Do a self analysis to build a entrepreneurial career.
CO3	Articulate an effective elevator pitch.
CO4	Analyze the local market environment & demonstrate the ability to find an attractive market
C05	Identify the required skills for entrepreneurship & develop

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		M	M	H	M	M	M		M	M	M	L
CO2	H	M		H	M	H	M	H	H	H	M	M
CO3		M	M	M		H		H	H	H		
CO4		H	M	M	M	M		H	M	M	H	
CO5		M	M	H	M	M	H	H	M	M	H	L

H/M/L indicates strength of correlation   H – High, M – Medium, L – Low

Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
							√		

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BES18ET1   ORIENTATION TO ENTREPRENEURSHIP AND PROJECT LAB   0   0/0   2/0   1

UNIT I   CHARACTERISTICS OF A SUCCESSFUL ENTREPRENEUR

Introduction to entrepreneurship education – Myths about entrepreneurship – How has entrepreneurship changed the country – Dream it. Do it - Idea planes - Some success stories – Global Legends – Identify your own heroes.

UNIT II   ENTREPRENEURIAL STYLE

Entrepreneurial styles – Introduction, concept & Different types - Barrier to Communication – Body language speaks louder than words

UNIT III   DESIGN THINKING

Introduction to Design thinking – Myth busters – Design thinking Process - Customer profiling – Wowing your customer – Personal selling – concept & process – show & tell concept – Introduction to the concept of Elevator Pitch

UNIT IV   RISK MANAGEMENT

Introduction to risk taking & Resilience – Managing risks (Learning from failures, Myth Buster) – Understanding risks through risk takers – Why do I do? – what do I do ?

UNIT V   PROJECT
How to choose a topic – basic skill sets necessary to take up a project – creating a prototype – Pitch your project – Project presentation.

Total No of Periods : 15

REFERENCE BOOKS & WEBSITE:
1. Encyclopedia of small Business (2011) – (e book)
2. Oxford Handbook of Entrepreneurship (2014) (ebook)
3. lms.learnwise.org

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Subject Code: BEN18ET1	Subject Name :COMMUNICATION LAB		Ty / Lb/ ETL	L	T/S Lr	P/R	C
	Prerequisite : None		ETL	1	0/0	2/0	1

L : Lecture T : Tutorial SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory / Lab / Embedded Theory and Lab

OBJECTIVES :

The student should be able to

- Use appropriate vocabulary and structure for effective interpersonal and academic communication.
- Interpret charts, diagrams, advertisements, etc.
- Participate in group discussions and present projects effectively.
- Present projects and ideas effectively
- Attend interviews

COURSE OUTCOMES (Cos) : (3 – 5)
Students completing the course were able to

CO1	Use appropriate vocabulary and structure for effective interpersonal and academic communication
CO2	Interpret charts, diagrams, advertisements, etc.
CO3	Participate in group discussions and present projects effectively
CO4	Present projects and ideas effectively
CO5	Attend interviews

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										H		
CO2										H		
CO3										H		
CO4										H		
CO5										H		

H/M/L indicates strength of correlation   H – High, M – Medium, L – Low

Category	Basic Sciences	Engg Sciences	Humanities & Social Sciences	Program core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skills	Soft Skills
			√						

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UNIT I   **6**
Listening and Speaking- Informal and Formal Contexts

UNIT II   **6**
Interpretation of charts / Diagrams – Group Discussion

UNIT III   **6**
Compeering -Anchoring -Group Discussion

UNIT IV   **8**
Formal Presentation -Power point presentation of charts/ Diagrams

UNIT V   **4**
Interview

SUGGESTED READINGS:

(i) *Practical English Usage.* Michael Swan. OUP. 1995.
(ii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007
(iii)*Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(iv) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
(v) *Exercises in Spoken English.* Parts. I-III. CIEFL, Hyderabad. Oxford University Press
(vi) Pronunciation in Use ,Mark Hancock. Cambridge University Press. 2012

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Subject Code: BBI18TS1	Subject Name: TECHNICAL SKILL 1		TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None		L	0	0/0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The objective is to develop the technical skill of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop the technical skills required in the field of study
CO2	Bridge the gap between the skill requirements of the employer or industry and the competency of the students.
CO3	Enhance the employability of the students.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	M	H	M	H	M
CO2	H	H	M	H	H	H	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
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Subject Code: BEN18SK1	Subject Name :SOFT SKILLS I (CAREER AND CONFIDENCE BUILDING)	TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None	ETL	0	0/0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE:
- To create awareness in students, various top companies helping them improve their skill set matrix, leading to develop a positive frame of mind.
- To help students be aware of various techniques of candidate recruitment and help them prepare CV's and resume.
- To help student how to face various types of interview, preparing for HR, technical interviews.
- To help students improve their verbal reading, narration and presentation skills by performs various mock sessions.

COURSE OUTCOMES (COs) : (3- 5)
Students will be able to

CO1	Be aware of various top companies leading to improvement in skills amongst them.
CO2	Be aware of various candidate recruitment techniques like group discussion, interviews and be able to prepare CV's and resumes.
CO3	Prepare for different types of interviews and be prepared for HR and technical interviews.
CO4	Improve their verbal, written and other skills by performing mock sessions.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	M	M	H	M	H	M	H
CO2	L	L	L	L	L	M	M	H	M	H	M	H
CO3	L	L	L	L	L	M	M	H	M	H	M	H
CO4	L	L	L	L	L	M	M	H	M	H	M	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	L	L	H	L	L			
CO2	L	L	H	L	L			
CO3	L	L	H	L	L			
CO4	L	L	H	L	L			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
			✓						✓			

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BEN18SK1	SOFT SKILLS I (CAREER AND CONFIDENCE BUILDING)	0	0/0	3/0	1

UNIT I **6**

Creation of awareness of top companies / improving skill set matrix / Development of positive frame of mind / Creation of self-awareness

UNIT II **6**

Group discussions / Do's and don'ts – handling group discussions / what evaluators look for interpersonal relationships / Preparation of Curriculum Vitae / Resume

UNIT III **6**

Interview – awareness of facing questions – Do's and don'ts of personal interview / group interview, enabling students to prepare for different proce3dures such as HR interviews and Technical Interviews / self-introductions

UNIT IV **6**

Verbal aptitude, Reading comprehension / narration / presentation / Mock Interviews

UNIT V **6**

Practical session on Group Discussion and written tests on vocabulary and reading comprehension

Total No of Periods: 30

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Subject Code: BBI18TS2	Subject Name :TECHNICAL SKILL 2		TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Technical Skill 1		L	0	0/0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The objective is to develop the technical skill of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop the technical skills required in the field of study
CO2	Bridge the gap between the skill requirements of the employer or industry and the competency of the students.
CO3	Enhance the employability of the students.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	M	H	M	H	M
CO2	H	H	M	H	H	H	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
								✓				

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Subject Code: BEN18SK2	Subject Name : SOFT SKILLS II (QUALITATIVE AND QUANTITATIVE SKILLS)	TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: Soft Skills - I	ETL	0	0/0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The main objective is to strengthen the logical and arithmetic reasoning skills of the students.

- To help students to improve their Logical reasoning.
- To help students to improve their arithmetic reasoning.
- To help students improve their data interpretation skills

COURSE OUTCOMES (COs) : (3- 5)

CO1	Prepare students for Logical reasoning
CO2	Prepare students for arithmetic reasoning
CO3	Prepare students for data interpretation skills

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	M	M	H	M	H	M	H
CO2	L	L	L	L	L	M	M	H	M	H	M	H
CO3	L	L	L	L	L	M	M	H	M	H	M	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	L	L	H	L	L		
CO2	L	L	H	L	L		
CO3	L	L	H	L	L		

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
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BEN18SK2	SOFT SKILLS II (QUALITATIVE AND QUANTITATIVE SKILLS)	0	0/0	3/0	1

UNIT I   LOGICAL REASONING I   **6**
Logical Statements – Arguments – Assumptions – Courses of Action

UNIT II   LOGICAL REASONING II   **6**
Logical conclusions – Deriving conclusions from passages – Theme detection

UNIT III   ARITHMETICAL REASONING I   **6**
Number system – H.C.F and L.C.M – Problem on ages – Percentage – Profit and Loss – Ratio and Proportion – Partnership

UNIT IV   ARITHMETICAL REASONING II   **6**
Time and Work – Time and Distance – Clocks – Permutations and Combinations – Heights and Distances – Odd man out and Series

UNIT V   DATA INTERPRETATION   **6**
Tabulation – Bar graphs – Pie graphs – Line graphs

Total No of Periods: 30

REFERENCE BOOKS:
1. R.S.Agarwal, A modern approach to Logical Reasoning, S.Chand and Co., (2017).
2. R.S.Agarwal, A modern approach to Verbal and Non verbal Reasoning, S.Chand and Co., (2017).
3. R.S.Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand and Co., (2017).
4. A.K.Gupta, Logical and Analytical Reasoning, Ramesh Publishing House, (2014).
5. B.S.Sijwali, Indusijwali, A new approach to Reasoning (Verbal and Non verbal), Arihant Publishers,   (2014).

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Subject Code: BBI18L07	Subject Name : MINI PROJECT/ INPLANT TRAINING/ INDUSTRIAL TRAINING	TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None	L	0	0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The main objective of the Inplant training is to provide a short-term work experience in an Industry/ Company/ Organization

COURSE OUTCOMES (COs) : (3- 5)

CO1	To get an insight of an industry / organization/company pertaining to the domain of study
CO2	To acquire skills and knowledge for a smooth transition into the career.
CO3	To gain field experience and get linked with the professional network

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	L	L	L	L	H	H	H	H	H	H	H
CO2	H	M	H	M	M	M	M	M	H	H	H	M
CO3	H	H	H	H	M	H	M	H	H	H	H	M

COs / PSOs	PSO1		PSO2		PSO3		PSO4		PSO5			
CO1	H		H		H		H		H			
CO2	H		H		H		H		H			
CO3	H		H		H		H		H			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
							✓					

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Subject Code:	Subject Name : TECHNICAL SKILL 3		TY / LB/ ETL	L	T / S.Lr	P/ R	C
BBI18TS3	Prerequisite: TECHNICAL SKILL 2		L	0	0/0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : The objective is to develop the technical skill of the students.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Develop the technical skills required in the field of study
CO2	Bridge the gap between the skill requirements of the employer or industry and the competency of the students.
CO3	Enhance the employability of the students.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	M	M	H	M	H	M
CO2	H	H	M	H	H	H	M	M	H	H	H	H
CO3	H	H	H	H	H	H	M	M	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5			
CO1	H	H	H	H	H			
CO2	H	H	H	H	H			
CO3	H	H	H	H	H			

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
								✓				

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Subject Code: BBI18L10	Subject Name :PROJECT PHASE - I	TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None	L	0	0/0	3/3	2

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits

T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE: The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue,address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.
CO2	To encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions
CO3	To refine research skills and demonstrate their proficiency in communication skills.
CO4	To take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	M	H	H	L	M	M	H	H
CO2	H	H	H	H	H	H	H	M	M	M	H	H
CO3	H	H	H	H	H	H	H	M	M	H	H	M
CO4	H	M	H	H	H	H	M	H	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	H	H	H	H
CO3	H	H	H	H	H
CO4	H	H	H	H	H

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			

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Subject Code: BHS18FLX	Subject Name :FOREIGN LANGUAGE		TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None		L	0	0/0	3/0	1

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE : To recognize the cultural values, practices, and heritage of the foreign country, communicate effectively in a foreign language and interact in a culturally appropriate manner with native speakers of that language.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Achieve functional proficiency in listening, speaking, reading, and writing.
CO2	Develop an insight into the nature of language itself, the process of language and culture acquisition.
CO3	Decode, analyze, and interpret authentic texts of different genres.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	L	L	L	L	H	L	H	M	H	H	L
CO2	M	L	L	L	L	H	L	H	H	H	H	L
CO3	L	L	M	M	L	H	M	H	M	H	H	L

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	L	L	L	L	L	
CO2	L	L	L	L	L	
CO3	L	L	L	L	L	

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			

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			✓							

Subject Code: BBI18L11	Subject Name : PROJECT PHASE - II		TY / LB/ ETL	L	T / S.Lr	P/ R	C
	Prerequisite: None		L	0	0/0	12/12	8

L : Lecture T : Tutorial   SLr : Supervised Learning P : Project R : Research C: Credits
T/L/ETL : Theory/Lab/Embedded Theory and Lab

OBJECTIVE: The objective of the Main Project is to culminate the academic study and provide an opportunity to explore a problem or issue, address through focused and applied research under the direction of a faculty mentor. The project demonstrates the student's ability to synthesize and apply the knowledge and skills acquired to real-world issues and problems. This project affirms the students to think critically and creatively, find an optimal solution, make ethical decisions and to present effectively.

COURSE OUTCOMES (COs) : (3- 5)

CO1	Apply the knowledge and skills acquired in the course of study addressing a specific problem or issue.
CO2	To encourage students to think critically and creatively about societal issues and develop user friendly and reachable solutions
CO3	To refine research skills and demonstrate their proficiency in communication skills.
CO4	To take on the challenges of teamwork, prepare a presentation and demonstrate the innate talents.

Mapping of Course Outcomes with Program Outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	H	H	H	H	H	H
CO2	H	H	H	H	H	H	H	H	H	H	H	H
CO3	H	H	H	H	H	H	H	H	H	H	H	H
CO4	H	H	H	H	H	H	H	H	H	H	H	H

COs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	H	H	H	H	H	
CO2	H	H	H	H	H	
CO3	H	H	H	H	H	
CO4	H	H	H	H	H	

H/M/L indicates Strength of Correlation   H- High, M- Medium, L-Low

Category	Basic Sciences	Engineering Sciences	Humanities and Social Sciences	Program Core	Program Electives	Open Electives	Practical / Project	Internships / Technical Skill	Soft Skills			
							✓					

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