



**Bharath**  
INSTITUTE OF HIGHER EDUCATION AND RESEARCH  
(Declared as Deemed to be University under section 3 of UGC Act 1956)



## DEPARTMENT OF AERONAUTICAL ENGINEERING



### SELF ASSESSMENT REPORT (SAR)

### UNDERGRADUATE ENGINEERING PROGRAMS (TIER-I)

### **Bharath Institute of Higher Education and Research**

# 173, Agharam Road, Selaiyur, Chennai - 600 073. Tamil Nadu, India.

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## PART A: Institutional Information

1. **Name and Address of the Institution** : **Bharath Institute of Science and Technology  
173, Agaram Road, Selaiyur, Chennai-73**
2. **Name and Address of the Affiliating University** : **Bharath Institute of Higher Education and  
Research  
173, Agaram Road, Selaiyur, Chennai-73**
3. **Year of establishment of the Institution** : **1985**

**4. Type of the Institution:**

- Institute of National Importance
- University
- Deemed University
- Autonomous
- Any other (Please specify)

**Note:**

1. In case of Autonomous and Deemed University, mention the year of grant of status by the authority.
2. In case of University Constituent Institution, please indicate the academic autonomy status of the Institution as defined in 12<sup>th</sup> Plan guidelines of UGC. Institute should apply for Tier 1 only when fully academically autonomous.

**5. Ownership Status:**

- Central Government
- State Government
- Government Aided
- Self - financing
- Trust
- Society
- Section 25 Company
- Any Other (Please specify)

**Provide Details:**

**6. Other Academic Institutions of the Trust/Society/Company etc., if any:**

Name of the Institution(s)	Year of Establishment	Programs of Study	Location
Sree Balaji Dental College and Hospital	1989	BDS, MDS	Pallikaranai, Chennai
Sree Balaji Medical College and Hospital	2003	MBBS,MD,MS	Works Road, Chrompet, Chennai
Sree Lakshmi Narayana Medical College and Hospital	2006	MBBS,MD,MS	Osudu, Villiyannur Commune, Puducherry
Sree Balaji College of Physiotherapy	1999	BPT	Pallikaranai, Chennai
Sree Balaji College of Nursing	1992	BSc(N), MSc(N)	Works Road, Chrompet, Chennai

**Table A.6**

**7. Details of all the programs being offered by the institution under consideration:**

S. No	Program Name	Name of the Department	Year of Start	Intake	Increase / Decrease in intake, if any	Year of Increase/Decrease	AICTE Approval	Accreditation Status*
1	B.Tech (Civil Engineering)	Civil Engineering	1985	60	600	2018	Yes	ABET Accreditation (6 Years)
2	B.Tech (Mechanical Engineering)	Mechanical Engineering	1985	60	840	2018	Yes	ABET Accreditation (6 Years)
3	B.Tech (Aerospace Engineering)	Aeronautical Engineering	2016	60	60	***	Yes	Not Eligible for Accreditation
4	B.Tech (Automobile Engineering)	Automobile Engineering	2003	50	60	2018	Yes	Eligible and Applied
5	B.Tech (Aeronautical Engineering)	Aeronautical Engineering	2012	60	300	2018	Yes	Eligible and Applied
6	B.Tech (Mechatronics)	Mechatronics	2008	30	60	2018	Yes	Eligible but not applied
7	B.Tech (Electrical and Electronics Engineering)	Electrical and Electronics Engineering	1992	60	120	2018	Yes	ABET Accreditation (6 Years)
8	B.Tech (Electronics and Communication Engineering)	Electronics and Communication Engineering	1992	60	900	2018	Yes	ABET Accreditation (6 Years)
9	B.Tech (Computer Science and Engineering)	Computer Science and Engineering	1985	60	1140	2018	Yes	Eligible and Applied
10	B.Tech (Information Technology)	Information Technology	2001	40	120	2018	Yes	Eligible but not applied
11	B.Tech (Industrial Biotechnology)	Industrial Biotechnology	2003	90	60	2018	Yes	Eligible but not applied
12	B.Tech (Biotechnology)	Industrial Biotechnology	2003	50	120	2018	Yes	Eligible but not applied

13	B.Tech (Biomedical Engineering)	Biomedical Engineering	2003	80	240	2018	Yes	Eligible but not applied
14	B.Tech (Nona Technology)	Nona Technology	2014	30	60	2018	Yes	Eligible but not applied
15	B.Tech (Agri Biotechnology)	Industrial Biotechnology	2017	120	240	2018	Yes	Not Eligible for Accreditation
16	B.Arch.	Architecture	1992	40	60	2018	Yes	Eligible but not applied
17	M.Arch	Architecture	2015	20	20	***	Yes	Not Eligible for Accreditation
18	M.Tech (Construction Engineering and Management)	Civil Engineering	2011	18	18	***	Yes	Eligible but not applied
19	M.Tech (EnironmentalEngin eering)	Civil Engineering	2016	18	18	***	Yes	Eligible but not applied
20	M.Tech (Structural Engineering)	Civil Engineering	2003	25	18	2018	Yes	Eligible but not applied
21	M.Tech (GeoTechnology)	Civil Engineering	2016	18	18	***	Yes	Not Eligible for Accreditation
22	M.Tech (Computer Aided Design)	Mechanical Engineering	2001	18	18	***	Yes	Eligible but not applied
23	M.Tech (Machine Design)	Mechanical Engineering	2003	18	18	***	Yes	Eligible but not applied
24	M.Tech (Thermal Engineering)	Mechanical Engineering	2002	60	18	2018	Yes	Eligible but not applied
25	M.Tech (Automobile Engineering)	Automobile Engineering	2011	18	18	***	Yes	Eligible but not applied
26	M.Tech (Power Electronics and Drives)	Electrical and Electronics Engineering	2002	18	18	***	Yes	Eligible but not applied
27	M.Tech (Power Systems)	Electrical and Electronics Engineering	2003	30	18	2018	Yes	Eligible but not applied
28	M.Tech (Embedded Systems)	Electronics and Communicati on Engineering	2004	10	18	2018	Yes	Eligible but not applied
29	M.Tech (Digital Communication and Networking)	Electronics and Communicati on Engineering	2004	10	18	2018	Yes	Eligible but not applied
30	M.Tech (Applied Electronics)	Electronics and Communicati on Engineering	2003	40	18	2018	Yes	Eligible but not applied
31	M.Tech (VLSI Design)	Electronics and Communicati on	2003	70	18	2018	Yes	Eligible but not applied

		Engineering						
32	M.Tech (Computer Science and Engineering)	Computer Science and Engineering	2002	18	18	***	Yes	Eligible but not applied
33	M.Tech (Information Technology)	Information Technology	2003	50	18	2018	Yes	Eligible but not applied
34	M.Tech (Industrial Biotechnology)	Industrial Biotechnology	2004	18	18	***	Yes	Eligible but not applied
35	M.Tech (Bio Informatics)	Industrial Biotechnology	2016	18	18	***	Yes	Not Eligible for Accreditation
36	M.Tech (Bio Medical Engineering)	Bio Medical Engineering	2011	18	18	***	Yes	Eligible but not applied
37	MBA	Management Studies	1992	60	120	2018	Yes	Granted provisional accreditation for two/three years for the period (2002-2005)
38	MCA	Computer Application	1995	60	60	***	Yes	Eligible but not applied

**Table A.7**

**8. Programs to be considered for Accreditation vide this application**

S.No	Program Name
1	B.Tech – Aeronautical Engineering
2	B.Tech – Automobile Engineering
3	B.Tech – Computer Science and Engineering
4	MBA – Master of Business Administration

**Table A.8**

**9. Total number of employees:**

**A. Regular Employees (Faculty and Staff):**

Items		2019-20		2018-19		2017-18	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M	219	222	107	109	74	81
	F	269	271	133	136	86	91
Faculty in Maths, Science & Humanities teaching in engineering Programs	M	91	93	91	94	42	49
	F	168	172	165	169	79	85
Non-teaching staff	M	109	113	89	97	79	94
	F	198	202	181	194	174	189

**B. Contractual Staff Employees (Faculty and Staff):** (Not covered in Table A):

Items		2019 -20		2018-19		2017-18	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	<b>M</b>	5	6	5	5	2	2
	<b>F</b>	5	6	4	4	--	1
Faculty in Maths, Science & Humanities teaching in engineering Programs	<b>M</b>	11	12	11	11	5	5
	<b>F</b>	16	18	16	17	1	3
Non-teaching staff	<b>M</b>	42	44	42	42	15	15
	<b>F</b>	39	41	36	39	18	21

**Table A.9b**

**10. Total number of Engineering Students:**

**Total number of Engineering (UG) Students:**

Item	2019-20	2018-19	2017-18
<b>Total no. of Boys</b>	1266	1779	1998
<b>Total no. of Girls</b>	1486	274	427
<b>Total no. of Students</b>	2752	2053	2425

**Total Number of Engineering (PG) Students include B.Arch**

Item	2019-20	2018 - 2019	2017 - 2018
<b>Total no. of boys</b>	79	72	31
<b>Total no. of girls</b>	28	30	26
<b>Total no. of students</b>	107	102	57

**Total Number of Management Students**

Item	2019-20	2018 - 2019	2017 - 2018
<b>Total no. of boys</b>	54	65	82
<b>Total no. of girls</b>	38	31	37
<b>Total no. of students</b>	92	96	119

**Total Number of MCA**

Item	2019-20	2018 - 2019	2017 - 2018
<b>Total no. of boys</b>	0	0	29
<b>Total no. of girls</b>	0	0	7
<b>Total no. of students</b>	0	0	36

### **11. Vision of the Institution:**

“Bharath Institute of Higher Education & Research (BIHER) envisions and constantly strives to provide an excellent academic and research ambience for students and members of the faculties to inherit professional competence along with human dignity and transformation of community to keep pace with the global challenges so as to achieve holistic development.”

### **12. Mission of the Institution:**

- i.** To develop as a Premier University for Teaching, Learning, Research and Innovation on par with leading global universities.
- ii.** To impart education and training to students for creating a better society with ethics and morals.
- iii.** To foster an interdisciplinary approach in education, research and innovation by supporting lifelong professional development, enriching knowledge banks through scientific research, promoting best practices and innovation, industry driven and institute oriented cooperation, globalization and international initiatives.
- iv.** To develop as a multi-dimensional institution contributing immensely to the cause of societal advancement through spread of literacy, an ambience that provides the best of international exposures, provide health care, enrich rural development and most importantly impart value based education.
- v.** To establish benchmark standards in professional practice in the fields of innovative and emerging areas in engineering, management, medicine, dentistry, nursing, physiotherapy and allied sciences.
- vi.** To imbibe human dignity and values through personality development and social service activities.

### **13. Contact Information of the Head of the Institution and NBA coordinator, if designated:**

- i. Name :** Dr. J. Hammed Hussain  
**Designation :** Dean Engineering  
**Mobile No :** 94440 11127  
**Email id :** [deanengg@bharathuniv.ac.in](mailto:deanengg@bharathuniv.ac.in)
- ii. NBA coordinator, if designated**  
**Name :** Dr.M.Sundararajan  
**Designation:** Dean Research  
**Mobile No:** 9840352860  
**Email id:** deanresearch@bharathuni.ac.in

<b>Self-Assessment Report (SAR)</b>	<b>NBA</b>
<b>Department of Aeronautical Engineering</b>	

## Part B

Criteria No.	Criteria	Mark/Weightage
	<b>Program Level Criteria</b>	TIER- I
1.	Vision, Mission and Program Educational Objectives	50
2.	Program Curriculum and Teaching –Learning Processes	100
3.	Course Outcomes and Program Outcomes	175
4.	Students’ Performance	100
5.	Faculty Information and Contributions	200
6.	Facilities and Technical Support	80
7.	Continuous Improvement	75
	<b>Institute Level Criteria</b>	
8.	First Year Academics	50
9.	Student Support Systems	50
10.	Governance, Institutional Support and Financial Resources	120
	<b>Total</b>	<b>1000</b>

<b>CRITERION 1</b>	<b>Vision, Mission and Program Educational Objectives</b>	<b>50</b>
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### 1.1. State the Vision and Mission of the Department and Institute

#### INSTITUTE VISION AND MISSION

##### **Vision of the Institution**

“Bharath Institute of Higher Education & Research (BIHER) envisions and constantly strives to provide an excellent academic and research ambience for students and members of the faculties to inherit professional competence along with human dignity and transformation of community to keep pace with the global challenges so as to achieve holistic development.”

##### **Mission of the Institution**

To develop as a Premier University for Teaching, Learning, Research and Innovation on par with leading global universities.

- ☐ To impart education and training to students for creating a better society with ethics and morals.
- ☐ To foster an interdisciplinary approach in education, research and innovation by supporting lifelong professional development, enriching knowledge banks through scientific research, promoting best practices and innovation, industry driven and institute-oriented cooperation, globalization and international initiatives.
- ☐ To develop as a multi-dimensional institution contributing immensely to the cause of societal advancement through spread of literacy, an ambience that provides the best of international exposures, provide health care, enrich rural development and most importantly impart value-based education.
- ☐ To establish benchmark standards in professional practice in the fields of innovative and emerging areas in engineering, management, medicine, dentistry, nursing, physiotherapy and allied sciences.
- ☐ To imbibe human dignity and values through personality development and social service activities.

## DEPARTMENT VISION AND MISSION

### **Vision:**

Department of Aeronautical Engineering will endeavour to accomplish worldwide recognition with a focal point of Excellence in the field of Aeronautics by providing quality Education through world class facilities, enabling graduates turning out to be Professional Experts with specific knowledge in Aeronautical & Aerospace engineering.

### **Mission:**

- (1) To be the state of art Teaching and Learning centre with excellent infrastructure and empowered Faculties in Aeronautical & Aerospace Engineering.
- (2) To foster a culture of innovation among students in the field of Aeronautics and Aerospace with updated professional skills to enhance research potential for sponsored research and innovative projects.
- (3) To Nurture young individuals to be knowledgeable, skilful, and ethical professionals in their pursuit of Aeronautical Engineering.

### Appropriateness of the Department Vision Statement

Vision	Appropriateness
Department of Aeronautical Engineering will endeavour and accomplish the worldwide recognition as a focal point of excellence in the field of aeronautics by providing quality education through world class facilities, prompting graduates turning out to be Professional experts with specific knowledge in Aeronautical & Aerospace engineering	<ul style="list-style-type: none"> <li>☑ Increasing demand for aviation, space exploration and defence system requires qualified and skilled engineers in the field of aeronautics.</li> <li>☑ Engineers have a huge contribution to design and produce high-end aircraft, satellites, missiles, and spacecraft.</li> <li>☑ To produce the engineers with professionalism and social ethics.</li> </ul>

### Appropriateness of the Department Mission Statement

Mission	Appropriateness
☐ M1: To be the state of art teaching and learning centre with excellent infrastructure and empowered faculties in Aeronautical & Aerospace Engineering	☐ Department provides learning resources using ICT and simulation tools to understand the fundamentals and core knowledge in the field of Aeronautics.
☐ M2: To foster a culture of innovation among students in the field of aeronautics and aerospace with updated professional skills to enhance the research potential for sponsored research and innovative projects.	☐ Research & Developmental activities and other efforts of Aeronautical engineering students would fulfil the industrial and societal needs.
☐ M3: To Nurture young individuals into knowledgeable, skilful, and ethical professionals in their pursuit of Aeronautical engineering.	☐ Providing technical skill to the students to improve proficiency for making them to get employable /entrepreneur.

### Consistency of the Department Statements with the Institute statements

Institution Vision	Department Vision	Consistency
☐ “Bharath Institute of Higher Education & Research (BIHER)” envisions and constantly strives to provide an excellent academic and research ambience for students and members of the faculties to inherit professional competence along with human dignity and transformation of	☐ Department of Aeronautical Engineering will endeavour and accomplish the worldwide recognition as a focal point of excellence in the field of aeronautics by providing quality education through world class facilities, prompting graduates turning out to be	<ul style="list-style-type: none"> <li>➤ Both the Institute and department vision provides an excellent academic and research environment for students and faculty members to inherit professional competence along with human dignity.</li> <li>➤ Both visions will provide training and development for students and faculty members</li> </ul>

community to keep pace with the global challenges so as to achieve holistic development.”	Professional experts with specific knowledge in Aeronautical & Aerospace engineering.	for improving core competence in the field of engineering.
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## 1.2. State the Program Educational Objectives (PEOs)

### Program Educational Objectives (PEOs)

**A Graduate of Aeronautical Engineering program will,**

**PEO-1:** Possess a strong foundation in Mathematical, Scientific, and Engineering fundamentals necessary to solve engineering problems in the field of Aeronautics.

**PEO-2:** Engage in designing, simulating, manufacturing, testing, and analyzing in the field of Aeronautical and allied Engineering Industries.

**PEO-3:** Acquire enhanced skill to involve in research and development activities in emerging areas and pursue higher education.

**PEO-4:** Work effectively as individuals and as team members in multidisciplinary projects.

**PEO-5:** Involve in lifelong learning, career development and adopt to social needs.

## 1.3. Indicate where the Vision, Mission and PEOs are published and disseminated among stakeholders.

### 1.3.A Adequacy in respect of publication & dissemination

Institute makes every effort to ensure Department Vision and Mission, Department PEOs are communicated effectively to all stakeholders namely students, faculty, parents, industry, alumni, and management etc.

Presently Department Vision and Mission PEOs are published and disseminated through the following methods:

- University website, ( <http://www.bharathuniv.ac.in> )
- Department website ( <http://www.bharathuniv.ac.in/aeronautical.html> )

- HOD cabin
- Faculty room
- Classrooms
- Department notice boards.
- Department brochures
- Laboratories
- Corridors

### **1.3.B Process of dissemination among stakeholders**

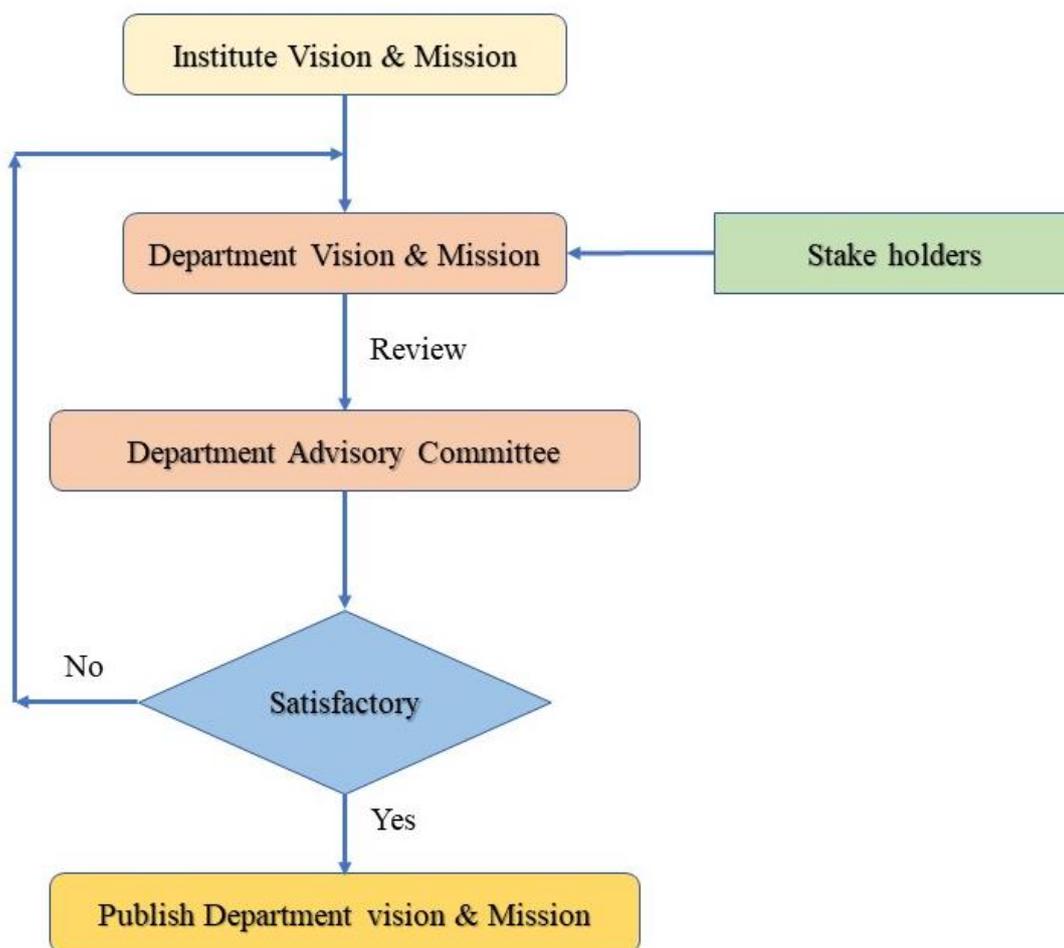
Institute makes every effort to ensure Department Vision and Mission, Department PEOs are communicated effectively to all internal and External stake holders.

S.No	Stake Holders	Mode of Dissemination
1	Students	College website, syllabus copy, display in Head of the Department (HOD) chamber, seminar hall, department library, orientation programs, placement training programs, college handbook, posters in department common areas, laboratory manuals
2	Faculty	College website, syllabus copy, display in HOD room, seminar hall, department library, periodical staff meetings, pedagogy programs, faculty development programs.
3	Support Staff	College website, syllabus copy, display in HOD room, seminar hall, department library, periodical staff meetings, training programs
4	Governing Board Members	College website, Governing Body meetings, Board of Studies (BOS), Board of Examiners (BOE), Academic Council meetings
5	Institutional Management	College website, brochure.
6	Industry	College website, industry institute interaction, workshops, seminars, BOS meetings

7	Alumni	College website, conferences, workshops, alumni meet, Magazine.
8	Employers	College website, brochures, industry institute interaction, workshops, seminars, BOS meeting, placement programs
9	Parents	College website, inauguration programme of I year, parent teacher meetings, Magazine.

#### **1.4. State the process for defining the Vision and Mission of the Department, and PEOs of the program**

##### **1.4.A Process Involved in Defining the Vision, Mission of the Department**



#### **Process Involved in Defining the Vision, Mission of the Department**

##### **Step -1**

Collect **feedback** from External Stake holder Such as Alumni, Employers, parents, Industry and Internal Stake holder such as Students, faculty, Supporting Staff, governing body, management.

#### **Step -2**

The HOD with the active participation of faculty members **develops** the vision and mission statement of the department in alignment with Vision and Mission of the University based on collected feedback from stakeholders.

#### **Step -3**

Developed vision and mission statement of the department are **reviewed** further among Department advisory committee before finalization.

#### **Step -4**

Department advisory committee is advised to make correction, if **not satisfied** with the framed vision and mission statement.

#### **Step -5**

If satisfied, the Department advisory committee approve the framed vision and mission statement and disseminate the Vision and Mission of the Department.

### **1.4.B Process Involved in Defining the Program Educational Objectives (PEOs)**

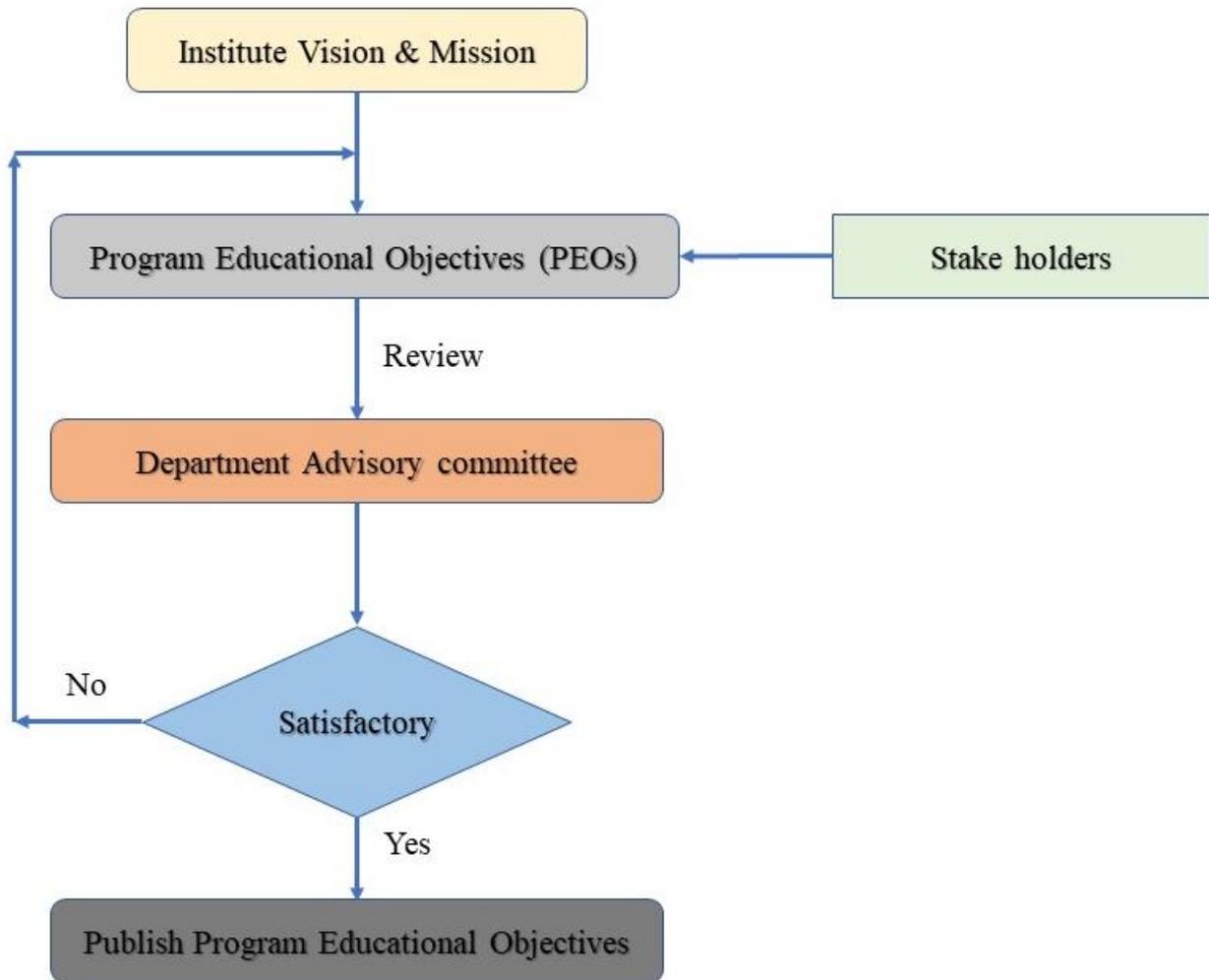
**Step -1:** Collect **feedback** from External Stake holder Such as Alumni, Employers, parents, Industry, and Internal Stake holder such as Students, faculty, Supporting Staff, governing body, management.

**Step -2:** The HOD with the active participation of faculty members **develops** the Program Educational Objectives (PEOs) of the department in alignment with Vision and Mission of the University based on collected feedback from stakeholders.

**Step -3:** Developed Program Educational Objectives (PEOs) of the department are **reviewed** further among Department advisory committee before finalization.

**Step -4:** Department advisory committee is advised to make correction, if **not satisfied** with the framed Program Educational Objectives (PEOs).

**Step -5:** If satisfied, the Department advisory committee approve the framed Program Educational Objectives (PEOs) and disseminate Program Educational Objectives (PEOs).



### **Process Involved in Defining the Program Educational Objectives (PEOs)**

#### **1.5. Establish consistency of PEOs with Mission of the Department**

##### **1.5.A Mission of the Department – PEOs Matrix**

PEO statements are framed based on the outcomes of our graduates who excel with a wide spectrum of technical competencies and interpersonal skills in the career. PEOs are mapped with department mission.

**1.5.B Consistency/Justification of PEOs and Mission statements Matrix**

S.No	PEO Statements	M1 (Teaching Learning Process)	M2 (Research and Development)	M3 (Ethics and Social Needs)
1.	PEO 1: Possess a strong foundation in Mathematical, Scientific, and Engineering fundamentals necessary to solve engineering problems in the field of Aeronautics.	✓		
2.	PEO 2 : Engage in designing, simulating, manufacturing, testing, and analyzing in the field of Aeronautical and allied Engineering Industries.	✓	✓	
3.	PEO 3: Acquire enhanced skill to involve in research and development activities in emerging areas and pursue higher education.		✓	
4.	PEO 4: Work effectively as individuals and as team members in multidisciplinary projects.		✓	✓
5.	PEO 5: Involve in lifelong learning, career development and adopt to social needs.			✓

The consistency of PEOs with Mission of the Department is arrived based on the mapping given below:

S.No	PEO Statements	M1 (Teaching Learning Process)	M2 (Research and Development)	M3 (Ethics and Social Needs)
1.	PEO 1: Possess a strong foundation in Mathematical, Scientific, and Engineering fundamentals necessary to solve engineering problems in the field of Aeronautics.	Students will learn through world class facilities and high-level teaching		
2.	PEO 2: Engage in designing, simulating, manufacturing, testing, and analyzing in the field of Aeronautical and allied Engineering Industries.	Students will develop their design and analysis knowledge through excellent infrastructure provided.	Students will engage in Research activities through Laboratories and Centre of Excellence	
3.	PEO 3: Acquire enhanced skill to involve in research and development activities in emerging areas and pursue higher education.		Students will Develop their research knowledge required to involve in innovative projects	
4.	PEO 4: Work effectively as individuals and as team members in multidisciplinary projects.		Students can work on innovative projects and sponsored projects as individual as well as team	Students will develop leadership skills through Projects
5.	PEO 5: Involve in lifelong learning, career development and adopt to social needs.			Students will involve in developing products which can be useful to the society

<b>CRITERION 2</b>	<b>Program Curriculum and Teaching Learning processes</b>	<b>100</b>
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## **2.1 Program Curriculum**

### **2.1.1 State the process for designing the program curriculum.**

#### **CURRICULUM DESIGN**

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, higher education and research.

#### **The process flow for Curriculum Design is as follows:**

**Step 1:** Based on Institute/Department mission and vision, and the NBA / AICTE guidelines the department formulates its POs and PSOs.

**Step 2:** The HOD along with all faculty members frames the outline of the curriculum based on norms of UGC, AICTE and referring to the curriculum of premier institutions like NITs, IITs, foreign universities etc. Alumni feedback is also considered during this step.

**Step 3:** The course outcomes of all the courses of the curriculum are planned according to the POs and PSOs. Then, the syllabi of various courses are framed.

**Step 4:** The feedback of the curriculum and syllabi is obtained from various stakeholders such as academicians, industrial experts, alumni, parents, faculty and students.

**Step 5:** The feedback from the various stakeholders is incorporated by Program Coordination Committee through brainstorming.

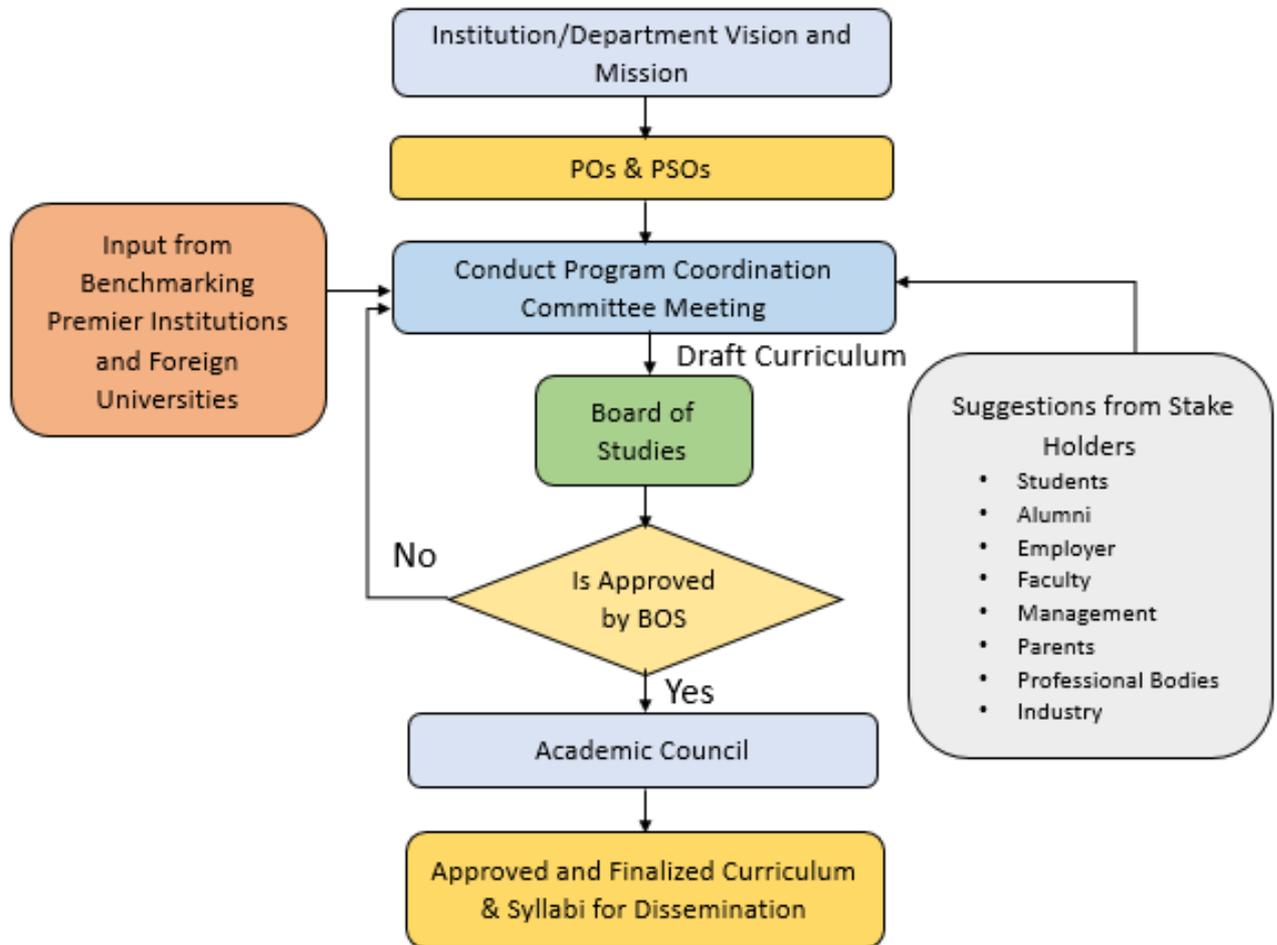
**Step 6:** The drafted curriculum and syllabi are submitted to the Board of Studies (BOS) meeting. The recommendations and modifications suggested by BOS members are incorporated in curriculum and syllabi.

**Step 7:** The curriculum and syllabi is then passed for approval to the Academic Council.

**Step 8:** After the approval from Academic Council (AC) the curriculum and syllabi are finalized.

**Step 9:** The approved curriculum and syllabi are then disseminated to the competent authorities of university.

Similar procedure is followed for amendments in syllabi of various courses whenever required. The following flowchart depicts the flow for curriculum development:



**Curriculum Development Flowchart**

### 2.1.2 Structure of the curriculum

The B.Tech. Aeronautical Engineering, offered by the Department is an eight semesters engineering graduate program. Curriculum structure of the program of Regulation 2015 (R2015) is presented in the following table. Each of the sub tables has courses of the respective semester along with their components. Notations of the components are: Lecture (L), Tutorial (T), Practical (P), Credit (C).

SEMESTER I							
S. No	Subject Code	Category	Course Title	L	T	P	C
<b>Theory</b>							
1	BEN101	HS	English-I	2	1	0	3
2	BMA101	BS	Mathematics –I	3	0	0	3
3	BPH101	BS	Engineering Physics – I	3	0	0	3
4	BCH101	BS	Engineering Chemistry – I	3	0	0	3
5	BCS101	ES	Fundamentals of Computing and Programming	3	0	0	3
6	BSS101	HS	Personality Development	1	1	0	2
7	BBT102	BS	Biology for Engineers	2	0	0	2
8	BCE101	ES	Basic Civil Engineering	2	0	0	2
9	BME101	ES	Engineering Graphics-E*	2	2	0	4
<b>Practical</b>							
10	BCM1L1	ES	Basic Civil and Mechanical Engineering Practices Laboratory	0	0	2	1
11	BSS1L4 / 1L5/IL6	HS	NCC/NSS/NSO to be conducted during week ends				1
*E- Civil, Mechanical, Aeronautical Branches							

Total No. of Contact Hours per week: 27

Total No. of Credits: 27

SEMESTER II							
S. No	Subject Code	Category	Course Title	L	T	P	C
<b>Theory</b>							
1	BEN 201	HS	English-II	2	1	0	3
2	BMA201	BS	Mathematics- II	3	0	0	3
3	BPH 201	BS	Engineering Physics – II	3	0	0	3
4	BCH201	BS	Engineering Chemistry – II	3	0	0	3
5		HS	Foreign/Indian Language <sup>#</sup>	3	0	0	3
6	BME202	ES	Engineering Mechanics	2	1	0	3
7	BEE201	ES	Basic Electrical and Electronics Engineering	2	0	0	2
<b>Practical</b>							
8	BCS2L2	ES	Computer Practices Lab	0	0	2	1
9	BEE2L1	ES	Basic Electrical and Electronics Engineering Practices	0	0	2	1
10	BPC2L1	BS	Physics and Chemistry Laboratory	0	0	2/2	1
11	BSS2L7	HS	Yoga to be conducted during week ends				1
* Any one of the following courses: BFR201 – French, BGM201 – German, BJP201- Japanese, BKR201 – Korean, BCN201 – Chinese, BTM201 – Tamil							

Total No. of Contact Hours per week: 26

Total No. of Credits: 24

SEMESTER III							
S. No	Subject Code	Category	Course Title	L	T	P	C
<b>Theory</b>							
1	BMA301	BS	Mathematics – III	3	1	0	4

2	BAN301	PC	Fundamentals of Aeronautics and Astronautics	3	0	0	3
3	BAN302	PC	Fundamentals of Fluid Mechanics	3	1	0	4
4	BAN303	PC	Fundamentals of Aero - Thermodynamics	3	1	0	4
5	BAN304	PC	Fundamentals of Structural Mechanics	3	1	0	4
6	BAN305	PC	Mechanics of Machines	3	0	0	3
<b>Practical</b>							
7	BCE3L1	ES	Fluid Mechanics and Machineries Laboratory	0	0	4	2
8	BCE3L2	ES	Strength of Materials Laboratory	0	0	4	2
9	BME3L1	ES	Machine Drawing	0	0	4	2

**Total No. of Contact Hours per week: 34****Total No. of Credits: 28****SEMESTER IV**

S. No	Subject Code	Category	Course Title	L	T	P	C
<b>Theory</b>							
1	BMA402	BS	Numerical Methods	3	1	0	4
2	BAN401	PC	Aircraft Structures – I	3	1	0	4
3	BAN402	PC	Aerodynamics – I	3	1	0	4
4	BAN403	PC	Aircraft Propulsion	4	0	0	4
5	BAN404	PC	Aircraft Systems and Instrumentation	3	0	0	3
6	BCE407	HS	Environmental Studies	3	0	0	3
<b>Practical</b>							
7	BAN4L1	PC	Aircraft Structures Laboratory	0	0	4	2
8	BME4L1	ES	Manufacturing Engineering Laboratory	0	0	2	1
9	BAN4L2	PC	Computer Aided Design and Drafting	0	0	2	1

**Total No. of Contact Hours per week: 30****Total No. of Credits: 26**

SEMESTER V							
S. No	Subject Code	Category	Course Title	L	T	P	C
<b>Theory</b>							
1	BAN501	PC	Aircraft Structures – II	3	1	0	4
2	BAN502	PC	Aerodynamics – II	3	1	0	4
3	BAN503	PC	Advanced Aerospace Propulsion	4	0	0	4
4	BAN504	PC	Flight mechanics	3	1	0	4
5	BME505	ES	Manufacturing Engineering	3	0	0	3
6	-	CE	Core Elective – I	3	0	0	3
<b>Practical</b>							
7	BAN5V1	PR	Value Added Program I	0	0	2	1
8	BAN5L1	PC	Aerodynamics Laboratory	0	0	4	2
9	BAN5L2	PC	Aero Design and Modeling Laboratory	0	0	2	1
10	BAN5L3	PC	Computer Aided Analysis	0	0	2	1

Total No. of Contact Hours per week: 32

Total No. of Credits: 27

SEMESTER VI							
S. No	Subject Code	Category	Course Title	L	T	P	C
<b>Theory</b>							
1	BSS601	HS	Value Education and professional Ethics	3	0	0	3
2	BAN601	PC	Aerospace Structural Materials and Composites	3	0	0	3
3	BAN602	PC	Finite Element Methods	3	1	0	4
4	BAN603	PC	Control Engineering	3	0	0	3
5	-	CE	Core Elective – II	3	0	0	3
6	-	NE	Non – Major Elective – I	3	0	0	3

Practical							
7	BAN6V1	PR	Value Added Program – II	0	0	2	1
8	BAN6L1	PC	Aircraft System Laboratory	0	0	4	2
9	BAN6L2	PC	Propulsion Laboratory	0	0	4	2
10	BAN6L3	PC	Aircraft Design Project – I	0	0	4	2

Total No. of Contact Hours per week: 33

Total No. of Credits: 26

SEMESTER VII							
S. No	Subject Code	Category	Course Title	L	T	P	C
Theory							
1	BAN701	PC	Computational Fluid Dynamics	3	0	0	3
2	BAN702	PC	Avionics	3	0	0	3
3	BAN703	PC	Heat Transfer	3	0	0	3
4	-	CE	Core Elective – III	3	0	0	3
5	-	NE	Non – Major Elective – II	3	0	0	3
6	-	OE	Open Elective – I	3	0	0	3
Practical							
7	BAN7L1	PC	Airframe and Aero Engine Repair Lab	0	0	2	1
8	BAN7L2	PC	Avionics Laboratory	0	0	2	1
9	BAN7L3	PC	Aircraft Design Project – II	0	0	4	2
10	BAN7P1	PR	Project Phase-I	0	0	4	2

Total No. of Contact Hours per week: 30

Total No. of Credits: 24

SEMESTER VIII							
S. No	Subject Code	Category	Course Title	L	T	P	C
Theory							
1	-	NE	Non – Major Elective – III	3	0	0	3

2	-	OE	Open Elective – II	3	0	0	3
<b>Practical</b>							
3	BAN8P1	PR	Project Phase-II	0	0	18	9
4	BAN8C1	PR	Comprehension	0	0	0	1

**Total No. of Contact Hours per week: 24**

**Total No. of Credits: 16**

**Total no. of credits for the program : 198**

### LIST OF ELECTIVES

#### List of Core Elective (CE) I:

Code No.	Course Title	L	T	P	C
BANE01	Basics of Aircraft Maintenance and Repair	3	0	0	3
BANE02	Rockets and Missiles	3	0	0	3
BANE03	Experimental Stress Analysis	3	0	0	3
BANE04	Experimental Aerodynamics	3	0	0	3

#### List of Core Elective (CE) II:

Code No.	Course Title	L	T	P	C
BANE05	Helicopter Maintenance	3	0	0	3
BANE06	Space Mechanics	3	0	0	3
BANE07	Theory of Vibrations	3	0	0	3
BANE08	Helicopter Aerodynamics	3	0	0	3

#### List of Core Elective (CE) III:

Code No.	Course Title	L	T	P	C
BANE09	Aircraft Engine Repair and Maintenance	3	0	0	3
BANE10	Cryogenic Rocket Propulsion	3	0	0	3
BANE11	Theory of Plates and Shells	3	0	0	3
BANE12	Hypersonic Aerodynamics	3	0	0	3

#### List of Non-Major Elective (NE) I:

Code No.	Course Title	L	T	P	C
BANE13	An Introduction to Combustion	3	0	0	3
BANE14	Principles of Turbo machinery in Air breathing Engines	3	0	0	3
BANE15	Nano Science and Technology	3	0	0	3
BANE16	Unmanned Aerial Vehicle	3	0	0	3

**List of Non-Major Elective (NE) II:**

Code No.	Course Title	L	T	P	C
BANE17	Boundary Layer Theory	3	0	0	3
BANE18	Fatigue and Fracture Mechanics	3	0	0	3
BANE19	High Temperature Materials	3	0	0	3

**List of Non-Major Elective (NE) III:**

Code No.	Course Title	L	T	P	C
BANE20	Wind Energy	3	0	0	3
BANE21	Satellite Technology	3	0	0	3
BANE22	Aircraft Rules and Regulations CAR I and II	3	0	0	3

**List of Open Elective (OE) I:**

Code No.	Course Title	L	T	P	C
BBA001	Principles of Management and Organizational Behavior	3	0	0	3
BANE23	Airport Management	3	0	0	3
BANE24	Aerospace Bio – Medical and Life Support Engineering	3	0	0	3

**List of Open Elective (OE) II:**

Code No.	Course Title	L	T	P	C
BBA008	Total Quality Management	3	0	0	3

BANE25	Industrial Aerodynamics	3	0	0	3
BANE26	Mechanics of Heterogeneous Materials	3	0	0	3

### 2.1.3 State the components of the curriculum.

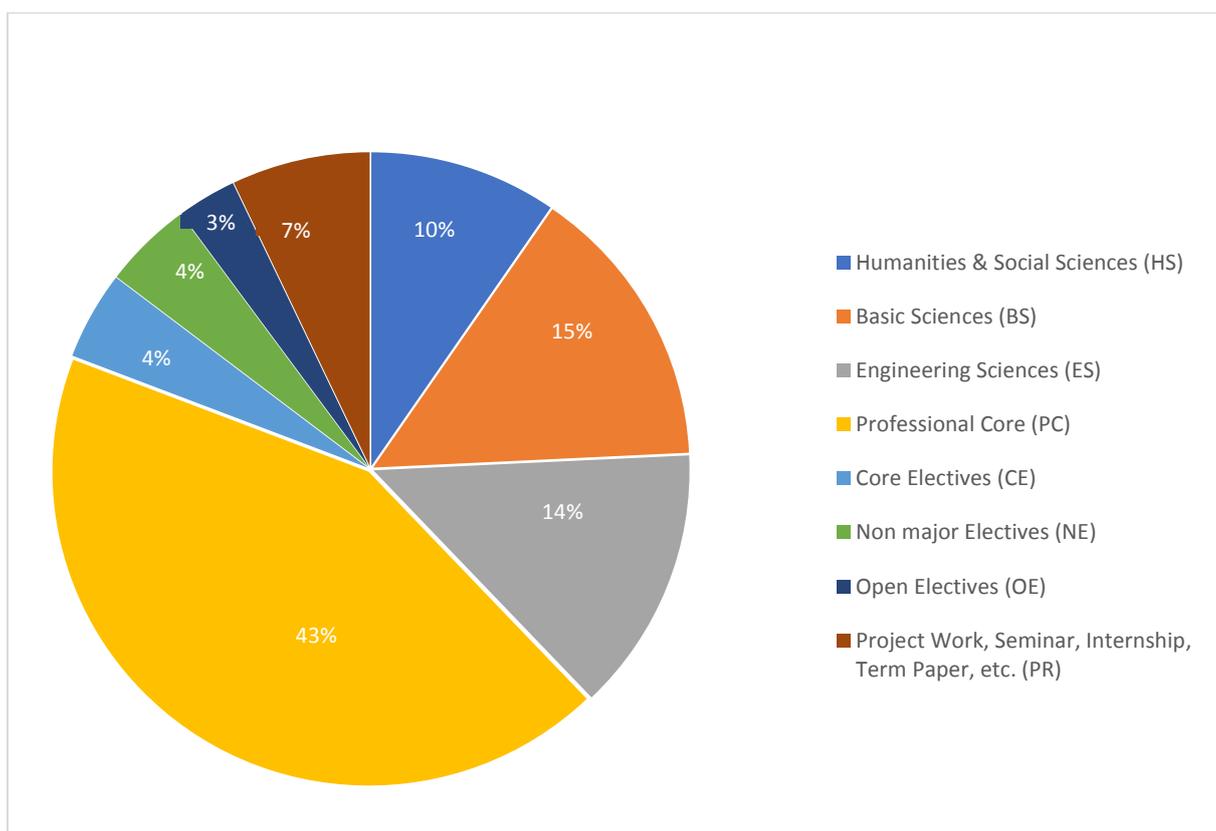
#### Components of the Curriculum- Regulations 2015

Program curriculum grouping based on course components.

S.No	Components	Credit As per Semester								No. of Credits	% of credit
		I	II	III	IV	V	VI	VII	VII I		
1	Humanities & Social Sciences (HS)	6	7	-	3	-	3	-	-	19	9.6
2	Basic Sciences (BS)	11	10	4	4	-	-	-	-	29	14.7
3	Engineering Sciences (ES)	10	7	6	1	3	-	-	-	27	13.7
4	Professional Core (PC)	-	-	18	18	20	16	13	-	85	42.9
5	Core Electives (CE)	-	-	-	-	3	3	3	-	9	4.5
6	Non major Electives (NE)	-	-	-	-	-	3	3	3	9	4.5
7	Open Electives (OE)	-	-	-	-	-	-	3	3	6	3
8	Project Phase-I ,Project Work, Seminar etc. (PR)	-	-	-	-	1	1	2	10	14	7
	Total Credit	27	24	28	26	27	26	24	16	198	

#### Credit Share Percentage- Regulations 2015

The Pie Chart describes the distribution of various components of curriculum based on Credit share percentage. Both the curriculum maintains a balance among various categories of courses from Science, Mathematics, Engineering, Humanities and Management, Projects and Internship components.



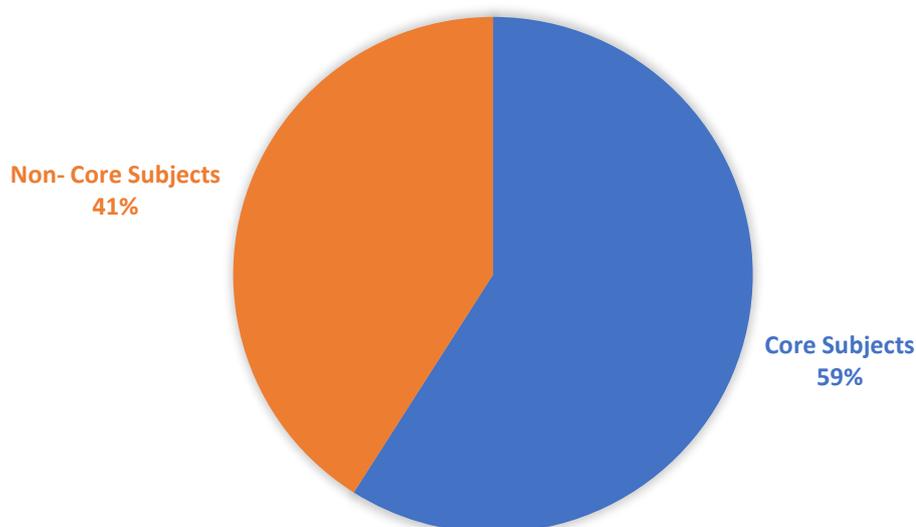
**Components of Curriculum as per Regulation 2015– Credit % Share**

**Credit Share Percentage- Regulations 2015**

	S.No	Course Component	No. of Credits	% of credit	
Non- Core Subjects	1	Humanities & Social Sciences (HS)	19	9.6	81
	2	Basic Sciences (BS)	29	14.7	
	3	Engineering Sciences (ES)	27	13.7	
	4	Open Electives (OE)	6	3	
Core Subjects	5	Professional Core (PC)	85	42.9	117
	6	Core Electives (CE)	9	4.5	
	7	Non major Electives (NE)	9	4.5	
	8	Project Phase-I, Project Phase-II, Seminar etc. (PR)	14	7	
		<b>Total Credit</b>	<b>198</b>		

Type	Percentage Share
Non-Core Subjects	41
Core Subjects	59

### Credit Share – Regulations 2015



#### 2.1.4 Process used to identify extent of compliance of curriculum for attaining POs & PSOs.

The following steps are used to identify the compliance of curriculum for attaining POs and PSOs.

##### **Step 1**

Course outcomes are formed for individual courses and the curriculum is finalized.

##### **Step 2**

Threshold is fixed for the attainment of Course Outcomes, Program Outcomes and Program Specific Outcomes

##### **Step 3**

The accepted curriculum is delivered using a variety of teaching tools, such as a blackboard, LCD, and Smart Class.

##### **Step 4**

The achievement of COs, PO s and PSO s is measured using Direct and Indirect methods. Direct method involves evaluation by internal assessment tests, end semester exams and projects. Feedback from the students are used to assess the CO s in case of indirect method

##### **Step 5**

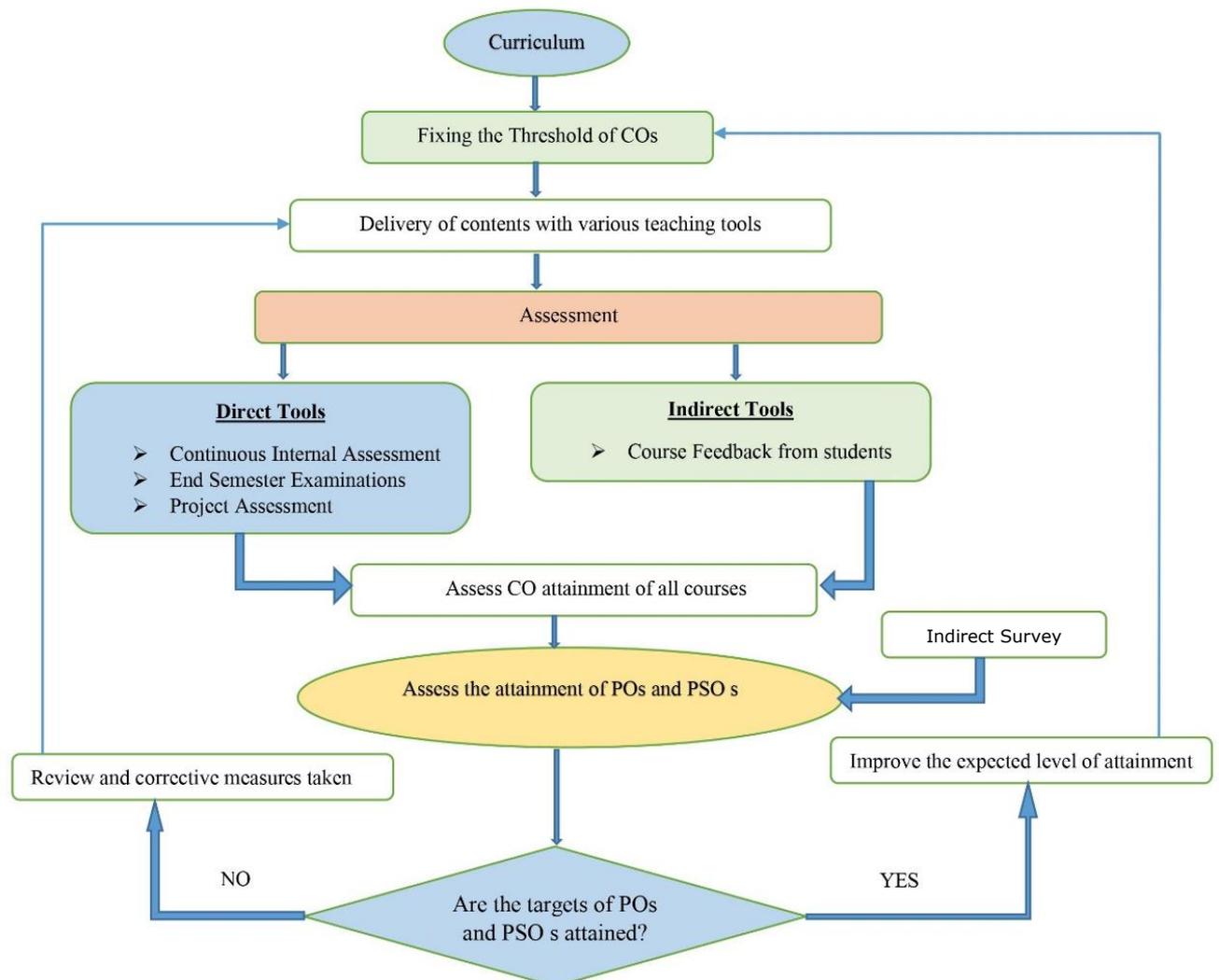
PO/PSO assessment is done by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Graduate Exit survey is used to assess the attainment of POs and PSOs

### Step 6

If the threshold on Cos, POs and PSOs are attained then the expected level of attainment will be improved and the step 3 is repeated

### Step 7

If the threshold on Cos, POs and PSOs are not attained then the curricular gaps will be reviewed and corrective measures are taken.



**Process used to identify extent of compliance of curriculum for attaining POs & PSOs.**

## 2.2 Teaching-Learning Processes

Teaching can be defined as engagement with learners to enable their understanding and

application of knowledge, concepts, and processes. It includes design, content selection, delivery, assessment, and reflection. Preparation, Execution, and Assessment of Academic Plan are the most striking feature of the Teaching Learning Process adopted by the Institute. Faculty members prepare an academic plan (based on prescribed format) for their respective courses before commencement of the semester. They present these plans in presentation session and explain their strategy to deal with a course. Head of the Department and senior professors modify this plan if required. The plan contains course outcomes, mapping of the COs with POs and PSOs, add on content to bridge the curriculum gaps, lecture schedule and delivery plan, assignments, and tutorial questions etc.

Teaching learning process is a transaction or complex cooperative and personal relationship between faculty and students.

- When viewed from the perspective of the ‘learning paradigm’ rather than the ‘instructional paradigm’, the teaching learning process is a personal interactive relationship that extends beyond the subject matter.
- Within the interactive relationship faculty relate to students with dignity and respect, with the expectation that students will be supported and stimulated to develop intellectual integrity and independent judgment.
- The roles of the teacher are facilitator, guide, coach, and mentor acting in partnership with students.

The student roles become those of learner inquirer and seeker of knowledge within and active participative student faculty relationship.

## **2.2.1 Describe Processes followed to improve quality of Teaching & Learning.**

### **2.2.1.A. Adherence to Academic Calendar**

The college adheres to academic calendar provided by the Institution for conduct of continuous learning and evaluation system. The institution always believes in effective time management and timeliness. The Department prepares the final academic calendar in line with the academic calendar published by the Institution prior to the commencement of the forthcoming semester. The finalized academic calendar is displayed on the notice boards of the departments and in the institution website. Any changes in the academic calendar due to the

unforeseen developments are communicated to the students. Based on the academic calendar, all the faculty members prepare lesson plans, topics to be handled, and ensure unit wise completion as per internal exam dates. Faculties must strictly adhere to the academic calendar.

The Institution sticks to the academic calendar published by the Institution for Respective Courses which allows the teachers and the students to space out their teaching and learning assessments.



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## Academic Calendar for the Academic Year 2018 - 2019 Jan 2019 - June 2019

Month / Year	Date	Day	Academic Events
Jan 2019	1	Tuesday	New Year Holiday
	2	Wednesday	Reopening for IV/VI/VIII Semester
	3	Thursday	
	4	Friday	
	5	Saturday	Holiday
	6	Sunday	Holiday
	7	Monday	
	8	Tuesday	
	9	Wednesday	
	10	Thursday	
	11	Friday	
	12	Saturday	Holiday
	13	Sunday	Holiday
	14	Monday	
	15	Tuesday	Pongal Holiday
	16	Wednesday	Pongal Holiday
	17	Thursday	Pongal Holiday
	18	Friday	
	19	Saturday	Holiday
	20	Sunday	Holiday
	21	Monday	
	22	Tuesday	
	23	Wednesday	Guest Lecture
	24	Thursday	
	25	Friday	Republic Day Holiday
	26	Saturday	Holiday
	27	Sunday	Holiday
	28	Monday	
	29	Tuesday	
	30	Wednesday	
	31	Thursday	

**No. of working days: 18**



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Month / Year	Date	Day	Academic Events
February 2019	1	Friday	
	2	Saturday	Holiday
	3	Sunday	Holiday
	4	Monday	
	5	Tuesday	
	6	Wednesday	
	7	Thursday	
	8	Friday	
	9	Saturday	Holiday
	10	Sunday	Holiday
	11	Monday	
	12	Tuesday	
	13	Wednesday	
	14	Thursday	
	15	Friday	
	16	Saturday	Holiday
	17	Sunday	Holiday
	18	Monday	<b>Internal Test 1 Begins</b>
	19	Tuesday	
	20	Wednesday	
	21	Thursday	
	22	Friday	
	23	Saturday	Holiday
	24	Sunday	Holiday
	25	Monday	
	26	Tuesday	
	27	Wednesday	
	28	Thursday	

**No. of working days: 20**



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Month / Year	Date	Day	Academic Events
March 2019	1	Friday	
	2	Saturday	Holiday
	3	Sunday	Holiday
	4	Monday	
	5	Tuesday	
	6	Wednesday	
	7	Thursday	
	8	Friday	
	9	Saturday	Holiday
	10	Sunday	Holiday
	11	Monday	
	12	Tuesday	
	13	Wednesday	Guest Lecture
	14	Thursday	
	15	Friday	
	16	Saturday	Holiday
	17	Sunday	Holiday
	18	Monday	
	19	Tuesday	
	20	Wednesday	
	21	Thursday	
	22	Friday	
	23	Saturday	Holiday
	24	Sunday	Holiday
	25	Monday	
	26	Tuesday	
	27	Wednesday	
	28	Thursday	
	29	Friday	National Conference
	30	Saturday	Holiday
	31	Sunday	Holiday

**No. of working days: 21**



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## Academic Calendar for the Academic Year 2018 - 2019

### Jan 2019 - June 2019

Month / Year	Date	Day	Academic Events
April 2019	1	Monday	
	2	Tuesday	
	3	Wednesday	
	4	Thursday	
	5	Friday	
	6	Saturday	Holiday
	7	Sunday	Holiday
	8	Monday	<b>Internal Test 2 Begins</b>
	9	Tuesday	
	10	Wednesday	
	11	Thursday	
	12	Friday	
	13	Saturday	Holiday
	14	Sunday	Holiday
	15	Monday	
	16	Tuesday	
	17	Wednesday	Holiday
	18	Thursday	
	19	Friday	Good Friday
	20	Saturday	Holiday
	21	Sunday	Holiday
	22	Monday	
	23	Tuesday	
	24	Wednesday	
	25	Thursday	
	26	Friday	
	27	Saturday	Holiday
	28	Sunday	Holiday
	29	Monday	
	30	Tuesday	

**No. of working days: 20**



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Month / Year	Date	Day	Academic Events
May 2019	1	Wednesday	May Day Holiday
	2	Thursday	
	3	Friday	
	4	Saturday	Holiday
	5	Sunday	Holiday
	6	Monday	
	7	Tuesday	
	8	Wednesday	
	9	Thursday	<b>Model Examination Begins</b>
	10	Friday	
	11	Saturday	
	12	Sunday	Holiday
	13	Monday	
	14	Tuesday	
	15	Wednesday	
	16	Thursday	<b>University Practical Begins</b>
	17	Friday	
	18	Saturday	
	19	Sunday	Holiday
	20	Monday	
	21	Tuesday	
	22	Wednesday	<b>University Practical Ends</b>
	23	Thursday	<b>University Theory Begins</b>
	24	Friday	
	25	Saturday	
	26	Sunday	Holiday
	27	Monday	
	28	Tuesday	
	29	Wednesday	
	30	Thursday	
	31	Friday	

**No. of working days: 22**



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### Academic Calendar for the Academic Year 2018 - 2019 Jan 2019 - June 2019

Month / Year	Date	Day	Academic Events
June 2019	1	Saturday	Holiday
	2	Sunday	Holiday
	3	Monday	
	4	Tuesday	
	5	Wednesday	Ramzan Holiday
	6	Thursday	
	7	Friday	
	8	Saturday	Holiday
	9	Sunday	Holiday
	10	Monday	
	11	Tuesday	
	12	Wednesday	
	13	Thursday	
	14	Friday	
	15	Saturday	Holiday
	16	Sunday	Holiday
	17	Monday	
	18	Tuesday	
	19	Wednesday	
	20	Thursday	
	21	Friday	
	22	Saturday	Holiday
	23	Sunday	Holiday
	24	Monday	
	25	Tuesday	
	26	Wednesday	
	27	Thursday	
	28	Friday	
	29	Saturday	Holiday
	30	Sunday	Holiday

**No. of working days: 22**



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**Academic schedule for the academic year 2018 – 2019 is as follows:**

**EVEN SEMESTER (JANUARY 2019 – JUNE 2019)**

MONTH	NO. OF WORKING DAYS
January	18
February	20
March	21
April	20
May	22
<b>TOTAL</b>	<b>101</b>

**All batches UG / PG – FT / PT**

Practical exam starts from      16-05-2019  
 Practical exam ends on            22-05-2019  
 Theory exam starts from          23-05-2019

### **2.2.1.B PEDAGOGICAL INITIATIVES**

Subject allocation is carried out well before the semester so that faculty members can prepare lesson plans, course plan, soft and/or hard copies of the lecture notes. Faculty members in the department prepare detailed lesson plan, assignment questions for their allotted subject by the Head of the Department. Faculty members use various pedagogical methods for effective teaching learning process. A well-thought process for course allotment and workload distribution is adopted at the department level. Three to four choices are solicited from the faculty members. Various pedagogical initiatives to achieve the outcomes of teaching are carried out.

Methods followed: PowerPoint Presentations, Access to NPTEL and SWAYAM Lectures, Smart Board Teaching, Quiz, Assignments, Workshops, Expert Talk's.

- **Lecture method and Interactive learning:**

The faculty use chalk and board and audio-visual aids in teaching. Students are also encouraged to interact during the lecture hour by getting the doubts clarified by the faculty. Also, faculties utilizing the OBE to cater the learning needs of students by innovative ways.

- **Project-based learning:**

Students are encouraged to carry out multidisciplinary projects to apply their engineering knowledge from seventh semester onwards. In BIHER, Aeronautical Engineering students are provided with state-of-the-art labs in which the Turbojet engines, High Speed jet and Low-Speed jet testing facilities augment the research initiatives of the students.

- **Computer-assisted learning:**

The Department has required number of computers, printers, LCD projectors, application software and system software. These are effectively used for teaching. The students are also encouraged to develop software for the solution of the assignments and tutorials. Many final year projects are completed using software such as CATIA, ANSYS, MATLAB, and MIDAS NFX.



Aeronautical Design and Analysis laboratory help students to understand in design and analysis of different parts and components of the aircrafts.

- **SMART classroom:**

Faculty are using SMART classroom to enhance the impact of the virtual classroom. The traditional whiteboards have been replaced with the Interactive **Smart Board**. Smart board is used for demonstration, video audio classes.

- **Demo Classes:**

Department Faculty take students to the Hanger (Figure 2.6) and demonstrate the fundamental concepts of aeronautical engineering by Utilizing the existing THORP T-211 trainer aircraft and HAWKER SIDDELEY 125 F400B as per the course plan demands.



**Demonstration of aircraft maintenance and repair subject by using real aircraft Thorp T-211. Ground run, periodical checks also illustrated to students by well-trained aircraft technicians.**

### **C. Methodologies to Support Weak Students and Encourage Bright Students**

- ☐ Faculty members are assigned with the responsibility of mentorship. Each mentor is allotted with 15 students. The students who secure below 50% marks in their Continuous Internal Evaluation are identified and considered as academically weak students (Slow learners). The slow learners are facilitated by their mentors to understand personal and professional difficulties of students.
- ☐ Students who secure above 90% marks in their Continuous Internal Evaluation in all subjects are considered as academically bright students (Advanced learners). The advanced learners are encouraged to take up new challenges.

#### **Assistance for weak students:**

Teachers attempt to enhance the performance of weak student as follows:

- Counselling to motivate students and guide students for better preparation by the mentors.
- Constant monitoring their performance in internal tests.
- Extra classes arranged for backlog subjects.
- Appreciation certificate for showcasing good marks after mentoring.
- Periodic interaction with the parents about the performance of slow learners.
- Encouraging them for regular attendance.

**Encouraging Bright students:**

Faculty members make efforts to boost up the performance of bright students by:

- Encouraging them to participate in seminars/conferences in different institutes.
- Students are encouraged to publish papers in various journals.
- Students are encouraged to undergo International and National level Internships.
- Students are encouraged to take up competitive exams like GATE, GRE, TOEFL, IELTS, etc.

S.No	Reg.No	Name
1	U15AE004	ARAVINDAN A
2	U15AE005	ARUP RATAN PARAMANIK
3	U15AE007	BOJJA MANOJ KUMAR
4	U15AE008	CHILAKALAPUDI YASHWANTH TEJA
5	U15AE009	CHITTOJI THANMAYI
6	U15AE015	ERLA NAVEEN KUMAR
7	U15AE023	KOLA JOHN HANNA JAYASHREE
8	U15AE024	KUSUNURI JYOTHI SAI PAVAN
9	U15AE028	MOPOORI BHARATH KUMAR
10	U15AE034	PULUSU PARDHU SREE
11	U15AE035	RAVILLA VISHNU VARADHAN NAIDU
12	U15AE036	ROSELIN L
13	U15AE037	RUTHRA S
14	U15AE040	SANGEETHA N
15	U15AE049	YALAMARTHI SRAVANI
16	U15AE050	YANAMADHALA AVINASH CHOWDARY
17	U15AE052	MANE JERMIAH
18	U15AE053	PALLEKONDU SIRISHA
19	U15AE058	SOBINRAJ M

  
**HOD-AERONAUTICAL**

S.No	Reg.No	Name
1	U15AE003	AMUTHAN A
2	U15AE010	DASARI RUFUS
3	U15AE012	DEGALA VINODKUMAR
4	U15AE013	DIVYA A
5	U15AE020	KARRI ASHOK KUMAR REDDY
6	U15AE021	KARTHIKEYAN R
7	U15AE027	MERLIN TERESA P
8	U15AE032	PAVULURI MOHITH CHOWDARY
9	U15AE033	PERCIYAL.A
10	U15AE039	SAMPATHARAO PARDHU
11	U15AE042	SHIVA SHANKAR V N
12	U15AE043	SWATHITH K S
13	U15AE051	JAKKULA RAM SARATH YADAV
14	U15AE055	VASU PALIVELA
15	U15AE059	SANTHOSHAJ K
16	U15AE063	VITTAL ZAHID AHMED
17	U15AE701	MOHD AMIR

  
**HOD-AERONAUTICAL**

### 2.2.1.D Quality of Classroom Teaching

Quality of teaching is very important factor for quality learning. The following aspects are considered to ensure a good quality classroom teaching:

- Conducive learning ambiances in the classrooms are maintained through comfort seating arrangements, good ventilation with proper lighting.
- The Faculty members go to the classrooms on time; revise the previous class Portions first and then ask questions from the previous day portions. Later they continue the new sessions.
- All the classrooms are well equipped with LCD projectors to provide enhanced learning.
- Smart board allow integration of various technologies and interaction to improve the learning experience.
- Smart classrooms are utilized to improve the teaching learning process.
- Real components and models are taken by the faculty to the classroom to demonstrate the concepts in a clear way to the students.
- Real time examples are cited in the form of videos.

- Dean and Head of Department regularly visit classes to observe the teaching process and convey their suggestions and appreciations to the faculty member.
- Supercomputer to support students for simulation and effective learning.

Sl. No	FACILITIES
1	Classrooms with LCD Projectors
2	Smart Classroom
3	Department Library

### **2.2.1.E Conduct of experiments.**

- All lab manuals are prepared well before the commencement of the semester as Prescribed by the Institution.
- Each class is divided into two groups and the two groups are sent to two separate Laboratories: in further they are divided into small groups, not more than four Students.
- Each group will do the experiments separately to make them understand and conduct the laboratory experiment and to get individual attention from the Faculty.
- The students record the experimental values in their observation after completing the relevant calculations; the students submit the same for evaluation.

Sl. No	List of Laboratory
1	Aerodynamics laboratory
2	Aircraft structures laboratory
3	Propulsion laboratory
4	Computer center
5	Avionics laboratory
6	Aircraft systems & Maintenance laboratory
7	Flight simulation laboratory
8	Aero design & modelling laboratory

### **2.2.1 F Continuous assessment in the laboratory**

- After completion of first set of exercises, students' knowledge in the experiments is tested.
- Based on that practical outcome, the weaker students are identified, and a special session is conducted after the set of exercises.
- Model Lab Exam: A model lab exam of 3 hours duration is conducted after the completion all the exercises; to assess the ability of a student performance.
- University Examination: The end semester practical examination is conducted for 3-hour duration.
- The maximum marks for each practical course shall be 100 comprising of 40 marks for internal assessment and 60 marks for the end semester examinations conducted by the University.

The criteria for awarding marks for internal assessment are given in the below table.

<b>Items</b>	<b>Marks (weightage)</b>
Observation	<b>10</b>
Record	<b>10</b>
Model Exam	<b>20</b>
<b>Total</b>	<b>40</b>

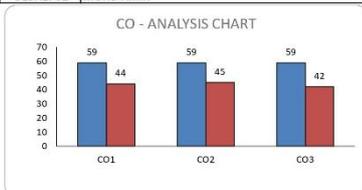


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**B.Tech Aeronautical Engineering**  
**Academic Year (2017-2018) Odd Sem**  
**Model Exam - CO ATTAINMENT**  
**BAN5L2 - AERO DESIGN AND MODELLING LABORATORY**

S.No	Reg.No	Name	CO1			TOTAL (100)	CO Attained		
			Q.1	Q.2	Q.3		CO1	CO2	CO3
1	U15AE001	NAGANANDAN A	29	27	39	95	Y	Y	Y
2	U15AE002	AJAY S	15	27	23	65	N	Y	N
3	U15AE003	AMUTHAN A	24	28	38	90	Y	Y	Y
4	U15AE004	ARAVINDAN A	12	20	8	40	N	N	N
5	U15AE005	ARUP RATAN PARAMANIK	28	28	39	95	Y	Y	Y
6	U15AE006	BANDARU KOTA NAGENDRA SURESH	19	21	27	67	N	Y	N
7	U15AE007	BOJJA MANOJ KUMAR	30	28	27	85	Y	Y	N
8	U15AE008	CHILAKALAPUDI YASHWANTH TEJA	30	28	27	85	Y	Y	N
9	U15AE009	CHITTOJI THANMAYI	30	26	39	95	Y	Y	Y
10	U15AE010	DASARI RUFUS	30	26	39	95	Y	Y	Y
11	U15AE012	DEGALA VINODKUMAR	19	28	38	85	N	Y	Y
12	U15AE013	DIVYA A	26	27	37	90	Y	Y	Y
13	U15AE014	EDWIN PRAKASH F	26	27	37	90	Y	Y	Y
14	U15AE015	ERLA NAVEEN KUMAR	19	8	18	45	N	N	N
15	U15AE016	GADDAM MADHUSUDHAN REDDY	30	30	40	100	Y	Y	Y
16	U15AE017	GANDLA SAI KEERTHANA	25	28	37	90	Y	Y	Y
17	U15AE018	VASUDEVA REDDY I	8	24	13	45	N	Y	N
18	U15AE019	ISHANT DUBEY	29	28	33	90	Y	Y	Y
19	U15AE020	KARRI ASHOK KUMAR REDDY	6	7	22	35	N	N	N
20	U15AE021	KARTHIKEYAN R	28	27	40	95	Y	Y	Y
21	U15AE022	JUHI GUPTA	19	18	33	70	N	N	Y
22	U15AE023	KOLA JOHN HANNA JAYASHREE	19	18	33	70	N	N	Y
23	U15AE024	KUSUNURI JYOTHI SAI PAVAN	13	15	27	55	N	N	N
24	U15AE025	MD ALAM	28	20	22	70	Y	N	N
25	U15AE026	MD MUDEE ALAM	30	30	40	100	Y	Y	Y
26	U15AE027	MERLIN TERESA P	19	27	39	85	N	Y	Y
27	U15AE028	MOPOORI BHARATH KUMAR	9	26	25	60	N	Y	N
28	U15AE030	NINGKHANRIN N G	27	28	40	95	Y	Y	Y
29	U15AE031	PARASA MAHENDRA	30	30	40	100	Y	Y	Y
30	U15AE032	PAVULURI MOHITH CHOWDARY	27	28	40	95	Y	Y	Y
31	U15AE033	PERCIYALA	27	28	40	95	Y	Y	Y
32	U15AE034	PULLUSU PARDHU SREE	26	30	34	90	Y	Y	Y
33	U15AE035	RAVILLA VISHNU VARADHAN NAIDU	30	30	40	100	Y	Y	Y
34	U15AE036	ROSELIN L	29	26	40	95	Y	Y	Y
35	U15AE037	RUTHRA S	29	26	40	95	Y	Y	Y
36	U15AE038	KARISHMA CHANDINI S	30	30	40	100	Y	Y	Y
37	U15AE039	SAMPATHARAO PARDHU	30	30	40	100	Y	Y	Y
38	U15AE040	SANGEETHA N	30	30	40	100	Y	Y	Y
39	U15AE041	SANJAY V	19	14	27	60	N	N	N
40	U15AE042	SHIVA SHANKAR V N	30	30	40	100	Y	Y	Y
41	U15AE043	SWATHITH K S	30	15	25	70	Y	N	N
42	U15AE045	PEMMASANI HANUMANTH RAO	30	23	37	90	Y	Y	Y
43	U15AE046	TYAGARAJAN BHAVANI SHANKAR	30	30	40	100	Y	Y	Y
44	U15AE048	BIKASH BORADO	30	30	40	100	Y	Y	Y
45	U15AE049	YALAMARTHI SRAVANI	30	23	37	90	Y	Y	Y
46	U15AE050	YANAMADHALA AVINASH CHOWDARY	30	23	37	90	Y	Y	Y
47	U15AE051	JAKKULA RAM SARATH YADAV	25	15	40	80	Y	N	Y
48	U15AE052	MANE JERMAH	17	11	27	55	N	N	N
49	U15AE053	PALLEKONDU SIRISHA	29	29	37	95	Y	Y	Y
50	U15AE054	ANBARASAN R	22	18	25	65	Y	N	N
51	U15AE055	VASU PALIVELA	27	19	34	80	Y	N	Y
52	U15AE057	DIVYA CHALAMPALEM	30	30	40	100	Y	Y	Y
53	U15AE058	SOBINRAJ M	26	29	40	95	Y	Y	Y
54	U15AE059	SANTHOSHRAJ K	26	29	35	90	Y	Y	Y
55	U15AE060	MUHAMMAD RAAZEE	26	29	35	90	Y	Y	Y
56	U15AE061	MOHAMMAD ALAM K A	30	30	40	100	Y	Y	Y
57	U15AE062	G.M.SANDEEP	29	30	26	85	Y	Y	N
58	U15AE063	VITTAL ZAHID AHMED	30	30	40	100	Y	Y	Y
59	U15AE701	MOHD AMIR	18	20	27	65	N	N	N



CO - ATTAINMENT				
	MARKS	THRES	ATTAIN	STUDENT
CO1	30	65	75	44
CO2	30	70	76	45
CO3	40	70	71	42
TOTAL STUDENTS PASS				55
TOTAL STUDENTS FAIL				4

**2.2.1 G. Student feedback of teaching learning process and action taken.**

- Minimum 3 Class committee meetings (for individual class i.e., batch wise section wise) are conducted (for UG Program) during every academic semester- 1st meeting within first week of commencement of the semester and 2nd and 3rd meeting at least one week prior to the commencement of unit tests.

- 4-6 students per class are identified by the class committee coordinator covering top, average and slow learners from each section. When student members are selected it is ensured that representatives from lateral entry hostellers and girl students are also included.
- Chairperson for the meeting is selected by the HOD among senior faculty members who are not handling Courses for those classes. This meeting is chaired by the chairperson and attended by course coordinator, all Course handling faculty members and Class advisor. The meeting dates are finalized by the class committee coordinator in consultation with HODs and circular is released as per at least two days prior to the meeting.
- The Class Committee will discuss the Feedback on course coverage (Course coverage as per plan), Clarity and quality of presentation by the Faculty, Interaction with the faculty inside the classroom / lab, Lecture material / E-self learning links provided to students. Any suggestion for improvement in teaching / learning from the student will also be recorded.
- End semester feedback from students is collected by class advisors, they are summarized, and faculty wise feedback is generated by HOD and communicated to competent authorities.
- Those feedback with overall % below 70 are reviewed with the faculty for the reasons and improvements required (if necessary, university examination results are also considered for deciding on the actions required) and recorded. If required, the actions planned for improvements are further followed up (or monitored at the end of the next semester when feedback is collected).



Class committee meeting (2015-2019 Batch)



Class committee meeting (2016-2020 Batch)



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**Students Feedback Form**  
 (On Curriculum, Teaching-Learning and Evaluation)

Academic year: 2018-2019  
 Course: B. Tech -Aeronautical Engineering  
 Year/Sem: III/V

Registration No: D16AE012  
 Student Name: UJJWAL KUMAR SINGH  
 Student Signature:

S. No	Parameter	BAN501	BAN502	BAN503	BAN504	BME505	BANE01	BANE03	BANSL1	BANSL2	BANSL3	BAN5V1
1	Curriculum and Syllabi of the Courses	3	2	3	2	3		4	3	3	5	4
2	Extent of syllabi covered in the Class	3	5	5	1	5		5	3	5	5	4
3	Course delivery by faculty members in the class	3	4	1	3	4		3	3	5	3	3
4	Usage of teaching aids and ICT in the class by faculty to facilitate teaching	3	5	3	5	2		3	3	3	4	4
5	Fairness in the assessment processes (Internal Test, Model Exam, Assignments, etc.)	4	2	1	1	3		3	3	3	4	3
6	Timely announcement of examination results	3	3	3	4	4		5	4	5	3	5
7	Opportunities in the School/ University for Research Activities	4	4	3	4	4		5	4	4	3	4
8	Opportunity for students to participate in internship, student exchange, field visit	5	5	3	5	4		5	5	3	3	3
9	Opportunities for out of classroom learning (guest lectures, seminars, workshop, value added program, conferences, competitions)	3	3	5	4	3		2	3	5	4	5
10	Overall Learning Experience	2	2	5	4	3		4	3	5	5	4
	Total	33	35	32	33	35		39	34	41	39	39

5-Excellent, 4-Vey Good, 3-Good, 2-Fair, 1-Poor

BAN501- AIRCRAFT STRUCTURES-II  
 BAN504- FLIGHT MECHANICS  
 BANE03- EXPERIMENTAL STRESS ANALYSIS  
 BANSL3- COMPUTER AIDED ANALYSIS LAB

BAN502- AERODYNAMICS-II  
 BME505- MANUFACTURING ENGINEERING  
 BANSL1- AERODYNAMICS LAB  
 BAN5V1- VALUE ADDED PROGRAM - I

BAN503- ADVANCED AEROSPACE PROPULSION  
 BANE01- BASICS OF AIRCRAFT MAINTENANCE AND REPAIR  
 BANSL2- AERO DESIGN AND MODELING LAB



**2.2.2. Quality of end semester examination, internal semester question papers, assignments and evaluation**

The Institution and the Department have split the students learning evaluation process into two parts: Internal Evaluation Process and External Evaluation Process. The Internal Evaluation Process is carried out by the Department with the help of Controller of Examination (CoE) and has typically three to four components: Internal Assessment-1, Internal Assessment-2, Assignments and Model Examination. The External Evaluation Process consists of End Semester Examination and is conducted by the Institution through CoE. All the question papers are set in alignment with Blooms’ Taxonomy Levels (BTL), Course Outcomes and Difficulty levels. These question papers are reviewed by Senior Faculty Members of the Department. Further, IQAC of the Institution ensures the quality of both the evaluation process.

### **2.2.2A Process for Internal semester Question paper Setting and Evaluation**

The following procedure is applied to ensure the quality of internal semester question paper setting and evaluation:

#### **Step 1:**

The Head of the Department will arrange meeting for all the faculty to discuss about the guidelines for framing internal semester question papers. Two continuous internal assessment Tests and one model exam are conducted for each subject per semester as per the Academic Calendar.

#### **Step 2:**

Concerned subject faculty will prepare the question papers based on the guidelines discussed in the meeting.

#### **Step 3:**

The prepared Question papers will be scrutinized by the Question Paper Scrutiny Committee for the verification of COs, distribution of marks and the Revised Blooms Taxonomy levels.

#### **Step 4:**

If the set question paper is found satisfactory by the Question Paper Scrutiny Committee, then it will be forwarded for printing. If not, then the faculty is asked to revise the question paper as per guidelines.

#### **Step 5:**

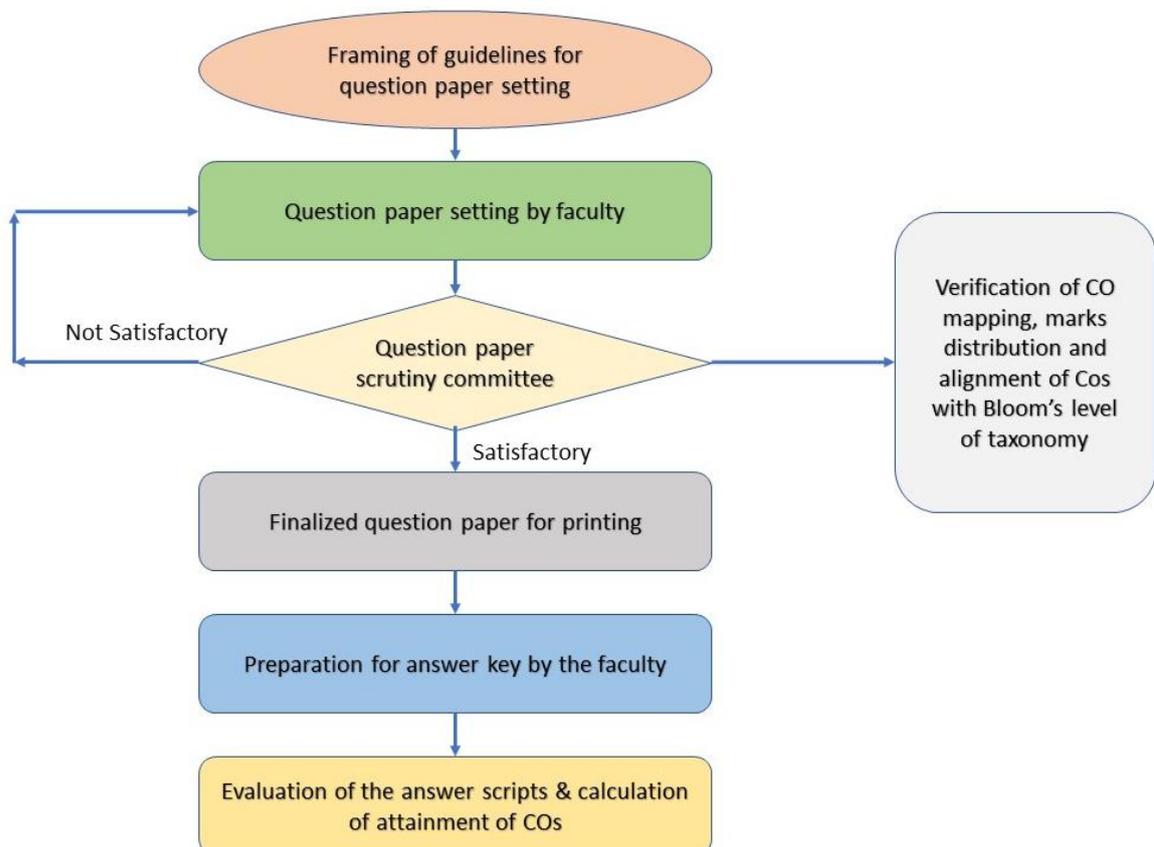
The Subject handling faculty will prepare the answer key for the approved question paper.

#### **Step 6:**

The answer script will be evaluated by the course in charge for the calculation of Course Outcomes.

**Step 7:**

The evaluated answer sheets are shown to the students to ensure transparency and give feedback.



The Question paper Pattern for conducting the Continuous Internal Evaluation (CIE) is mentioned below:

**Internal Assessment Test I and II**

Part A:  $6 \times 2 = 12$  marks

- ☐ Six questions carrying 2 marks each.

Part B:  $3 \times 6 = 18$  marks

- ☐ Three questions of either-or type carrying 6 marks each.

Part C:  $2 \times 10 = 20$  marks

- ☐ Two questions of either-or type carrying 10 marks each.

Total = 50 marks

**Assignment**

Two Assignments each carries 5 marks will be given.

**Model Examination**

Part A:  $10 \times 2 = 20$  marks

- ☐ Ten questions carrying 2 marks each.

Part B:  $5 \times 6 = 30$  marks

- ☐ Five questions of either-or type carrying 6 marks each.

Part C:  $5 \times 10 = 50$  marks

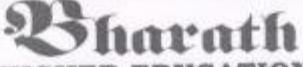
- ☐ Five questions of either-or type carrying 10 marks each.

Total = 100 marks

**2.2.2B Process to ensure questions from outcomes/learning levels perspective.**

Testing the students' cognitive level is the prime objective of any assessment system. However, it is perhaps necessary to review and introduce steps in the examination paper design to ensure that the student is tested for the different cognitive levels of learning.

The Question paper is set based on Revised Bloom's taxonomy levels and aligned with knowledge categories at which the Course Outcomes are delivered. Each question will be mapped with respective Bloom's level and sent to the Question paper scrutiny committee for finalization.


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**MODEL EXAMINATION, Odd Semester (2017- 2018)**  
BANS04-Flight Mechanics

Year/Sem: III/V Date: 06/11/2017  
Duration: 3 Hour Max. Marks: 100

Part – A (10×2=20Marks) Answer All Questions		CO Mapping	BL
1	Define ISA	CO1	L1
2	Define Drag polar	CO1	L1
3	Define absolute and service ceiling	CO2	L1
4	Define SAR	CO2	L1
5	Relate bank angle and load factor	CO3	L1
6	Define ground roll	CO3	L1
7	Define stability and control	CO4	L1
8	Define static margin	CO4	L1
9	Define yaw and sideslip	CO5	L1
10	The difference in lift between two wings causes the airplane to roll and the difference in roll causes it to _____	CO5	L1
<b>Part – B (5×6=30 Marks)</b>			
11 a	Explain the structure of ISA	CO1	L2
Or			
b	Calculate minimum drag in level flight for the given data. $W=300000\text{N}; S=100\text{sq.m}; C_{d_0}=0.02; \text{Aspect Ratio}=10; \text{Oswald efficiency factor}=0.85$	CO1	L3
12 a	Calculate the range of aircraft, $sfc=0.5\text{kg/kw-hr}, \eta=75\%, s=150\text{m}^2, L/D=12, C_d=0.018+0.072C_{l,2}, W_f / W_0 = 0.2, W_0=600000\text{N}, W_1=480000\text{N}$	CO2	L3
Or			
b	Explain glide hodograph	CO2	L2
13 a	Explain limit load factor and ultimate load factor	CO3	L2
Or			
b	Explain pull up manoeuvre	CO3	L2
14 a	Discuss the direct contribution of powerplants to the static longitudinal stability	CO4	L2
or			
b	Explain Routh's Discriminate	CO4	L2
15 a	Discuss the need for fin	CO5	L2
or			
b	Discuss the spin characteristics of an airplane	CO5	L2

Part – C (5×10=50 Marks)							
16	a	Explain the variation of pressure, temperature, density at 5000m, 14000m	CO1	L2			
Or							
	b	Explain the different types of drag and discuss the drag reduction methods	CO1	L2			
17	a	A glider of 4905N has an wing area of 25m <sup>2</sup> , C <sub>Do</sub> =0.012, AR=16, e=0.87 calculate the minimum angle of glide, minimum rate of sink, corresponding speed at sealevel condition.	CO2	L3			
Or							
	b	A light airplane weighing 7400N and the engine delivering 115HP with propulsive efficiency 80%. Its wing span of 9.41m and a plan form area of 12.3m <sup>2</sup> . If C <sub>Do</sub> =0.025 and e=0.8. Determine the maximum angle of climb at maximum rate of climb.	CO2	L5			
18	a	An aircraft is in steady level at a sea level at a speed of 100m/s. The pilot causes his aircraft to enter a horizontally corrected banked circle incidence. The engine thrust is altered as necessary. Then the pilot brings the aircraft out of turn without altering the angle of incident and thrust and allow the aircraft to climb, Determine the rate of climb if at that incident L/D is 9.	CO3	L5			
Or							
	b	Explain the effect of ground wind during take off	CO3	L2			
19	a	Explain aerodynamic balancing	CO4	L2			
Or							
	b	A wing body model is tested in subsonic wind tunnel. The lift is found to be zero. At a geometric angle of attack -1.5deg and at angle of attack of 5deg the C <sub>l</sub> is 0.52, also at 1 deg angle of attack about 1g the measured as -0.018, 0.05 respectively. The cg located at 0.55c. Calculate the position of a.c and C <sub>m<sub>ac</sub></sub>	CO4	L2			
20	a	Explain Autorotation and Dutch roll	CO5	L2			
Or							
	b	Explain the requirements of rudder in detail	CO5	L2			
CO's	L1	L2	L3	L4	L5	L6	
CO 1	4	26	6				
CO 2	4	16			10		
CO 3	4	12	10		10		
CO 4	4	32					
CO 5	4	32					
BL – Bloom's Taxonomy Levels: (L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analysing, L5 – Evaluating, L6 - Creating)							

CO 1	Calculate thrust and power required for propeller driven and jet powered aircraft at steady level flight. (Apply)
CO 2	Evaluate the Range, Endurance, Glide and climb performances. (Evaluate)
CO 3	Estimate the take-off, landing, turning performance using V-n diagram. (Evaluate)
CO 4	Describe the characteristics of longitudinal stability. (Understand)
CO 5	Evaluate the lateral and directional stability characteristics. (Evaluate)

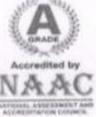
**Suggestion and Comments**

As per the regulations, Question paper is verified and approved for printing.

*M. Syed*  
Signature of the Scrutiny Member

**2.2.2C Evidence of COs coverage in class test / mid-term tests**

Continuous Internal Evaluation will be performed through two Internal Assessment Tests, two assignments and a model exam.

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**Internal Assessment Test I, Odd Semester (2017-2018)**  
**BAN504-Flight Mechanics**

Year/Sem: III/V Date: 29/8/2017  
 Duration: 1 ½ Hour Max. Marks: 50

Part – A (6×2=12 Marks) Answer All Questions		CO Mapping	BL
1	Define Induced Drag	CO1	L1
2	Define ISA	CO1	L1
3	Enumerate the conditions for minimum drag in steady level flight	CO1	L2
4	Define Range and Endurance	CO2	L1
5	Enumerate the conditions for best possible range for jet airplane	CO2	L2
6	Define Absolute ceiling and Service ceiling	CO2	L1
<b>Part – B (3×6=18 Marks)</b>			
7 a	Explain the structure of ISA	CO1	L2
Or			
b	Explain Drag polar and prove that $(L/D)_{max} = 1/2\sqrt{kcd_0}$	CO1	L2
8 a	Show that $D/D_{min} = 1/2[m^2+m^{-2}]$	CO1	L2
Or			
b	Calculate minimum drag in level flight for the given data. W=30000N; S=100sq.m; C <sub>d0</sub> =0.02; Aspect Ratio=10; Oswald efficiency factor =0.85	CO1	L3
9 a	Show that $V_{mp} = 0.76V_{md}$	CO2	L2
Or			
b	Explain glide hodograph	CO2	L2
<b>Part – C (2×10=20 Marks)</b>			
10 a	Explain the different types of and discuss the drag reduction methods	CO1	L2
Or			
b	Explain the variation of pressure, temperature, density in troposphere and in stratosphere	CO1	L2
11 a	A glider weighing 4905N has an area of 25m <sup>2</sup> , C <sub>d0</sub> =0.012, AR=16, e=0.87 calculate the minimum angle of glide, minimum rate of sink, corresponding speed under standard sea level conditions	CO2	L3
Or			
b	A light airplane weighing 7400N and the engine delivering 115HP with propulsive efficiency 80%. Its wing span of 9.41m and a plan form area of 12.3m <sup>2</sup> . If C <sub>d0</sub> =0.025 and e=0.8. Calculate the maximum angle of climb at maximum rate of climb.	CO2	L3

Assessment Summary:							
CO's	L1	L2	L3	L4	L5	L6	
CO 1	4	40	6				
CO 2	4	14	20				

BL – Bloom's Taxonomy Levels: (L1- Remembering, L2- Understanding, L3 – Applying, L4 – Analysing, L5 – Evaluating, L6 - Creating)

#### Course Outcome

CO1	Calculate thrust and power required for propeller driven and jet powered aircraft at steady level flight. (Apply)
CO2	Evaluate the Range, Endurance, Glide and climb performances. (Evaluate)

#### Suggestion and Comments

As per the regulations, question paper is verified and approved for printing.

*M. Syed*  
Signature of the Scrutiny Member



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**Internal Assessment Exam – I / II**

Name - <i>Bandaru Kota Nagendra Suresh</i>	Register Number - <i>DUSAEE006</i>
Program – B. Tech Aeronautical /Aerospace	Year/ Sem/Section - <i>III/V</i>
Course Code/Name- <i>RAN 504 FM</i>	Date of Exam - <i>29/8/17</i>

*[Signature]*  
Signature of Student

*[Signature]*  
Signature of Invigilator

	Q.No	Marks							Q.No	Marks						
		CO 1	CO 2	CO 3	CO 4	CO 5	CO 6			CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	
Part - A	1	<i>01</i>						Part - B	7	a	<i>06</i>					
	2	<i>02</i>								b						
	3	<i>02</i>							8	a						
	4		<i>02</i>							b	<i>05</i>					
	5		<i>02</i>						9	a		<i>03</i>				
	6		<i>02</i>							b						
Part - C	Q.No		Marks						Grand Total		<i>42</i>					
	10	a							Grand Total (In Words)							
		b	<i>07</i>						<i>FOUR TWO</i>							
	11	a		<i>10</i>												
b																

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	Total
Maximum Marks Allotted	<i>28</i>	<i>22</i>					<i>50</i>
Marks Obtained	<i>28</i>	<i>19</i>					<i>42</i>

Date	Name of Examiner	Signature of Examiner
<i>21.08.17</i>	<i>MR. S.R. VIMBURAJ</i>	<i>S.R. Vimal R. J</i>

Comments

*Fair Valuation*

*[Signature]*  
Signature of scrutiny officer



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#### Model Exam

Name - <u>DEVALA VINODKUMAR</u>	Register Number - <u>UISAE 012</u>
Program - <u>B. Tech Aeronautical / Aerospace</u>	Year/ Sem/Section - <u>III/V</u>
Course Code/Name- <u>BAN504 - FM</u>	Date of Exam - <u>06/11/17</u>

[Signature]  
Signature of Student

[Signature]  
Signature of Invigilator

Part - A	Q.No	Marks						Part - B	Q.No	Marks							
		CO 1	CO 2	CO 3	CO 4	CO 5	CO 6			CO 1	CO 2	CO 3	CO 4	CO 5	CO 6		
	1	01							11	a							
	2	02							11	b	05						
	3		02						12	a		04					
	4		00						12	b							
	5			02					13	a			05				
	6			00					13	b							
	7				01				14	a							
	8				02				14	b				06			
	9					01			15	a							
	10					01			15	b					02		
Part - C	Q.No	Marks						Grand Total									
	16	a	09					83									
	16	b															
	17	a		10				Grand Total (In Words)									
	17	b															
	18	a			10			EIGHT THREE.									
	18	b															
19	a				10												
19	b																
20	a					10											
20	b																

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	Total
Maximum Marks Allotted	20	20	20	20	20		100
Marks Obtained	17	16	17	19	14		83
Date	Name of Examiner			Signature of Examiner			
09.11.2017	Mr. S.R. VIMALRAJ			S.R. Vimalraj			
Comments							
 Signature of scrutiny officer							

**2.2.2D Quality of Assignment and its relevance to COs**

- ☐ Assignments are given to the students to achieve the outcomes of the courses to promote the self-learning.
  - ☐ The Assignments are designed to assess the application-oriented knowledge gained by the students in the relevance course.
  - ☐ Evaluation of the assignment will be done by giving importance to the extent with which the students have used multiple sources for collecting information for the assignment.
  - ☐ The concerned faculty will give the feedback for further improvement if necessary.
- Quality of assignment is evaluated based on the rubrics framed.

Assessment Pattern				Marks obtained
<b>Comprehensive Response</b>	Response relevant to Question Satisfactory Answer <b>(3 Marks)</b>	Response relevant to Question Fair Answer <b>(2 Marks)</b>	Not Satisfactory <b>(0 Marks)</b>	/3
<b>Adopting Novel Methods</b>	Trying new Methodology approved by the faculty to approach the solution/answer <b>(1 Marks)</b>	No Novelty <b>(0 Marks)</b>		/1
<b>Timeliness</b>	Turned in on time <b>(1 Marks)</b>	Turned in late <b>(0 Marks)</b>		/1
Total Marks Allotted				/5



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### Assignment - 2

Name - SRI SRI BORRA	Register Number - U17AE130
Program - B. Tech Aeronautical /Aerospace	Year/ Sem/Section - III / 5 <sup>th</sup>
Course Code/Name - BAN504 / FLIGHT MECHANICS	Date of Submission - 21-10-2019

	CO	Maximum marks	Marks obtained
Assignment 2	CO5	5	5

Assessment Pattern				Marks obtained
Quality of reply	Response relevant to posting with factual Information (3 Marks)	Response relevant to posting but fails to give factual Information (2 Marks)	Response not relevant to posting (0 Marks)	3 / 3
Understanding of Reading and outside source material	Responds to question posted and demonstrates understanding of material and outside source material and properly cites information. (1 Marks)	Responds to the question posted but does not mention materials from the outsource material (0 Marks)		1 / 1
Timeliness	Turned in on time (1 Marks)	Turned in late (0 Marks)		1 / 1
Total Marks Allotted				5 / 5
<p>Comments</p> <p style="text-align: right;">             Signature of Faculty         </p>				

### **2.2.3A Process of Project Work Assessment**

#### **Guidelines for Projects**

- The Head of Department provides the list of faculty members and their area of specialization to the students at least one month before the end of the 6th semester.
- The project coordinator advises the students to form a group of 4 members and identify the project area/title, obtain the consent of faculty/industry professionals to guide them. The Project coordinator collects these details from the students at least two weeks before the zeroth review in seventh semester.
- The Head of Department/Project committee /project coordinator finalizes project titles, project guide, group of students and displays the allocation at the end of zeroth review.
- The progress of a project is monitored by the guide on weekly basis. All Student group will maintain a Project File, which will be monitored by the Project guide.
- The continuous progress is assessed through periodic review in both phases by panel based on Rubrics.
- Projects will be evaluated based on Working principle, implementation methodology, design process of components, performance of the system, application of projects and future scopes, Demonstration of the project work o Viva-Voce by panel of Experts.

#### **Project Phase -I:**

Students are expected to finalize the project themes/titles with the assistance of an identified faculty member as project guide before zeroth review in the seventh semester. During this the students are required to prepare a project plan, relevance of the project proposed, literature survey, objectives, statement of how the objectives are to be addressed. The conceptual design of the problem will be evaluated.

Evaluation is conducted at the end of the semester in the form of the presentation. The evaluation panel asks questions and seeks clarifications on specific issues related to the project. The effectiveness of the individual student response to these queries is assessed.

#### **Project Phase -II:**

##### **First review:**

The preliminary design part of the proposed work is evaluated. The students' communication skills and depth of knowledge in designing is assessed based on presentation and

response to questions asked by the panel comprising of guide, Head of the department and project coordinator.

**Second Review:**

The percentage of work completed, difficulties faced and how the students have tackled these difficulties are analyzed to evaluate project progress. The individual involvement in project work is assessed based on response to questions asked by the panel.

**Final Review:**

The evaluation includes demonstration and evaluation by the panel of examiners consisting of supervisor and faculty member. Final demonstration is conducted at the end of the semester to evaluate the completeness and perfection of work done. At the end of the demonstration, the assessment panel asks questions and seeks clarifications on specific issues related to various stages of the project. Responses from each student to these queries are assessed. The performance of individual student is evaluated by the panel of examiners.

The project report submitted by a project group is evaluated by the panel. The panel of examiners analyse the nature of the project and apart from the technical merit of the work, makes sure that the work is environment friendly, cost effective, ensures safety and ensures adherence to best ethical practices.

**2.2.3B Types and relevance of the projects and their contribution towards attainment of POs and PSOs**

Quality of the project is measured based on application, analysis, product, research, review etc. The factors such as environmental safety, societal needs, public health, natural resources, waste management, energy sustainability and management including, but not limited to cost and standards. Project works are monitored and evaluated as per the schedule by the project review committee. Students appear before the committee with power point presentation followed by viva-voce. POs and PSOs are attained through theory and practical courses. The contribution of projects towards POs and PSOs attainments is given below:

**Project Relevance with POs and PSOs (Year 2018-19)**

S. No.	Project Name	Project Guide	Mapping with POs	Mapping with PSOs
1	Autonomous fixed wing Unmanned Aerial Vehicle	Dr. M. Sundararaj	PO1,PO2, PO3,PO5,PO8, PO9,PO10, PO11,PO12	PSO2
2	Effect of edge modifications on building Aerodynamics	Mr. M. Syedhaleem	PO1, PO2, PO3,PO4, PO5, PO6,PO7, PO8, PO9, PO10, PO11,PO12	PSO1
3	Eccentric effect on co-flow jet characteristics	Dr. S. Elangovan	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, PO11,PO12	PSO1
4	Design and development of drone car model	Mr. N. Kalaimani	PO1, PO2, PO3, PO5,PO8,PO9, PO10, PO11,PO12	PSO2
5	Autonomous vertical takeoff landing fixed wing Unmanned Aerial Vehicle	Mr. R.Karthikeyan	PO1, PO2, PO3, PO5,PO8, PO9, PO10,PO11, PO12	PSO2
6	Experimental Study of Environmental Effects on Hybrid Composites	Mrs. P. Divyabarathi	PO1, PO2, PO3, PO4, PO5,PO8, PO9,PO10, PO11,PO12	PSO1
7	Performance prediction of vertical axis wind turbine	Mr. A. Adaikalaraj	PO1, PO2, PO3, PO4, PO5, PO6, PO7,PO8, PO9, PO10, PO11,PO12	PSO1
8	Design and analysis of flapping wing UAV	Mr. R. Karthikeyan	PO1,PO2, PO3,PO5,PO8, PO9,PO10,PO11, PO12	PSO2
9	Mixing characteristics of co-axial jets using grooves	Dr. S. Elangovan	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, PO11,PO12	PSO1
10	Design and development of duct augmented wind turbine	Mr.S.R Vimal Raj	PO1, PO2, PO3, PO4, PO5, PO6, PO7,PO8,PO9, PO10,PO11,PO12	PSO1

11	Effect of kevlar thread stitching and stitch bonded scarf patch repair in chopped glass/epoxy fiber for aerospace applications	Dr. C. Suresh Kumar	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12	PSO1
12	Design of multi-purpose autonomous rover	Mr. R.Karthikeyan	PO1, PO2, PO3, PO5, PO8, PO9, PO10, PO11, PO12	PSO2
13	Investigation of flow characteristics of coaxial jets	Dr. S. Elangovan	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, PO11, PO12	PSO1
14	Design and development of autonomous underwater vehicle	Mr. N. Kalaimani	PO1, PO2, PO3, PO5, PO8, PO9, PO10, PO11, PO12	PSO1
15	Fabrication of a starting mechanism to rotate cut section of a jet engine	Mr. D. Hasen	PO1, PO2, PO8, PO9, PO10, PO11, PO12	PSO2
16	Design, Fabrication & Analysis of open coil Helical springs	Mr. V.P Durairaj	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PO11, PO12	PSO1
17	Design and Analysis of wind turbine Blade	Mr. M. Syedhaleem	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12	PSO1
18	Effect of adjacent flare on aerodynamic control characteristics	Dr. M. Sundararaj	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PO11, PO12	PSO1

### **2.2.3C Project Related to Industry**

The department encourages students to take-up industry related problems for their final year projects. Such projects can be guided through direct mentoring of industry expert and a faculty member. List of such projects are listed below.

#### **Number of in-house and Industry projects executed by the students.**

SNO	Academic Year	No of In-house Project	No of Industrial Projects	Total No of Projects
1	2017-2018	21	02	23

2	2018-2019	17	01	18
3	2019-2018	14	02	16

### **ACADEMIC YEAR 2017-2018 Industrial Projects**

S.No	REG NO	Name of Student	Title of the Project	Industry	Internal Guide	External Guide
1	U14AE069	Sayan Battacharjee	Mathematical Modelling and Non-Linear Vibration Analysis of Unmanned Aerial Vehicle Landing Gear	Equipment Technologies, Chennai	D.Hasen	C Yuvaraj Design Engineer Equipment technologies
2	U14AE076	Siddhareddy Manikandan	Reduction of Pressure Drag Over a Commercial Truck	Big Bang Boom Solutions Private limited, Chennai	Dr.S.Elangovan & Dr.M.Sundararaj	Dr.Sivaraman Managing Director , Big Bang Boom Solutions Private limited, Chennai
	U14AE054	Palakada Bhavana				

### **ACADEMIC YEAR 2018-2019 Industrial Projects**

S.No	REG NO	Name of Student	Title of the Project	Industry	Internal Guide	External Guide
1	U15AE017	Gandla.Sai Keerthana	Effect of Adjacent Flare on Aerodynamic Control Characteristics	Directorate of aerodynamics (DOAD) at Defense research and development laboratory (DRDL)	Dr.M.Sundararaj	Dilip Kumar Yadav, Scientist "F", DOAD

### **ACADEMIC YEAR 2019-2020 Industrial Projects**

S.No	REG NO	Name of Student	Title of the Project	Industry	Internal Guide	External Guide
1	U16AE001	Sarkar Abhijit	Design and fabrication of 1u-cubesat	Big Bang Boom Solutions Private limited, Chennai	Dr. M. Sundararaj & Mr. N. Kalaimani	Dr.Sivaraman Managing Director , Big Bang Boom Solutions Private limited, Chennai
	U16AE012	Ujjwal Kumar Singh				
	U16AE024	Santosh Kumar Sahu				
	U16AE045	Hurasu Venuh				
	U16AE701	Sheik Gafoor				

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2	U16AE02 1	Mandalahari	Aerodynamical modification for drag reduction on class 8 heavy truck	Wheels india	Mr.M.Ramakrishna	Raja E Manager Wheels India Private limited, Chennai
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**2.2.3D Process for monitoring and evaluation**

The Department follows the Institution guidelines for the marks distribution of the Final Year Projects. The Department has developed rubrics for the evaluation of both the internal and external reviews. These rubrics are presented in the following tables.

**Project Rubrics - Project Phase I – Internal Assessment**

Criteria	100 - 76%	75-51 %	50 - 26 %	25 - 0 %	Earned Marks
Tentative project title, Collection of the relevant literatures and the summary of the literature survey	Thoughtful, connected and Comprehensive identification of the tentative project title with appropriate reasoning	Comprehensive identification of tentative project title with lacking in appropriate reasoning	Clear Identification of project title but inadequate research papers	Undefined	/20
Identifying the research gap, problem definition and exploring the possible conceptual design methods.	Thoughtful, connected and Comprehensive identification of problem and objective	Comprehensive identification of problem but objective is not Precisely connected	Clear Identification of Problem but inadequate objective	Not Clear Identification of Problem and un defined objective	/10
Identification of Methodology to execute the design	Clear identification of the methodology	Partial identification of the methodology	identification of the methodology is not satisfactory	Undefined	/10

**Project Rubrics- Project Phase I End semester**

Criteria	100 - 76%	75-51 %	50 - 26 %	25 - 0 %	Earned Marks
Project title, Literature review, Problem definition, Objective.	Thoughtful, connected and Comprehensive identification of problem and objective	Comprehensive identification of problem but objective is not Precisely connected	Clear Identification of Problem but inadequate objective	Not Clear Identification of Problem and un defined objective	/30
Conceptual Design	Detailed and extensive explanation of the specification	Well Defined but lack in explanation of the specification	The explanation for specification is not satisfactory	Undefined information	/20
Methodology	Clear identification of the system	Partial identification of the system	identification of the system is not satisfactory	Undefined	/10

**Project Rubrics- Project Phase II- First Review**

Criteria	100 - 76%	75-51 %	50 - 26 %	25 - 0 %	Earned Marks
Adaption of proposed Methodology	Demonstrate sound methodology to achieve the objective	Reasonable methodology to achieve the objective	Moderate explanation of the methodology to achieve the objective	Not clearly defined the methodology to achieve the objective	/30

Preliminary design/ Simulation	Ready with Geometric design of the model/ Sourced the raw material	Geometric model is not well defined/ Sourced the raw material	Geometric Design the model is not satisfactory/ Sourced the raw material	Undefined	/40
Presentation	Content of presentation are appropriate and well delivered	Content of presentation are appropriate and not well delivered	Content of presentation is not satisfactory	Undefined	/30

**Project Rubrics- Project Phase II- Second Review**

Criteria	100 - 76%	75-51 %	50 - 26 %	25 - 0 %	Earned Marks
Fabrication / Simulation	Well defined model based on the specifications / proper execution of the boundary condition and display of the convergence criterion	Model is ready in working but not meeting their specifications/ proper execution of the boundary condition and divergence in the criterion	not satisfactory	Un defined	/40
Test problem/vali dation problem, Commissionin g of test setup, calibration	Well-defined & executed test problem/validation problem, Commissioning of test-setup, calibration	Well-defined test problem/validation problem but execution could have been better, Commissioning of test-setup, calibration	not satisfactory	Un defined	/30
Demonstratio n and presentation	Research objectives are satisfied Content of	Research objectives are not attained Content of	not satisfactory	Poor execution	/30

	presentation are appropriate and well delivered	presentation are appropriate and not well delivered			
--	---	---	--	--	--

**Project Rubrics- Project Phase II- Final Viva-Voce**

Criteria	100 - 76%	75-51 %	50 - 26 %	25 - 0 %	Earned Marks
Execution of the project with technical description	Complete execution of the key concepts and strong description of the technical requirements of the project	Complete execution of the key concepts but in-sufficient description of the technical requirements of the project	Incomplete execution of the key concepts and in-sufficient description of the technical requirements of the project	Inappropriate execution of the key concepts and poor description of the technical requirements of the project	/30
Results and Discussion	Results are discussed in very appropriate manner. Project work is well summarized and concluded.	Results are discussed in good manner. Project work summary and conclusions are not very appropriate.	Results discussed are not much satisfactory. Project work summary and conclusion not very appropriate	Results are not discussed properly Project work is not summarized and concluded	/40
Report and Presentation	Project report is according to the specified format. Project work is presented in appropriate manner.	Project report is according to the specified format. Project work is presented in good manner.	Project report is according to the specified format but the presentation of the Project work is not satisfactory	Project report not prepared according to the specified format and also the presentation of the Project work is not satisfactory	/30

**2.2.3E Process to assess individual and team performance:**

The individual performance of the student in a project is assessed at the periodic reviews of Project presentation by evaluating the following criterions:

- Self-confidence in the project work
- Communication Skills
- Attainment of individual scale of work
- Overall contribution for the project accomplishment

The performance of the project team is assessed by considering the following benchmarks:

- Knowledge of the team members contribution towards the project
- Coordination in consolidating work
- Time management
- Overall Value of the Project.

**2.2.3F Quality of Completed Projects/Working Prototypes****Best Projects**

S.No	Register no	Name	Title of the project	Project supervisor	Year
1	U15AE009	Chittoji Thanmayi	Design Of Multi-Purpose Autonomous Rover	Mr. R. Karthikeyan	2018-2019
	U15AE023	Kola John Hanna Jayashree			
	U15AE057	Divya. C			
2	U15AE048	Bikash Borado	Design And Development Of Autonomous Underwater Vehicle	Mr. N.Kalaimani	2018-2019
	U15AE025	Md Alam			
	U15AE026	Md Mudee Alam			
	U15AE031	Parasa Mahendra			
	U15AE055	Vasu.P			
3	U15AE035	Ravilla Vishnu Varadhan Naidu	Effect Of Kevlar Thread Stitching And Stitch Bonded Scarf Patch Repair In Chopped Glass/Epoxy Fiber For Aerospace Applications	Dr. C.Suresh Kumar	2018-2019
	U15AE034	Pulusu Pardhu Sree			
	U15AE045	Peemmasani Hanumanth Rao			
4	U16AE001	Sarkar Abhijit	Design And Fabrication Of 1U-Cubesat	Dr. M. Sundararaj &	2019-2020
	U16AE012	Ujjwal Kumar Singh			
	U16AE024	Santosh Kumar Sahu			

	U16AE045	Hurasu Venuh		Mr. N. Kalaimani	
	U16AE701	Sheik Gafoor			
5	U16AE028	Muhunthani B.	Design Of An Anti Drone System	Dr. M. Sundararaj	2019-2020
	U16AE030	Monika Vemagiri			
	U16AE038	Goriparthi Prathyusha			
	U16AE049	Akash V			
6	U16AE051	Prasanna Prakash .J	Nano Drone Surveillance In Negative Altitude	Mr. N.Elumalai	2019-2020
	U16AE019	Punithan A			
	U16AE054	Ashlin Kumar			
7	U16AE021	Mandalahari	Aerodynamical Modification For Drag Reduction On Class 8 Heavy Truck	Mr. M. Rama Krishna	2019-2020

### **2.2.3G Evidence of papers published/awards received by projects**

#### **Paper Publication by students**

Sl. No	Title of the Paper	Name of the Authors	Name of the Journal	Year of Publication
1	A small unmanned flapping air vehicle "Ornithopter"	Ishant Dubey, Mohd Amir G.sai Keerthana	International Journal of scientific & research	2017
2	Experimental Evaluation of Magnetorheological Damper Characteristics for Vibration Analysis	Dr. S.Sivakumar , K.S.Raj Kumar Navaneet Kumar	International Journal of Vehicle Structures & systems	2018
3	Design, Fabrication & Simulation of a Semi-Rigid Helicopter Swashplate Control Mechanisms	Yograj Sonar, Dr. S. Sivakumar	International Journal of Engineering Science Invention (IJESI)	2018

### 2.2.4A Industry Supported Laboratories

Department of Aeronautical Engineering, in Association with **Big Bang Boom solutions Pvt Limited**, entered a MOU for establishing **Center of Excellence for Defence applications**. This collaboration has developed various products like Anti-drones, Cubesat, Hybrid paramotor power glider, Negative altitude drone etc.

### 2.2.4B Industry involvement in the program design and Curriculum

The design of curriculum and syllabi, derives the inputs from various industrial experts.

The following experts from industry are part of Board of Studies involved in Curriculum and Syllabi design

S.No	Name/ Designation	Specialization	Role
1	<b>Dr.S.Selvi Rajan.</b> Chief Scientist and Head Wind Engineering Laboratory, CSIR-SERC Taramani,Chennai-113	Structures, Aerodynamics and Aeroelasticity	<b>Expert Member</b>
2	<b>Dr.S.Ganesan</b> Scientist-F,CFD Group Gas Turbine Research Esta.(GTRE) DRDO, Ministry of Defence, C.V. Raman Nagar, Bangalore.	Propulsion and CFD	<b>Expert Member</b>
3	<b>Dr.P.Harikrishna</b> Principal Scientist, Wind Engineering Laboratory CSIR-SERC, Taramani,Chennai-113.	Structures, CFD, Aerodynamics and Aeroelasticity	<b>Expert Member</b>
4	<b>Dr.Muniyappan</b> DGM, Aircraft Design, Tata Advanced Systems Ltd	Aerodynamics	<b>Expert Member</b>
5	<b>Dr.R.Kalimuthu,</b> Engineer-SG ISRO, Propulsion Complex, ITRC Mahendragiri	Propulsion	<b>Expert Member</b>

### 2.2.4 C Industry Involvement in Partial Delivery of Courses

To promote Industry – Institute interaction and to increase the student exposure to industry environment, the following programs are being conducted:

- ❖ Guest lectures are conducted with the experts from various institutes and organizations across India especially like DRDL, NAL, VSSC etc to enhance the knowledge of students in industry point of view.

- ❖ Also, guest lectures are invited for non-technical courses like Total Quality Management, Principles of Management, Environmental Science from industry experts.

S. No.	Date	Topic	Speaker & Organization
1.	19/07/2017	Skill Development	Step-up Consultancy
2.	31/01/2018	Composite Design, Analysis and Manufacture	Dr. Vijay Sahadeven GKN Aerospace, Filton UK
3.	21/02/2018	Aerospace Technical Publication	Mr.Venkatesh Venkatachalam Gloinnt Solutions (P)Ltd,Bengaluru
4.	12/10/2018	Indian Space Programme –An overview	Shri.R.Arunachalam , Scientist(Retd) ISRO Satellite Centre.
5.	26/10/2018	Analysis of aero engines Turbines	Dr.Ramesh Rajasekaran <u>Department of Design</u> ,Bellevue, United States
6.	12/11/2018	Military, Logistics and Aviation	Major Lee Davis,Veteran USA army Major Sunil Shetty,SENA medal, Veteran Indian Army
7.	29/03/2019	Recent trends in Aerospace Renewable Energy Sources	Dr. Giridhar G Deputy Director-general MINISTRY OF NEW AND RENEWABLE ENERGY
8.	08/08/2019	Evolution of Communication Spacecraft,The Indian Senario & Emerging Trends	Shri.T.K.Sundaramurthy, Former Mission Director ISRO
9.	16/05/2020	Advance in Space Technology	Mr. Ranganath Ekkundi Former Deputy Director U R RAO Satellite Centre, ISRO, Bangalore
10.	09/05/2020	Experimental Evaluation of Aerospace Structures for Structural, Thermal and Dynamic Loads	Mr. S. Narendar, Scientist D, Structures Division, DRDL, Kanchenbagh, Hyderabad.
11.	16/05/2020	Advance in Space Technology	Mr. Ranganath Ekkundi Former Deputy Director U R RAO Satellite Centre, ISRO, Bangalore
12.	05/06/2020	An Introduction to Plasma Physics and Plasma Thruster	Mr. P. Kalaiselvan, Founder &CEO, Sphere Tech Innovations, Chennai
13.	07/10/2020	Indian Space Program - Present & Future	Mr.T.K.Sundaramurthy, Ex-Mission Director, ISRO Satellite Center, Bangalore.
14.	15/10/2020	Launching of a Nano-Satellite	Dr. Vinod Agarwal Ex-Mission Director, ISRO Satellite Center, Bangalore
15.	17/10/2020	An Introduction to Missile Aerodynamics	Dr. Krishnamohan Rao, Head, Aerodynamics Division, DRDL, Hyderabad
16.	17/10/2020	Basics of Flight Testing & Flight Testing Techniques	Gp. Capt. A Aruchaleswaran Flight Test Engineer, NFTC, ADA
17.	03/11/2020	Basic Introduction on OpenFoam for Beginners	Mr. C Venkatesh CFD Consulting Engineer, Japan

18.	07/11/2020	Challenges in Tejas (LCA) Flight Control Design, Development & Testing	Dr Vijay Vinayak Patel Outstanding Scientist, CLAW, ADA, Bangalore
19.	11 <sup>th</sup> , 12 <sup>th</sup> , 15 <sup>th</sup> to 17 <sup>th</sup> December 2020	Series of Guest Lectures for the subjects of Space Mechanics & Satellite Technology	Mr. T K Sundaramurthy Ex-Mission Director, ISRO Satellite Center, Bangalore

#### **2.2.4 D Impact analysis of industry institute interaction and actions taken**

Department maintains regular interaction with various companies and organizations to co-operate each other in terms of student internship, faculty training, collaborative research, and knowledge exchange. The outcome of these MOU's is internship for students, faculty exposure to various technology and equipment, economical product design and fabrication and collaborative research.

As a part of interaction, Memorandum of Understanding (MOUs) are made with various companies are listed here under.

S.No	Name of the company	Purpose	Date
1	Aries Solution Pvt Ltd	Design and Development of UAV's and UGV's	13.03.20
2	Georgian Aviation University Tbilisi	Joint education Programs	18.02.20
3	Equipmen Technologies	Maintenance & Training	15.12.19
4	Sphere Tech Innovations Pvt Ltd	MPD thrusters design & fabrication, 3D printing	08.09.19
5	Orient Flight Pvt Ltd	Industrail Tools and Techniques	04.01.19
6	Dronix Technologies Pvt Ltd	Design and Development of Drones	09.05.18
7	Gloinnt Solution Pvt Ltd	Aerospace Tech Publications	22.02.18
8	Barola technologies	Design and Development of UAV	09.11.17
9	Maruthsakha Aerospace Pvt Ltd	Aircraft maintenance	30.10.17
10	Sukra Helitek Pvt Ltd	Software Training	28.09.17
11	Jetwings Technologies	Software Training	24.08.17
12	CADDAM Technologies Pvt Ltd	Software Training	18.08.17
13	CADD Centre Training Service Pvt Ltd	Software Training	25.07.17
14	BCROWS Technologies	Software Training	08.02.17

- CADDAM centre is providing training to students in Design and Analysis software every year.
- CADD centre is providing training to students in 3D Design software every year.
- BCROWS technologies guiding students in programming drones.

- JETWINGS & SUKRA HELITEK providing internships and training program to students every year.
- MARUTHSAKHA AEROSPACE PVT LTD providing training to interested students in Aircraft Maintenance activities.
- BAROLA TECHNOLOGIES, DRONIX TECHNOLOGIES PVT LTD & ARIES SOLUTION PVT LTD guiding students in design, fabrication, and programming of drones.
- ORIENT FLIGHT PVT LTD guiding Lab Engineers in annual service and maintenance activities of two aircrafts owned by department.
- SPHERE TECH INNOVATIONS PVT LTD guiding students in design and fabrication of MPD thrusters, pressure scanners and in 3D printing activities.
- EQUIPMEN TECHNOLOGIES is performing annual maintenance and service activities of heavy machinery equipment of the department.

### **Impact of Industry – Institute Interaction**

The MOU's made helped students to get trained in drones making, 3D software design, making of gliders etc. Students participated in some of the events conducted at various organizations to check their competency level.

S. No.	Name of the student	Event	Organizer	Date	Status in competition
1	Zahid Ahmed	Para Gliding	Aerista-2k17, Excel Engineering College	26 Sep 2017	II Prize
2	Muhammad Raazee	Para Gliding	Aerista-2k17, Excel 42engineering 4college	26 Sep 2017	II Prize
3	Kaari Ashok Kumar Reddy	Assembling And Testing Of Quadcopter	IIT Madras Research Park	05 Oct 2017	Participation
4	A Punithan	Drone Championship	Dhruva Karpagam College Of Engineering	1-3 Feb 2018	Participation
5	Prithvi Rajan Sm	Drone Championship	Dhruva Karpagam College Of Engineering	1-3 Feb 2018	Participation
6	G Prathusha	Nastran Workshop	Flight'18 Madras Institute Of Technology	16-17 March 2018	Participation

7	P.Rishikesh	South India Electric UAV Fabrication Workshop	Dr A P J Abdul Kalam Center For Aerospace Excellence And Skill Development East West College Of Engineering	25 <sup>th</sup> To 27 <sup>th</sup> Sep 2019	Participation
8	Shaik Darbar Basha	South India Electric Uav Fabrication Workshop	Dr A P J Abdul Kalam Center For Aerospace Excellence And Skill Development East West College Of Engineering	25 <sup>th</sup> To 27 <sup>th</sup> Sep 2019	Participation
9	Manav.J	Mayvi Make Your Vimana	Hindustan Institute Of Technology And Science	5 To 6 Oct 2019	Participation

### **2.2.5A Industrial training/tours for students**

Department of Aeronautical Engineering arrange Industrial Visits to strengthen interaction with industry and to keep the students up to date on the latest developments in the field of Aeronautical Engineering. The Aeronautical Engineering Department communicates with the Institute's Training & Placement Office on a regular basis through the Departmental Coordinator. Industrial visits are arranged with faculty members to bridge the gap between theoretical ideas and their practical implications.

The table below lists the industries that students have visited for either a study of industrial processes or for consulting projects.

S. No.	Academic Year	Batch/ Year	Location	Visited Date	No. Of Students
1	2017-2018	2015-19 /V	National Atmospheric Research Laboratory, Department of Space, ISRO, Gandinki	20.10.2017	55
2	2017-2018	2016-20 / IV	Coast Guard Air station, Meenambakkam, Chennai	03.02.2018	55
3	2017-2018	2015-19 / VI	National Aerospace Research Laboratory, Department of Space, ISRO, Gandinki	23.02.2018	55
4	2018-2019	2016-20 / VI	Council Of Scientific And Industrial Research–Structural Engineering Research Center (CSIR–SERC), CSIR Road, CSIR Campus, Chennai	21.03.2019	55
5	2018-2019	2017-21 /IV	Taneja Aerospace & Aviation Limited ,(TAAL) Belagondapally village, Thally	18.04.2019	170

			road, Denkanikottai Taluk, Krishnagiri District, Belagondapally		
6	2019-2020	2018-22 /IV	INS Rajali Naval Air Station, Arakonam	04.02.2020	120
7	2019-2020	2017-21 /VI	Coast Guard Air station, Meenambakkam, Chennai	03.03.2020	170



**INS Rajali Naval Air Station, Arakonam**



**Coast Guard Air station, Meenambakkam, Chennai**

**2.2.5B Industrial /internship /summer training of more than two weeks and post training Assessment**

**Academic Year- 2017-2018**

S.NO	REGISTER NUMBER	STUDENTS NAME	COMPANY	DURATION
1.	U14AE013	K BALAJI	DRONIX TECHNOLOGIES PVT LTD	04.12.2017 to 16.12.2017
	U14AE014	BALASUBRAMANIAN PL		
	U14AE015	BALINENI ANVESH		
2	U14AE007	ANANDH.C	DRONIX TECHNOLOGIES PVT LTD	04.12.2017 to 16.12.2017
	U14AE008	ANBU KUMAR.P		
	U14AE009	ANNAPAREDDY NAGA SAI SRINIVAS		
3.	U14AE052	NISHANT SHUKLA	BAROLA TECHNOLOGIES	14.06.2018 to 26.06.2018
	U14AE053	PADAMATI SUSMITHA		
	U14AE054	PALAKADA BHAVANA		
4.	U14AE085	B.VENKATESAN	MARUTHSAKHA AEROSPACE PVT LTD	7.05.2018 to 18.05.2018
	U14AE086	VENKATESH P		
	U14AE087	VIJAY RAJ SIVANGI		
	U14AE093	VATHADI VIKAS		
5.	U16AE006	VIGNESH .T	MARUTHSAKHA AEROSPACE PVT LTD	7.05.2018 to 18.05.2018
	U16AE007	B.S. ANSHU BABU		
	U16AE008	SEELAM DURGALAKSHMI PRIYANKA		
	U16AE009	LOKESH .B		
6.	U16AE052	VISHAVAK P S	GLOINNT SOLUTION PVT LTD	10.05.2018 to 19.05.2018
	U16AE053	GONDAL PRANAY GOPAL		
7.	U16AE028	MUHUNTHANI B.	JETWINGS TECHNOLOGIES	17.12.2018 to 31.12.2018
	U16AE030	MONIKA VEMAGIRI		
	U16AE031	D. VINOD RAO		
	U16AE035	ADAPALA ANIL KUMAR		
8.	U15AE052	MANE JERMIAH	JETWINGS TECHNOLOGIES	17.12.2018 to 31.12.2018
	U15AE053	PALLEKONDU SIRISHA		
	U15AE054	ANBARASAN.R		
	U15AE701	MOHD AMIR		
9.	U15AE037	RUTHRA S		

	U15AE038	KARISHMA CHANDINI S	BAROLA TECHNOLOGIES	14.06.2018 to 26.06.2018
10.	U15AE013	DIVYA A	GLOINNT SOLUTION PVT LTD	10.05.2018 to 19.05.2018
	U15AE014	EDWIN PRAKASH F		
	U15AE015	ERLA NAVEEN KUMAR		

**Academic Year- 2018-2019**

S.NO	REGISTER NUMBER	STUDENTS NAME	COMPANY	DURATION
1.	U15AE004	ARAVINDAN A	DRONIX TECHNOLOGIE S PVT LTD	04.12.2017 to 16.12.2017
	U15AE005	ARUP RATAN PARAMANIK		
	U15AE006	BANDARU KOTA NAGENDRA SURESH		
	U15AE007	BOJJA MANOJ KUMAR		
	U15AE008	CHILAKALAPUDI YASHWANTH TEJA		
2.	U15AE022	JUHI GUPTA	DRONIX TECHNOLOGIE S PVT LTD	04.12.2017 to 16.12.2017
	U15AE023	KOLA JOHN HANNA JAYASHREE		
	U15AE024	KUSUNURI JYOTHI SAI PAVAN		
	U15AE025	MD ALAM		
	U15AE026	MD MUDEE ALAM		
3.	U16AE010	KANDULA THIRINATH	SUKRA HELITEK PVT LTD	14.06.2018 to 26.06.2018
	U16AE011	KODAVALLURU SAI BHAVANA		
	U16AE012	UJJWAL KUMAR SINGH		
	U16AE014	PRAKASH GUPTA		
	U16AE015	MOHANISH DHURUW		
4.	U16AE032	ARUN R	SUKRA HELITEK PVT LTD	14.06.2018 to 26.06.2018
	U16AE033	DEKKA SAI VENKATA SURYA AJAY KUMAR		
	U16AE034	SHAKEELAKTHAR .M		
	U16AE035	ADAPALA ANIL KUMAR		
	U16AE036	GHANTASALA PARASU RAJU		
5.	U17AE015	BISMAYA BENNY KOLLICHIRA	BCROWS TECHNOLOGIE S	14.06.2018 to 26.06.2018
	U17AE016	VIJAY S		
	U17AE017	NARESH KUMAR G		
	U17AE018	SINGAMPALLI HARISH		
	U17AE019	SAMBANTHAM S M S		
	U17AE020	PRAVEENRAJ S		
6.	U17AE094	RAPARTHI HEMANTH	BCROWS TECHNOLOGIE S	7.05.2018 to 18.05.2018
	U17AE095	P RISHIKESH		
	U17AE096	SHAIK DARBAR BASHA		
	U17AE097	KADAPA AZEEM		
	U17AE098	MOGASATI BHARAT ANAND SAIRAM		

	U17AE099	GUTHIREDDY KALYAN KUMAR REDDY		
7.	U17AE158	JAYA CHIRANJIVI J.V.M	SUKRA HELITEK PVT LTD	7.05.2018 to 18.05.2018
	U17AE159	DHILIP E		
	U17AE160	PRAKASHRAJ P		
	U17AE162	SAMPATHI RAJASHEKAR		
	U17AE163	MOHAMMAD KHARISH M		

**Academic Year- 2019-2020**

S.NO	REGISTER NUMBER	STUDENTS NAME	COMPANY	DURATION
1	U16AE002	MOHAMMED FAHATH M S	BCROWS TECHNOLOGI ES	07.12.2019 to 20.12.2019
	U16AE003	ANTANIESKEMIN .Y		
	U16AE009	LOKESH .B		
	U16AE010	KANDULA THIRINATH		
2	U16AE044	GOGULAMANDA VEERA SWAMY RAJIV	BCROWS TECHNOLOGI ES	07.12.2019 to 20.12.2019
	U16AE045	HURASU VENUH		
	U16AE051	PRASANNA PRAKASH J		
	U16AE052	VISHAVAK P S		
	U16AE701	SHEIK GAFOOR		
3.	U17AE001	BHARKAVI S	SUKRA HELITEK PVT LTD	06.05.2020 to 17.05.2020
	U17AE002	YETTULA RISHAN RAJ		
	U17AE003	YACOB S		
	U17AE013	CHITTI SAI SRAVAN KUMAR		
	U17AE014	VALLALA MUKESH GOUD		
4.	U17AE022	SWETHA T	SUKRA HELITEK PVT LTD	06.05.2020 to17.05.2020
	U17AE023	ATHOTA SURESH		
	U17AE024	PAVITHRA D		
	U17AE035	NALAMASU NIKHIL		
	U17AE036	SURJITH S		
5.	U17AE074	MARTHALA BALAJI REDDY	MARUTHSAK HA AEROSPACE PVT LTD	16.06.2020 to25.06.2020
	U17AE076	RAMAN BHASKAR PANDIAN		
	U17AE085	SUSWANTH P		
	U17AE086	NETHALA TERIYA ROSHAN		
6.	U17AE136	ANAPARTHI AJAY CHANDRA	MARUTHSAK HA AEROSPACE PVT LTD	16.06.2020 to25.06.2020
	U17AE137	KUNCHAPA VENKATASUNIL		
	U17AE138	MUGESH C		
	U17AE139	THANISH S		
	U17AE142	AZARUDEEN K		
	U17AE143	KANTHARAJU L		
7.	U17AE150	ARISH VISHVA K S	GLOINNT SOLUTION PVT LTD	07.12.2019 to 20.12.2019
	U17AE151	BARANIDHARAN S		
	U17AE152	NAKKANI PRASANNA KUMAR		

	U17AE153	GOPINATH M		
	U17AE154	GAJULA TERISHA		
8.	U17AE155	PATRICK SUNIL PULAPAKURI	DRONIX TECHNOLOGIES PVT LTD	07.12.2019 to 20.12.2019
	U18AE023	GAJULA VINAYSAI		
	U18AE025	BENSON THOMAS		
	U18AE026	NITHYASREE V		
	U18AE027	NALLAMALLI YOGA NAGA SAI BHAVYA		
	U18AE028	VISHNU D		
	U18AE029	KAKKALA KISHORE KUMAR		
9.	U18AE084	RAVURI ANIL BABU	DRONIX TECHNOLOGIES PVT LTD	07.12.2019 to 20.12.2019
	U18AE085	NEETIPILLI MAHESH		
	U18AE097	SANDRA NIKITHA		
	U18AE098	TAMILSELVAN T		
	U18AE111	SUDHEER V		

After the completion of internships, each student is assessed by the respective Tutors and Head of the Department, through presentations on the learning during internships.

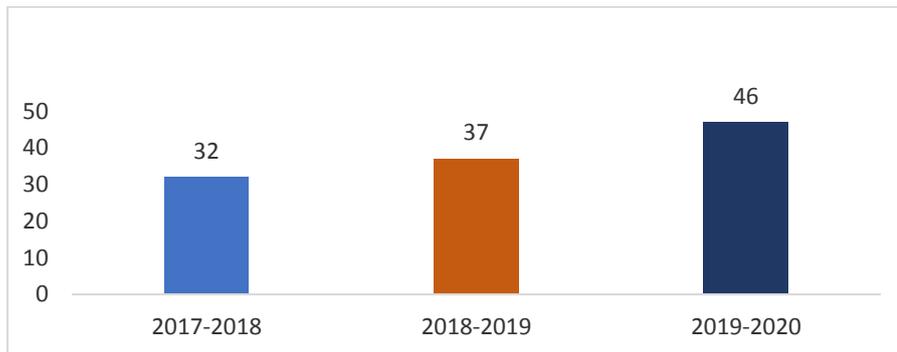
### **2.2.5C Impact analysis of industrial training**

In improving the student's abilities for a **professional career, industrial training** plays a significant role. It is not enough to obtain theoretical knowledge, students should also know how to use it in the true world, they will have the opportunity to comprehend the practical implementation of their educational program, work with experts and create networks with industry experts.

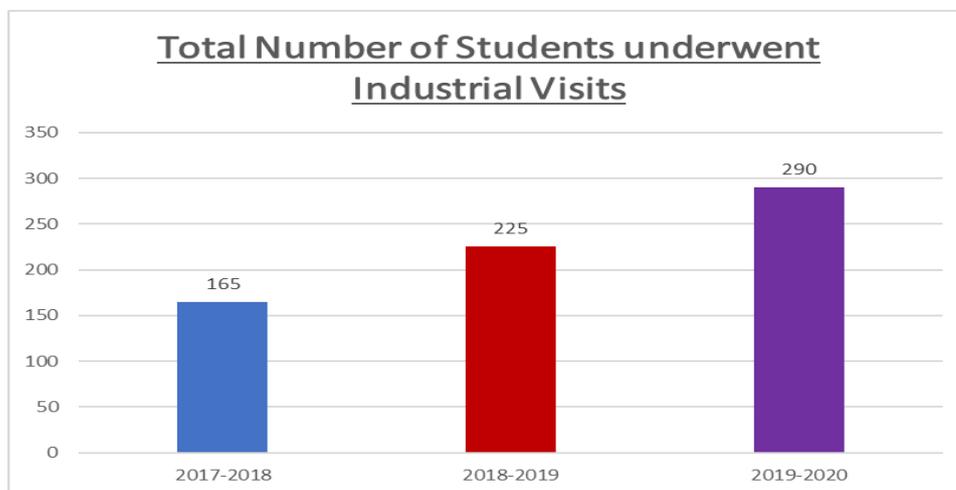
Students of Aeronautical Engineering, BIHER have participated in the Internship program offered by a different company like Dronix Technologies Pvt Ltd, Gloint Solution Pvt Ltd, Barola technologies, Maruthsakha Aerospace Pvt Ltd, Sukra Helitek Pvt Ltd, Jetwings Technologies, CADDAM Technologies Pvt Ltd, CADD Centre Training Service Pvt Ltd, BCROWS Technologies etc. to acquire the knowledge of the **Live projects**. The experience acquired from training sharpens the student's professional skills to get better job opportunities.

The following are the impact analysis observed on Industry Institute interactions:

➤ **Internship Over the years:**

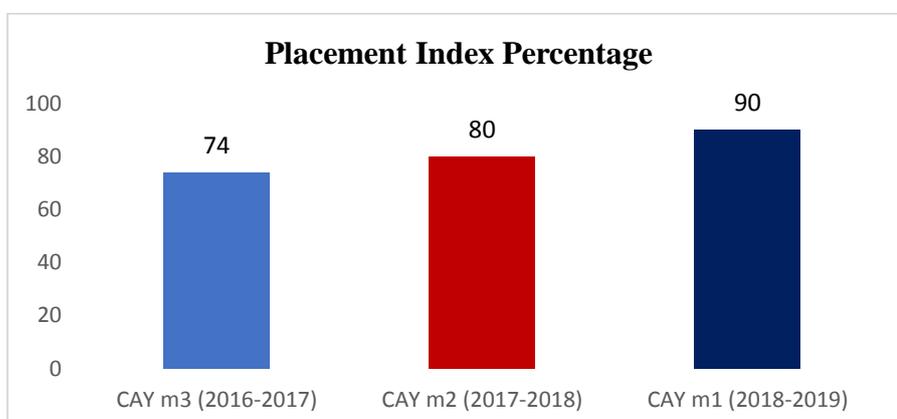


➤ **Industrial training over the Years:**



➤ **Placement over the years**

The number of placements also increased these years due of increase in number of students underwent internship/industrial training.



**2.2.5D Student feedback on initiative:**

The industrial feedback provides information's on effective duration and academic slot of industrial training, theory to practice relationship in student's curriculum. Student feedback is regularly taken after their industrial training, internships, etc. to analyse the gaps between curriculum and Industrial needs.

<b>CRITERION 3</b>	<b>Course Outcomes and Program Outcomes</b>	<b>175</b>
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### 3.1. Establish the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes

#### 3.1.A Evidence of COs being defined for every course:

Course Outcomes are goals for student learning that the Course Co-Ordinator set for a course. Course Outcomes are usually shared with students in the syllabus and in the first class of the course.

Course Outcomes:

- Measure students learning in an objective and measurable way.
- Focus on learning, student success and support the Institute and Department Vision and Mission.
- Are an integral part of accreditation standards.
- Empower students to become more involved with their learning experiences.
- Allow to assess students' learning and use the results as a tool for improvement.
- Create a common language that crosses all departments within the Institution.

Course Outcomes demonstrate what Course Co-Ordinator want students to know, do, or value by the end of course. A typical Course outcome will start with "By the end of this course, students will be able to..." Then, continue the sentence with an action verb and a goal for the course. When writing Course Outcomes, Revised Bloom's Taxonomy is used to choose action verbs that reflect the appropriate level of outcome intended for the course.

At the end of the course, student will be able to

<b>BMA301</b>	<b>MATHEMATICS III</b>
CO1	<b>Classify</b> the different methods for solving partial differential equations. ( <b>Understand</b> )
CO2	<b>Apply</b> Fourier series solution method for engineering problems.( <b>Apply</b> )

CO3	<b>Analyze</b> the solutions of one dimensional and two dimensional boundary value problems in partial differential equations.( <b>Analyze</b> )
CO4	<b>Apply</b> the concept of Laplace transform to various engineering problems.( <b>Apply</b> )
CO5	<b>Evaluate</b> the engineering problems using inverse Laplace techniques.( <b>Evaluate</b> )
CO6	<b>Apply</b> Fourier transform to engineering problems.( <b>Apply</b> )
<b>BAN301</b>	<b>FUNDAMENTALS OF AERONAUTICS AND ASTRONAUTICS</b>
CO1	<b>Describe</b> the basic components of airplane and various flight vehicles. ( <b>Remember</b> )
CO2	<b>Summarize</b> the variation of aircraft performance at various altitudes. ( <b>Understand</b> )
CO3	<b>Explain</b> the structural components of airplane and materials used for aircraft construction. ( <b>Understand</b> )
CO4	<b>Describe</b> the working of different types of aircraft engines and their performances. ( <b>Understand</b> )
CO5	<b>Discuss</b> the theory behind rocket propulsion and the problems associated with hypersonic vehicle operation. ( <b>Understand</b> )
<b>BAN302</b>	<b>FUNDAMENTALS OF FLUID MECHANICS</b>
CO1	<b>Recall</b> the concepts of fluids, properties of fluids and its classification. ( <b>Remember</b> )
CO2	<b>Calculate</b> the flow properties using the fundamental equations of fluid motion. ( <b>Apply</b> )
CO3	<b>Solve</b> problems based on dimensional analysis and fluid flow analysis. ( <b>Apply</b> )
CO4	<b>Examine</b> the pipe line system for minimum head loss. ( <b>Apply</b> )
CO5	<b>Calculate</b> the performance and operating characteristics of turbines and pumps. ( <b>Apply</b> )
<b>BAN303</b>	<b>FUNDAMENTALS OF AERO – THERMODYNAMICS</b>
CO1	<b>Apply</b> the fundamental laws of thermodynamics and its thermodynamic relations. ( <b>Apply</b> )
CO2	<b>Compute</b> the air standard efficiencies using P-V and T-S diagram of various air power cycles. ( <b>Apply</b> )
CO3	<b>Calculate</b> the efficiency of various Vapor power cycles ( <b>Apply</b> )
CO4	<b>Estimate</b> the COP of refrigeration and air-conditioning systems. ( <b>Analyze</b> )
CO5	<b>Calculate</b> the efficiency of jet propulsion cycles. ( <b>Apply</b> )
<b>BAN304</b>	<b>FUNDAMENTALS OF STRUCTURAL MECHANICS</b>
CO1	<b>Compute</b> the stress developed in statically determinate and indeterminate structures subjected to axial load. ( <b>Apply</b> )

CO2	<b>Sketch</b> shear force and bending moment diagram for a given beam. ( <b>Apply</b> )
CO3	<b>Determine</b> the deflection of beams using various methods ( <b>Apply</b> )
CO4	<b>Compute</b> the shear stress developed in circular shafts and springs subjected to torsional and axial load. ( <b>Apply</b> )
CO5	<b>Determine</b> the principal stresses developed in structural components using Mohr's Circle. ( <b>Apply</b> )
<b>BAN305</b>	<b>MECHANICS OF MACHINES</b>
CO1	<b>Describe</b> the working of different mechanisms along with inversion and their corresponding velocity and acceleration diagrams. ( <b>Understand</b> )
CO2	<b>Determine</b> the Power transmission in machine elements using fundamentals of friction. ( <b>Apply</b> )
CO3	<b>Sketch</b> the Cam profile for various follower motions. ( <b>Apply</b> )
CO4	<b>Determine</b> the unbalanced forces acting on rotating and reciprocating parts in engine. ( <b>Apply</b> )
CO5	<b>Classify</b> the types of vibration and the frequencies of vibrating systems. ( <b>Understand</b> )
<b>BCE3L1</b>	<b>FLUID MECHANICS AND MACHINERIES LAB</b>
CO1	<b>Observe</b> the flow characteristics in a fluid flow system. ( <b>Imitation</b> )
CO2	<b>Acquire</b> the pressure data with manometers/sensors for finding the efficiency of given system. ( <b>Manipulation</b> )
CO3	<b>Perform</b> the basic calculations and plot graphs to infer fluid behaviour at various flow conditions. ( <b>Precision</b> )
<b>BCE3L2</b>	<b>STRENGTH OF MATERIALS LAB</b>
CO1	<b>Carry out</b> elementary mechanical coupon testing of materials as per the given procedure. ( <b>Imitation</b> )
CO2	<b>Acquire</b> data using the available measuring devices. ( <b>Manipulation</b> )
CO3	<b>Perform</b> basic mathematical calculation using the appropriate formulae and represent the results in form of graph and table ( <b>Precision</b> )
<b>BME3L1</b>	<b>MACHINE DRAWING</b>
CO1	<b>Observe</b> basic representation of symbols used in Engineering drawings. ( <b>Imitation</b> )
CO2	<b>Acquire</b> attributes of Production Drawing and Limits, fits, tolerances. ( <b>Manipulation</b> )
CO3	<b>Complete</b> the assembly of a given set of machine components. ( <b>Manipulation</b> )
<b>BMA402</b>	<b>NUMERICAL METHODS</b>
CO1	<b>Apply</b> numerical techniques to solve equations and linear system of equations. ( <b>Apply</b> )

CO2	<b>Interpolate</b> the value of a dependent variable in the given data by Newton's forward and backward difference formulae and also unequal intervals. <b>(Understand)</b>
CO3	<b>Understand</b> and apply the concept of numerical methods to differentiation and integration. <b>(Understand)</b>
CO4	<b>Evaluate</b> initial value problems of ODE by applying single step and multistep methods. <b>(Evaluate)</b>
CO5	<b>Analyse</b> the two dimensional and one-dimensional ordinary differential equation with numerical techniques. <b>(Analyse)</b>
CO6	<b>Solve</b> the boundary value problems in engineering with the help of finite difference methods. <b>(Create)</b>
<b>BAN401</b>	<b>AIRCRAFT STRUCTURES I</b>
CO1	<b>Determine</b> the forces acting in the members of statically determinate truss and frames. <b>(Apply)</b>
CO2	<b>Calculate</b> the slope and deflection of statically indeterminate beams. <b>(Apply)</b>
CO3	<b>Calculate</b> the deflection and strain energy of statically determinate and indeterminate structures. <b>(Apply)</b>
CO4	<b>Compute</b> the buckling load and crippling stress of columns with different end conditions. <b>(Apply)</b>
CO5	<b>Determine</b> the safe stress of the structural component using failure theories. <b>(Apply)</b>
<b>BAN402</b>	<b>AERODYNAMICS I</b>
CO1	<b>Identify</b> the concepts of various types of flow based on mathematical equations. <b>(Understand)</b>
CO2	<b>Apply</b> the concept of inviscid flow theory to solve flow over basic aerodynamic shapes. <b>(Apply)</b>
CO3	<b>Practice</b> the construction of airfoils numerically with the help of mathematical transformations. <b>(Apply)</b>
CO4	<b>Describe</b> the concept of lift generation for efficient wing design. <b>(Understand)</b>
CO5	<b>Determine</b> the skin friction drag over surfaces. <b>(Apply)</b>
<b>BAN403</b>	<b>AIRCRAFT PROPULSION</b>
CO1	<b>Compare</b> the performance characteristics of turbojet, turbofan, turboprop and propeller engines. <b>(Understand)</b>
CO2	<b>Identify</b> the engine starting problems associated with inlets. <b>(Understand)</b>
CO3	<b>Discuss</b> the types of nozzles and the losses in nozzles. <b>(Understand)</b>
CO4	<b>Explain</b> the working principle of axial and centrifugal flow compressors. <b>(Understand)</b>
CO5	<b>Discuss</b> important factors affecting combustion chamber design and the problems associated with flame stabilization. <b>(Understand)</b>
CO6	<b>Analyze</b> the working principle of axial and radial flow turbines and their overall performance. <b>(Analyze)</b>

<b>BAN404</b>	<b>AIRCRAFT SYSTEMS AND INSTRUMENTATION</b>
CO1	<b>Identify</b> the components of Hydraulic, Pneumatic, Landing gear and brake system. <b>(Understand)</b>
CO2	<b>Compare</b> the advantages and disadvantages of conventional and modern flight control systems. <b>(Understand)</b>
CO3	<b>Explain</b> the operating principle of various systems associated with the aircraft engines. <b>(Understand)</b>
CO4	<b>Describe</b> the working principle of air-conditioning, oxygen, fire protection and ice protection systems. <b>(Understand)</b>
CO5	<b>Describe</b> the operating principle of flight and navigation instruments. <b>(Understand)</b>
CO6	<b>Summarize</b> the working principle of engine instruments such as tachometers, temperature gauges and Pressure gauges. <b>(Understand)</b>
<b>BCE407</b>	<b>ENVIRONMENTAL STUDIES</b>
CO1	<b>Summarize</b> the types of natural resources and identify the role of an individual in conservation of nature. <b>(Understand)</b>
CO2	<b>Describe</b> different eco systems and energy flow in a defined ecosystem. <b>(Understand)</b>
CO3	<b>Define</b> ecosystem bio-diversity and the threats to biodiversity. <b>(Remember)</b>
CO4	<b>Define</b> types of pollution, effects and control measures of pollution. <b>(Remember)</b>
CO5	<b>Explain</b> the need for sustainable development and water conservation. <b>(Understand)</b>
CO6	<b>Express</b> the need for population control and the impact of population growth in economy. <b>(Understand)</b>
<b>BAN4L1</b>	<b>AIRCRAFT STRUCTURES LABORATORY</b>
CO1	<b>Demonstrate</b> structural mechanics principles/phenomenon using simple experiments. <b>(Manipulation)</b>
CO2	<b>Observe</b> deformation of structural members or/and failure of materials under given loads. <b>(Imitation)</b>
CO3	<b>Perform</b> comparative study between the obtained experimental results and theoretical values. <b>(Precision)</b>
<b>BME4L1</b>	<b>MANUFACTURING ENGINEERING LABORATORY</b>
CO1	<b>Carry out</b> different machining operations on center lathe <b>(Imitation)</b>
CO2	<b>Perform</b> drilling, reaming and boring processes. <b>(Precision)</b>
CO3	<b>Observe</b> the working of Planner shaper miller and grinder. <b>(Imitation)</b>
<b>BAN4L2</b>	<b>COMPUTER AIDED DESIGNING AND DRAFTING</b>
CO1	<b>Master</b> the geometrical profile and modification tools. <b>(Precision)</b>

CO2	<b>Create</b> 3-Dimensional models from 2-Dimensional geometries. ( <b>Naturalization</b> )
CO3	<b>Design</b> basic Aerospace components using CADD. ( <b>Articulation</b> )
<b>BAN501</b>	<b>AIRCRAFT STRUCTURES – II</b>
CO1	<b>Compute</b> the bending stress distribution in beams of symmetric and unsymmetrical sections. ( <b>Apply</b> )
CO2	<b>Calculate</b> the shear flow distribution in symmetrical and unsymmetrical thin-walled open section and its shear center. ( <b>Apply</b> )
CO3	<b>Calculate</b> the shear flow distribution in thin walled single and multi-cell structures subjected to combined loading. ( <b>Apply</b> )
CO4	<b>Compute</b> the crippling strength of thin plates and effective width of sheet stiffener panels. ( <b>Apply</b> )
CO5	<b>Analyze</b> the stress developed in aircraft wings and fuselage. ( <b>Analyze</b> )
<b>BAN502</b>	<b>AERODYNAMICS II</b>
CO1	<b>Apply</b> the concepts of isentropic flow for problems related to variable area ducts. ( <b>Apply</b> )
CO2	<b>Calculate</b> the properties of flow through shock and expansion waves. ( <b>Apply</b> )
CO3	<b>Determine</b> the aerodynamic coefficients of compressible flows based on linearized flow theory. ( <b>Apply</b> )
CO4	<b>Categorize</b> various aircrafts intended for subsonic and supersonic regimes based on wing and fuselage design. ( <b>Analyze</b> )
CO5	<b>Describe</b> flow measurement and visualization techniques for high-speed flows. ( <b>Understand</b> )
<b>BAN503</b>	<b>ADVANCED AEROSPACE PROPULSION</b>
CO1	<b>Explain</b> the working principle, modes of operation and performance parameters of Ramjet engine. ( <b>Understand</b> )
CO2	<b>Discuss</b> supersonic combustion and the challenges involved in scramjet design. ( <b>Understand</b> )
CO3	<b>Explain</b> the operating principle of solid propellant rockets and selection of propellant grain. ( <b>Understand</b> )
CO4	<b>Describe</b> various feed systems, cooling methods in liquid propellant rockets. ( <b>Understand</b> )
CO5	<b>Explain</b> the working principle and the practical limitations of hybrid rockets. ( <b>Understand</b> )
<b>BAN504</b>	<b>FLIGHT MECHANICS</b>
CO1	<b>Calculate</b> thrust and power required for propeller driven and jet powered aircraft at steady level flight. ( <b>Apply</b> )
CO2	<b>Evaluate</b> the Range, Endurance, glide and climb performances. ( <b>Evaluate</b> )
CO3	<b>Estimate</b> the take-off, landing, turning performance using V-n diagram. ( <b>Evaluate</b> )
CO4	<b>Describe</b> the characteristics of longitudinal stability. ( <b>Understand</b> )

CO5	<b>Evaluate</b> the lateral and directional stability characteristics. ( <b>Evaluate</b> )
<b>BME505</b>	<b>MANUFACTURING ENGINEERING</b>
CO1	<b>Describe</b> various metal forming process and different types of welding. ( <b>Understand</b> )
CO2	<b>Estimate</b> the tool life, machining time and the forces involved in metal cutting process. ( <b>Apply</b> )
CO3	<b>Describe</b> types of lathe and their construction. ( <b>Understand</b> )
CO4	<b>Explain</b> the process of shaping, planing and milling operations. ( <b>Understand</b> )
CO5	<b>Discuss</b> the process involved in drilling, boring, broaching, surface finishing. ( <b>Understand</b> )
CO6	<b>Describe</b> the working principle of various Non-traditional machining techniques. ( <b>Understand</b> )
<b>BAN5V1</b>	<b>VALUE ADDED PROGRAM I</b>
CO1	<b>Demonstrate</b> team work and leadership quality ( <b>Apply</b> )
CO2	<b>Demonstrate</b> communication and interpersonal skills ( <b>Apply</b> )
CO3	<b>Express</b> the need for Social responsibilities ( <b>Understand</b> )
<b>BAN5L1</b>	<b>AERODYNAMICS LABORATORY</b>
CO1	<b>Carry out</b> flow analysis over various aerodynamic models. ( <b>Imitation</b> )
CO2	<b>Demonstrate</b> the usage of mechanical and electronic instruments in data acquisition. ( <b>Manipulation</b> )
CO3	<b>Conduct</b> experiments at various orientation of models to characterize the flow. ( <b>Articulation</b> )
<b>BAN5L2</b>	<b>AERO DESIGN AND MODELING LABORATORY</b>
CO1	<b>Design</b> and fabricate the Aircraft Structural components with appropriate materials. ( <b>Naturalization</b> )
CO2	<b>Conduct</b> flight testing of powered glider and RC plane. ( <b>Precision</b> )
CO3	<b>Observe</b> Performance characteristics of Glider and RC plane. ( <b>Imitation</b> )
<b>BAN5L3</b>	<b>COMPUTER AIDED ANALYSIS</b>
CO1	<b>Design</b> the structural components under static and dynamic loading. ( <b>Precision</b> )
CO2	<b>Observe</b> temperature distribution for structure under thermal loading. ( <b>Imitation</b> )
CO3	<b>Carry out</b> the flow analysis over aerodynamic shapes. ( <b>Imitation</b> )
<b>BSS601</b>	<b>VALUE EDUCATION AND PROFESSIONAL ETHICS</b>
CO1	<b>Describe</b> the meaning and philosophy of life and the qualities an individual must possess. ( <b>Understand</b> )

CO2	<b>Explain</b> the individual responsibility towards family and society. ( <b>Understand</b> )
CO3	<b>Discuss</b> the methods to maintain proper physical and mental health. ( <b>Understand</b> )
CO4	<b>Summarize</b> the importance of safety during social experimentation. ( <b>Understand</b> )
CO5	<b>Express</b> the rights and responsibilities of engineer on global issues. ( <b>Understand</b> )
<b>BAN601</b>	<b>AEROSPACE STRUCTURAL MATERIALS AND COMPOSITES</b>
CO1	<b>Discuss</b> various materials used in aerospace applications. ( <b>Understand</b> )
CO2	<b>Compute</b> the properties of isotropic, anisotropic and orthotropic materials. ( <b>Apply</b> )
CO3	<b>Calculate</b> the properties of laminated composites along natural and arbitrary axis. ( <b>Apply</b> )
CO4	<b>Determine</b> the stiffness matrix, stress and strain of laminated composite plate with different orientations. ( <b>Apply</b> )
CO5	<b>Interpret</b> the properties and failure modes in composite plates and sandwich panels. ( <b>Apply</b> )
CO6	<b>Describe</b> the manufacturing process of fibers and fabrication methods of composites. ( <b>Understand</b> )
<b>BAN602</b>	<b>FINITE ELEMENT METHODS</b>
CO1	<b>Compare</b> various functional approximation methods for structural problems. ( <b>Analyze</b> )
CO2	<b>Calculate</b> the nodal field variables for one dimensional structure. ( <b>Apply</b> )
CO3	<b>Determine</b> the stiffness matrix and stress developed in two dimensional structures. ( <b>Apply</b> )
CO4	<b>Calculate</b> the nodal displacements and stress for axi-symmetric structures. ( <b>Apply</b> )
CO5	<b>Analyze</b> the static and dynamic behavior of structures. ( <b>Analyze</b> )
<b>BAN603</b>	<b>CONTROL ENGINEERING</b>
CO1	<b>Analyze</b> mathematical model for mechanical and Electrical systems. ( <b>Analyze</b> )
CO2	<b>Analyze</b> time response of the system with various test inputs and steady state errors. ( <b>Analyze</b> )
CO3	<b>Analyze</b> the frequency response of the system and Correlate frequency - time domain specifications. ( <b>Analyze</b> )
CO4	<b>Predict</b> the stability of the system using Root Locus and Routh Hurwitz stability criterion. ( <b>Evaluate</b> )
CO5	<b>Discuss</b> the basic components of Digital Control System. ( <b>Understand</b> )
<b>BAN6V1</b>	<b>VALUE ADDED PROGRAM II</b>
CO1	<b>Acquire</b> written communication & its importance in current scenario. ( <b>Understand</b> )

CO2	<b>Develop</b> Individual or in-group class presentations skills pertaining to the applications of concepts, theories or issues in human development. ( <b>Apply</b> )
CO3	<b>Develop</b> analytical problem-solving skills. ( <b>Apply</b> )
<b>BAN6L1</b>	<b>AIRCRAFT SYSTEM LABORATORY</b>
CO1	<b>Observe</b> Aircraft ground operations. ( <b>Imitation</b> )
CO2	<b>Conduct</b> Checks to ensure the airworthiness of aircraft. ( <b>Precision</b> )
CO3	<b>Refine</b> the performance of aircraft systems. ( <b>Articulation</b> )
<b>BAN6L2</b>	<b>PROPULSION LABORATORY</b>
CO1	<b>Demonstrate</b> the various procedures and techniques for the experiments. ( <b>Manipulation</b> )
CO2	<b>Observe</b> the data using the different measuring devices and techniques. ( <b>Imitation</b> )
CO3	<b>Follow</b> the mathematical concepts/equations to obtain quantitative results. ( <b>Imitation</b> )
<b>BAN6L3</b>	<b>AIRCRAFT DESIGN PROJECT I</b>
CO1	<b>Acquire</b> the design parameters of various aircrafts necessary for the suitable preliminary design. ( <b>Manipulation</b> )
CO2	<b>Acquire</b> aerodynamic and geometric parameters for detailed aircraft design. ( <b>Manipulation</b> )
CO3	<b>Integrate</b> performance and stability parameters for different phases of flight. ( <b>Precision</b> )
<b>BAN701</b>	<b>COMPUTATIONAL FLUID DYNAMICS</b>
CO1	<b>Solve</b> the well posed and ill posed problems. ( <b>Apply</b> )
CO2	<b>Apply</b> appropriate Finite Difference schemes for solving PDE. ( <b>Apply</b> )
CO3	<b>Analyze</b> various explicit and implicit methods for a converging solution. ( <b>Analyze</b> )
CO4	<b>Solve</b> the steady state diffusion and convection problems using finite volume method. ( <b>Apply</b> )
CO5	<b>Identify</b> suitable turbulence model for fluid flow problems. ( <b>Understand</b> )
<b>BAN702</b>	<b>AVIONICS</b>
CO1	<b>Describe</b> the needs for avionics in different fields of aviation. ( <b>Understand</b> )
CO2	<b>Explain</b> the architecture of microprocessor and combinational logic circuits. ( <b>Understand</b> )
CO3	<b>Discuss</b> Avionics system architecture and various data-buses. ( <b>Understand</b> )
CO4	<b>Compare</b> various display technologies used in civil and military cockpits. ( <b>Understand</b> )
CO5	<b>Discuss</b> the working principles of various avionic sub-systems. ( <b>Understand</b> )

<b>BAN703</b>	<b>HEAT TRANSFER</b>
CO1	<b>Solve</b> one dimensional steady state heat conduction problems. ( <b>Apply</b> )
CO2	<b>Estimate</b> heat transfer rate of semi-infinite and infinite solids. ( <b>Evaluate</b> )
CO3	<b>Estimate</b> heat transfer coefficient for flow over a flat plate and circular pipe. ( <b>Evaluate</b> )
CO4	<b>Calculate</b> radiative heat transfer of black and gray surfaces. ( <b>Apply</b> )
CO5	<b>Compare</b> different types of heat exchangers and their performance. ( <b>Analyze</b> )
CO6	<b>Solve</b> heat transfer problems related to aerospace applications. ( <b>Apply</b> )
<b>BAN7L1</b>	<b>AIRFRAME AND AERO ENGINE REPAIR LAB</b>
CO1	<b>Demonstrate</b> the various procedures and techniques for the Airframe repair ( <b>Manipulation</b> )
CO2	<b>Demonstrate</b> the procedures and techniques followed in Aero Engine inspection . ( <b>Manipulation</b> )
CO3	<b>Perform</b> engine dismantling and Assembling ( <b>Precision</b> )
<b>BAN7L2</b>	<b>AVIONICS LABORATORY</b>
CO1	<b>Demonstrate</b> combinational, sequential and wave shaping circuits in digital electronics. ( <b>Manipulation</b> )
CO2	<b>Perform</b> arithmetic, logical operations and storing the data in microprocessor. ( <b>Precision</b> )
CO3	<b>Design</b> avionics control system using MATLAB. ( <b>Articulation</b> )
<b>BAN7L3</b>	<b>AIRCRAFT DESIGN PROJECT II</b>
CO1	<b>Observe</b> safety flying critical flying load limits. ( <b>Imitation</b> )
CO2	<b>Design</b> of fuselage and wing structural members. ( <b>Articulation</b> )
CO3	<b>Integrate</b> all the design parameters to assemble an aircraft. ( <b>Articulation</b> )
<b>BAN7P1</b>	<b>PROJECT PHASE – I</b>
CO1	<b>Observe</b> the current market scenario to develop new or modify the existing product. ( <b>Imitation</b> )
CO2	<b>Complete</b> the conceptional design of the project. ( <b>Manipulation</b> )
CO3	<b>Point out</b> the methodology for implementation of design. ( <b>Manipulation</b> )
<b>BAN8P1</b>	<b>PROJECT PHASE – II</b>
CO1	<b>Express</b> the method of achieving perfection in project implementation & completion. ( <b>Imitation</b> )

CO2	<b>Build</b> the skills, competencies and point of view of designed concepts. <b>(Naturalization)</b>
CO3	<b>Replicate</b> professional skills in Presentation, Technical report writing, critical thinking and decision making. <b>(Manipulation)</b>
<b>BAN8C1</b>	<b>COMPREHENSION</b>
CO1	<b>Recollect</b> the core engineering concepts. <b>(Remember)</b>
CO2	<b>Acquire</b> Presentation Skills to face job interviews. <b>(Apply)</b>
CO3	<b>Write</b> competitive examinations for successful career. <b>(Apply)</b>

### **LIST OF ELECTIVES:**

<b>BANE01</b>	<b>BASICS OF AIRCRAFT MAINTENANCE AND REPAIR</b>
CO1	<b>Discuss</b> the fundamentals aspects of aircraft maintenance and repair. <b>(Understand)</b>
CO2	<b>Describe</b> the repair and maintenance procedures of aircraft structures. <b>(Understand)</b>
CO3	<b>Explain</b> the trouble shooting procedures involved in primary aircraft systems. <b>(Understand)</b>
CO4	<b>Explain</b> the maintenance procedures of engine and fuel system. <b>(Understand)</b>
CO5	<b>Summarize</b> the maintenance procedures of auxiliary and instruments. <b>(Understand)</b>
<b>BANE02</b>	<b>ROCKETS AND MISSILES</b>
CO1	<b>Describe</b> combustion mechanisms in solid and liquid propellant rockets. <b>(Understand)</b>
CO2	<b>Compute</b> the forces and moments acting on rockets and missile while passing through atmosphere. <b>(Apply)</b>
CO3	<b>Analyze</b> the trajectory of rockets and missiles in free space and gravitational field. <b>(Analyze)</b>
CO4	<b>Summarize</b> different thrust vector control techniques and stage separation in rockets. <b>(Understand)</b>
CO5	<b>Apply</b> suitable materials used for their construction. <b>(Apply)</b>
<b>BANE03</b>	<b>EXPERIMENTAL STRESS ANALYSIS</b>
CO1	<b>Describe</b> the working principle of different extensometers and their uses. <b>(Understand)</b>
CO2	<b>Compute</b> the strain in loaded structures based on measurement of change in resistance using strain gauges. <b>(Apply)</b>
CO3	<b>Discuss</b> the techniques used for determination of stress in photo elastic materials. <b>(Understand)</b>
CO4	<b>Explain</b> the concepts of more technique and brittle coating techniques. <b>(Understand)</b>
CO5	<b>Describe</b> the different type of NDT methods. <b>(Understand)</b>

<b>BANE04</b>	<b>EXPERIMENTAL AERODYNAMICS</b>
CO1	<b>Discuss</b> calibration procedures using various instruments and <b>Determine</b> aerodynamic coefficients. ( <b>Apply</b> )
CO2	<b>Explain</b> various types of high-speed wind tunnels and discuss their design parameters. ( <b>Understand</b> )
CO3	<b>Describe</b> measurement techniques for flow properties. ( <b>Understand</b> )
CO4	<b>Explain</b> different flow visualizations technique in subsonic and supersonic regimes. ( <b>Understand</b> )
CO5	<b>Discuss</b> data acquisition and error analysis. ( <b>Understand</b> )
<b>BANE05</b>	<b>HELICOPTER MAINTENANCE</b>
CO1	<b>Explain</b> the basic components and working of helicopter. ( <b>Understand</b> )
CO2	<b>Explain</b> the balancing of main rotor and the maintenance procedures in control rigging. ( <b>Understand</b> )
CO3	<b>Discuss</b> the main rotor transmission coupling and maintenance steps involved. ( <b>Understand</b> )
CO4	<b>Discuss</b> installation and modification of fixed wing power plant. ( <b>Understand</b> )
CO5	<b>Describe</b> maintenance procedure of power plant and tail rotor system. ( <b>Understand</b> )
CO6	<b>Explain</b> the maintenance procedures involved in fuselage and airframe systems. ( <b>Understand</b> )
<b>BANE06</b>	<b>SPACE MECHANICS</b>
CO1	<b>Discuss</b> the basic concepts and laws applicable to attracting bodies in the universe. ( <b>Understand</b> )
CO2	<b>Determine</b> orbital parameters of Satellite injection and methods of satellite perturbations. ( <b>Apply</b> )
CO3	<b>Explain</b> two- and three-dimensional interplanetary trajectories and launch of interplanetary spacecrafts. ( <b>Understand</b> )
CO4	<b>Estimate</b> the ballistic missile trajectory. ( <b>Evaluate</b> )
CO5	<b>Discuss</b> the materials required for the construction of spacecraft and the impact of space environment on spacecraft materials. ( <b>Understand</b> )
<b>BANE07</b>	<b>THEORY OF VIBRATIONS</b>
CO1	<b>Compute</b> the natural frequency of SDOF systems under free and forced vibrations. ( <b>Apply</b> )
CO2	<b>Determine</b> the frequency of vibrating body using instruments. ( <b>Apply</b> )
CO3	<b>Calculate</b> principle mode of vibration for MDOF systems. ( <b>Apply</b> )
CO4	<b>Calculate</b> the natural frequency of continuous systems. ( <b>Apply</b> )
CO5	<b>Calculate</b> natural frequency of MDOF systems using approximate methods. ( <b>Apply</b> )

CO6	<b>Discuss</b> the problems in aeroelastic instability and its prevention. <b>(Understand)</b>
<b>BANE08</b>	<b>HELICOPTER AERODYNAMICS</b>
CO1	<b>Describe</b> various helicopter configurations and their working principles. <b>(Understand)</b>
CO2	<b>Estimate</b> the rotor performance parameters for hover flight. <b>(Evaluate)</b>
CO3	<b>Discuss</b> the forward flight dynamic performance parameters. <b>(Understand)</b>
CO4	<b>Discuss</b> the power required for climb and descent. <b>(Understand)</b>
CO5	<b>Discuss</b> the working principle and applications of hovercraft. <b>(Understand)</b>
<b>BANE09</b>	<b>AIRCRAFT ENGINE REPAIR AND MAINTENANCE</b>
CO1	<b>Describe</b> the inspection and troubleshooting procedure for piston engine components. <b>(Understand)</b>
CO2	<b>Explain</b> the inspection and troubleshooting methods of aircraft propeller. <b>(Understand)</b>
CO3	<b>Discuss</b> the overhauling and testing procedure for aircraft reciprocating engine. <b>(Understand)</b>
CO4	<b>Describe</b> the checks and maintenance procedures followed in gas turbine engines and <b>select</b> appropriate trouble shooting technique. <b>(Understand)</b>
CO5	<b>Discuss</b> the overhauling procedure of aircraft gas turbine engine. <b>(Understand)</b>
<b>BANE10</b>	<b>CRYOGENIC ROCKET PROPULSION</b>
CO1	<b>Discuss</b> the basic components of cryogenic systems. <b>(Understand)</b>
CO2	<b>Explain</b> the types of cryogenic propellant used and their storage and handling. <b>(Understand)</b>
CO3	<b>Discuss</b> cryo equipment and accessories of cryogenic engine system. <b>(Understand)</b>
CO4	<b>Discuss</b> various subsystem involved in the operation of cryogenic engine and their design aspects. <b>(Understand)</b>
CO5	<b>Discuss</b> the challenges in cryogenic rocket technology. <b>(Understand)</b>
<b>BANE11</b>	<b>THEORY OF PLATES AND SHELLS</b>
CO1	<b>Explain</b> the classical plate theory subjected to Axi-symmetric loading. <b>(Understand)</b>
CO2	<b>Use</b> Navier's method and Levy's method to obtain solution for rectangular plates under different boundary conditions. <b>(Apply)</b>
CO3	<b>Illustrate</b> the stability and free vibration analysis of rectangular plates. <b>(Understand)</b>
CO4	<b>Apply</b> various approximate methods on rectangular plates for stability analysis. <b>(Apply)</b>
CO5	<b>Describe</b> the concepts of shell type structures and bending theories for circular cylindrical shells. <b>(Understand)</b>

<b>BANE12</b>	<b>HYPERSONIC AERODYNAMICS</b>
CO1	<b>Recall</b> the concepts of compressible flows and differentiate between supersonic and hypersonic flows. <b>(Remember)</b>
CO2	<b>Discuss</b> simple solution methods of hypersonic inviscid flows. <b>(Understand)</b>
CO3	<b>Discuss</b> the basics of viscous hypersonic flows. <b>(Understand)</b>
CO4	<b>Describe</b> the shock shear layer interaction in hypersonic flows. <b>(Understand)</b>
CO5	<b>Discuss</b> basics of high temperature flows. <b>(Understand)</b>
<b>BANE13</b>	<b>AN INTRODUCTION TO COMBUSTION</b>
CO1	<b>Explain</b> thermo chemical reaction associated with combustion process and the various parameters affecting burning velocity. <b>(Understand)</b>
CO2	<b>Select</b> apt fuel for optimum combustion in piston engines. <b>(Analyze)</b>
CO3	<b>Compare</b> the ramjet and gas turbine combustion chamber design. <b>(Understand)</b>
CO4	<b>Analyze</b> the challenges associated with supersonic combustion. <b>(Analyze)</b>
CO5	<b>Discuss</b> combustion process in solid, liquid propellant rockets and hybrid rockets. <b>(Understand)</b>
<b>BANE14</b>	<b>PRINCIPLES OF TURBO MACHINERY IN AIR BREATHING ENGINES</b>
CO1	<b>Recall</b> basic thermodynamic laws and working principles of Gas Turbines. <b>(Remember)</b>
CO2	<b>Discuss</b> the operating principle of centrifugal compressor using velocity triangle. <b>(Understand)</b>
CO3	<b>Describe</b> the operating principle of axial flow compressor using velocity triangle. <b>(Understand)</b>
CO4	<b>Discuss</b> the basic theory of axial and radial Turbine. <b>(Understand)</b>
CO5	<b>Discuss</b> Turbine blade cooling <b>(Understand)</b>
CO6	<b>Describe</b> Turbine Compressor matching. <b>(Understand)</b>
<b>BANE15</b>	<b>NANO SCIENCE TECHNOLOGY</b>
CO1	<b>Memorize</b> the fundamentals of nanoscale materials and the scope of nanoscience and technology. <b>(Remember)</b>
CO2	<b>Describe</b> the types of nanostructures and quantum size effects in nanostructures. <b>(Understand)</b>
CO3	<b>Discuss</b> the synthesis of nanomaterials and methods of nanomaterials preparation. <b>(Understand)</b>
CO4	<b>Define</b> the Mechanical, optical, electronic, magnetic, thermal and chemical properties of nanomaterials. <b>(Understand)</b>
CO5	<b>List</b> the physical properties of nanostructured materials. <b>(Apply)</b>

<b>BANE16</b>	<b>UNMANNED AERIAL VEHICLE</b>
CO1	<b>Discuss</b> the unmanned aircraft systems and their selection criteria. <b>(Understand)</b>
CO2	<b>Explain</b> the aerodynamics and airframe configurations of UAV. <b>(Understand)</b>
CO3	<b>List</b> the different types of UAVs and their performance parameters. <b>(Apply)</b>
CO4	<b>Discuss</b> the various communication and navigation systems used in UAVs. <b>(Understand)</b>
CO5	<b>Describe</b> the concept behind the operation of Horizontal Takeoff and landing of aircrafts. <b>(Understand)</b>
<b>BANE17</b>	<b>BOUNDARY LAYER THEORY</b>
CO1	<b>Recall</b> the fundamental equations of viscous flow and basics of boundary layer theory. <b>(Understand)</b>
CO2	<b>Discuss</b> the solutions of simplified viscous flow equations. <b>(Understand)</b>
CO3	<b>Discuss</b> the equations and methods used for solving the flow field of laminar boundary layer over a flat plate. <b>(Understand)</b>
CO4	<b>Describe</b> the basics of Turbulent boundary layer. <b>(Understand)</b>
CO5	<b>Describe</b> the basics of Compressible boundary layer. <b>(Understand)</b>
<b>BANE18</b>	<b>FATIGUE AND FRACTURE MECHANICS</b>
CO1	<b>Calculate</b> the stress concentration in structures subjected to fatigue loads. <b>(Analyze)</b>
CO2	<b>Describe</b> statistical methods to determine the strain in structures under fatigue loading. <b>(Understand)</b>
CO3	<b>Describe</b> various stages of failures due to fatigue load. <b>(Understand)</b>
CO4	<b>Determine</b> stress in cracked structures. <b>(Apply)</b>
CO5	<b>Design</b> composite material-based structures subjected to fatigue load which are fail-safe. <b>(Create)</b>
<b>BANE19</b>	<b>HIGH TEMPERATURE MATERIALS</b>
CO1	<b>Discuss</b> the effect of creep on the functional life of components. <b>(Understand)</b>
CO2	<b>Explain</b> the creep resistance of ductile and brittle materials. <b>(Understand)</b>
CO3	<b>Describe</b> the effect of different alloys and oxides materials behaviour from low temperature to high temperature. <b>(Understand)</b>
CO4	<b>Discuss</b> the fracture mechanism maps for different alloys and oxides. <b>(Understand)</b>
CO5	<b>Describe</b> the process of oxidation and different oxidations prevention techniques. <b>(Understand)</b>
CO6	<b>Discuss</b> the various types of super alloys and its strengthening mechanisms. <b>(Understand)</b>

<b>BANE20</b>	<b>WIND ENERGY</b>
CO1	<b>Describe</b> the wind energy basics and the wind rose diagram. <b>(Understand)</b>
CO2	<b>List</b> the wind turbines types and to familiarize with the theory behind wind turbine operation. <b>(Remember)</b>
CO3	<b>Explain</b> the measurement and instrumentation related to wind turbines <b>(Understand)</b>
CO4	<b>Discuss</b> power generation, power transmission and monitoring of wind turbines <b>(Understand)</b>
CO5	<b>Describe</b> the safety, maintenance and control aspects of wind turbines <b>(Understand)</b>
<b>BANE21</b>	<b>SATELLITE TECHNOLOGY</b>
CO1	<b>Discuss</b> the basics of satellites and its system's functions. <b>(Understand)</b>
CO2	<b>Describe</b> the fundamentals of orbital mechanics and the coordinate systems. <b>(Understand)</b>
CO3	<b>Design</b> the satellite structures and thermal protection systems. <b>(Create)</b>
CO4	<b>Express</b> the attitude controls and its stabilization schemes. <b>(Understand)</b>
CO5	<b>Summarize</b> various types of power systems and bus electronics. <b>(Understand)</b>
<b>BANE22</b>	<b>AIRCRAFT RULES AND REGULATIONS CAR I &amp; II</b>
CO1	<b>Identify</b> the aircraft airworthiness and to list the responsibilities of owners/operators. <b>(Understand)</b>
CO2	<b>Discuss</b> the procedures involved in defect recording, monitoring, investigation, reporting and maintenance programmes. <b>(Understand)</b>
CO3	<b>Explain</b> the procedures of approval for aircraft manufacturing and maintenance industries. <b>(Understand)</b>
CO4	<b>Outline</b> the procedures followed to conduct AME examinations and license issue. <b>(Analyze)</b>
CO5	<b>Discuss</b> the procedures followed in flight testing of aircrafts and the miscellaneous requirements. <b>(Understand)</b>
<b>BBA001</b>	<b>PRINCIPLES OF MANAGEMENT AND ORGANIZATIONAL BEHAVIOUR</b>
CO1	<b>Describe</b> the structure of management and the functions of each department. <b>(Understand)</b>
CO2	<b>Describe</b> business, trading, partnership and methods to overcome pitfalls. <b>(Understand)</b>
CO3	<b>Analyze</b> the causes of accidents. <b>(Analyze)</b>
CO4	<b>Explain</b> Organizational behavior and factors influencing personality. <b>(Understand)</b>
CO5	<b>Define</b> group, Communication, Barriers and factors contributing effective leadership. <b>(Understand)</b>
CO6	<b>Summarize</b> the various ethics to be followed in different workplace. <b>(Understand)</b>

<b>BANE23</b>	<b>AIRPORT MANAGEMENT</b>
CO1	<b>State</b> the Role of ICAO and IATA. ( <b>Remember</b> )
CO2	<b>Describe</b> aircraft forecasting and fleet planning and to do route analysis. ( <b>Understand</b> )
CO3	<b>Summarize</b> the flight operations and various methods of flight scheduling. ( <b>Understand</b> )
CO4	<b>Discuss</b> the condition monitoring maintenance and ageing aircraft maintenance production. ( <b>Understand</b> )
CO5	<b>List</b> the equipment and tools for aircraft maintenance. ( <b>Apply</b> )
<b>BANE24</b>	<b>AEROSPACE BIO – MEDICAL AND LIFE SUPPORT ENGINEERING</b>
CO1	<b>Explain</b> physiological problems associated with human in space flight. ( <b>Understand</b> )
CO2	<b>Interpret</b> the equations of motion for human organ systems during space flight. ( <b>Understand</b> )
CO3	<b>Prepare</b> mechanical and electrical models of human systems for studying astronaut performance. ( <b>Apply</b> )
CO4	<b>Discuss</b> the life support systems onboard the space flight. ( <b>Understand</b> )
CO5	<b>Discover</b> life activities and specialties of space suit. ( <b>Apply</b> )
<b>BBA008</b>	<b>TOTAL QUALITY MANAGEMENT</b>
CO1	<b>Develop</b> action plans for customer centric business on the basis of various quality philosophies. ( <b>Apply</b> )
CO2	<b>Apply</b> total quality management techniques for design and manufacture of highly reliable products and services. ( <b>Apply</b> )
CO3	<b>Develop</b> statistical process control charts for monitoring the health of manufacturing systems. ( <b>Apply</b> )
CO4	<b>Solve</b> various industrial problems using Six Sigma and related techniques. ( <b>Apply</b> )
CO5	<b>Establish</b> quality management system and environmental management system for product and service industries. ( <b>Apply</b> )
<b>BANE25</b>	<b>INDUSTRIAL AERODYNAMICS</b>
CO1	<b>Discuss</b> weather terminology and terrain structure. ( <b>Understand</b> )
CO2	<b>Compare</b> the flow characteristics over automobile bodies for drag reductions ( <b>Analyze</b> )
CO3	<b>Discuss</b> the concepts of wind turbines and its applications ( <b>Understand</b> )
CO4	<b>Discuss</b> the codes of practice and properties of external and internal flows over buildings ( <b>Understand</b> )
CO5	<b>Discuss</b> the concepts of induced vibrations and their effect over launch vehicles and civil structures ( <b>Understand</b> )
<b>BANE26</b>	<b>MECHANICS OF HETEROGENEOUS MATERIALS</b>

CO1	<b>Summarize</b> various material structures and different crystal properties. <b>(Understand)</b>
CO2	<b>Predict</b> the stiffness and strength of different directions. <b>(Understand)</b>
CO3	<b>Memorize</b> the properties of Particulate, fibrous and cellular solids. <b>(Remember)</b>
CO4	<b>Define</b> the various aspects of hierarchical structure of heterogeneous materials. <b>(Remember)</b>
CO5	<b>Explain</b> the eutectic structure and gradient effects. <b>(Understand)</b>

### 3.1.C Explanation of Course Articulation Matrix table to be ascertained

POs and PSOs are attained mainly through Core Courses. Each Course Outcome addresses a sub-set of POs and PSOs to varying levels (strengths) (1, 2 or 3).

- Strength of mapping is defined at three levels: Low (1), Medium (2) and High (3).
- If >40 % of classroom sessions/tutorials/lab hours address a particular PO, it is considered that the PO is addressed at Level 3 (High).
- If 26% to 40% of classroom sessions/tutorials/lab hours address a particular PO, it is considered that the PO is addressed at Level 2 (Medium).
- If 10% to 25% of classroom sessions/tutorials/lab hours address a particular PO, it is considered that the PO is addressed at Level 1 (Low).
- If <10% of classroom sessions /tutorials/lab hours address a particular PO, it is considered that the PO is not addressed.

Course	Statement	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BMA3 01.1</b>	<b>Classify</b> the different methods for solving partial differential equations. <b>(Understand)</b>	3	3										3		
<b>BMA3 01.2</b>	<b>Apply</b> Fourier series solution method for engineering problems. <b>(Apply)</b>	3	3			3							3		

<b>BMA3 01.3</b>	<b>Analyze</b> the solutions of one dimensional and two dimensional boundary value problems in partial differential equations. ( <b>Analyze</b> )	3	3	3		3							3		
<b>BMA3 01.4</b>	<b>Apply</b> the concept of Laplace transform to various engineering problems. ( <b>Apply</b> )	3	3	3		3							3		
<b>BMA3 01.5</b>	<b>Evaluate</b> the engineering problems using inverse Laplace techniques. ( <b>Evaluate</b> )	3	3	3	1	3							3		
<b>BMA3 01.6</b>	<b>Apply</b> Fourier transform to engineering problems. ( <b>Apply</b> )	3	3	3	1								3		
<b>BMA301</b>		3	3	3	1	3							3		

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN30 1.1</b>	<b>Describe</b> the basic components of airplane and various flight vehicles. ( <b>Remember</b> )	3									2			3	
<b>BAN30 1.2</b>	<b>Summarize</b> the variation of aircraft	3				1								3	

	performance at various altitudes. (Understand)														
<b>BAN30 1.3</b>	<b>Explain</b> the structural components of airplane and materials used for aircraft construction. (Understand)	3									2		3	3	
<b>BAN30 1.4</b>	<b>Describe</b> the working of different types of aircraft engines and their performances. (Understand)	3											3	3	
<b>BAN30 1.5</b>	<b>Discuss</b> the theory behind rocket propulsion and the problems associated with hypersonic vehicle operation. (Understand)	3											3	3	
<b>BAN301</b>		3				1					2		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN30 2.1</b>	<b>Recall</b> the concepts of fluids, properties of	3												3	

	fluids and its classification. <b>(Remember)</b>														
<b>BAN30 2.2</b>	<b>Calculate</b> the flow properties using the fundamental equations of fluid motion. <b>(Apply)</b>	3													3
<b>BAN30 2.3</b>	<b>Solve</b> problems based on dimensional analysis and fluid flow analysis. <b>(Apply)</b>	3											1		3
<b>BAN30 2.4</b>	<b>Examine</b> the pipe line system for minimum head loss. <b>(Apply)</b>	3									3				3
<b>BAN30 2.5</b>	<b>Calculate</b> the performance and operating characteristics of turbines and pumps. <b>(Apply)</b>	3									3				3
<b>BAN302</b>		3									3			1	3

Course	Statement	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN30 3.1</b>	<b>Apply</b> the fundamental laws of thermodynamics and its thermodynamic relations. <b>(Apply)</b>	3													3
<b>BAN30 3.2</b>	<b>Compute</b> the air standard efficiencies using P-V and T-S diagram of various air	3												2	3

	power cycles. (Apply)														
<b>BAN30 3.3</b>	<b>Calculate</b> the efficiency of various Vapor power cycles (Apply)	3									2		2	3	
<b>BAN30 3.4</b>	<b>Estimate</b> the COP of refrigeration and air-conditioning systems. (Analyze)	3												3	
<b>BAN30 3.5</b>	<b>Calculate</b> the efficiency of jet propulsion cycles. (Apply)	3									2			3	
	<b>BAN303</b>	3									2		2	3	

Course	Statement	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN30 4.1</b>	<b>Compute</b> the stress developed in statically determinate and indeterminate structures subjected to axial load. (Apply)	3									3			3	
<b>BAN30 4.2</b>	<b>Sketch</b> shear force and bending moment diagram for a given beam. (Apply)	3				2								3	
<b>BAN30 4.3</b>	<b>Determine</b> the deflection of beams using various	3											2	3	

	methods (Apply)														
<b>BAN30 4.4</b>	<b>Compute</b> the shear stress developed in circular shafts and springs subjected to torsional and axial load. (Apply)	3											2	3	
<b>BAN30 4.5</b>	<b>Determine</b> the principal stresses developed in structural components using Mohr's Circle. (Apply)	3				2						3		3	
<b>BAN304</b>		3				2						3		2	3

Course	Statement	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN30 5.1</b>	<b>Describe</b> the working of different mechanisms along with inversion and their corresponding velocity and acceleration diagrams. (Understand)	3				3					3			3	
<b>BAN30 5.2</b>	<b>Determine</b> the Power transmission in machine elements using fundamentals of friction. (Apply)	3												3	
<b>BAN30 5.3</b>	<b>Sketch</b> the Cam profile for various follower	3				3					3			3	

	motions. (Apply)														
<b>BAN30 5.4</b>	<b>Determine</b> the unbalanced forces acting on rotating and reciprocating parts in engine. (Apply)	3				3					3			3	
<b>BAN30 5.5</b>	<b>Classify</b> the types of vibration and the frequencies of vibrating systems. (Understand)	3												3	
<b>BAN305</b>		3				3					3			3	

Course	Statement	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BCE3L 1.1</b>	<b>Observe</b> the flow characteristics in a fluid flow system. (Imitation)	3								3	3			3	
<b>BCE3L 1.2</b>	<b>Acquire</b> the pressure data with manometers/sensors for finding the efficiency of given system. (Manipulation)	3								3	3			3	
<b>BCE3L 1.3</b>	<b>Perform</b> the basic calculations and plot graphs to infer fluid behaviour at various flow conditions. (Precision)	3								3	3			3	
<b>BCE3L1</b>		3								3	3			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS O2
BCE3L 2.1	Carry out elementary mechanical coupon testing of materials as per the given procedure. (Imitation)	3								3	3			3	
BCE3L 2.2	Acquire data using the available measuring devices. (Manipulation)	3								3	3			3	
BCE3L 2.3	Perform basic mathematical calculation using the appropriate formulae and represent the results in form of graph and table.(Precision)	3								3	3			3	
BCE3L2		3								3	3			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BME3 L1.1	Observe basic representation of symbols used in Engineering drawings. (Imitation)	3	3							3	3			3	
BME3 L1.2	Acquire attributes of Production Drawing and Limits, fits, tolerances.	3	3							3	3			3	

	(Manipulation)														
<b>BME3 L1.3</b>	<b>Complete</b> the assembly of a given set of machine components. (Manipulation)	3	3							3	3			3	
	<b>BME3L1</b>	3	3							3	3			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BMA4 02.1</b>	<b>Apply</b> numerical techniques to solve equations and linear system of equations. (Apply)	3	3			3							3		
<b>BMA4 02.2</b>	<b>Interpolate</b> the value of a dependent variable in the given data by Newton's forward and backward difference formulae and also unequal intervals. (Understand)	3	3	3		3							3		
<b>BMA4 02.3</b>	<b>Understand</b> and apply the concept of numerical methods to differentiation and integration. (Understand)	3	3	3									3		
<b>BMA4 02.4</b>	<b>Evaluate</b> initial value problems of ODE by	3	3			3							3		

	applying single step and multistep methods. <b>(Evaluate)</b>														
<b>BMA4 02.5</b>	<b>Analyse</b> the two dimensional and one dimensional ordinary differential equation with numerical techniques. <b>(Analyse)</b>	3	3			3							3		
<b>BMA4 02.6</b>	<b>Create</b> and <b>solve</b> the boundary value problems in engineering with the help of finite difference methods. <b>(Create)</b>	3	3	3		3							3		
<b>BMA402</b>		3	3	3		3							3		

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN40 1.1</b>	<b>Determine</b> the forces acting in the members of statically determinate truss and frames. <b>(Apply)</b>	3									2			3	
<b>BAN40 1.2</b>	<b>Calculate</b> the slope and deflection of statically indeterminate beams. <b>(Apply)</b>	3											2	3	

<b>BAN40 1.3</b>	<b>Calculate</b> the deflection and strain energy of statically determinate and indeterminate structures. <b>(Apply)</b>	3											2	3	
<b>BAN40 1.4</b>	<b>Compute</b> the buckling load and crippling stress of columns with different end conditions. <b>(Apply)</b>	3													3
<b>BAN40 1.5</b>	<b>Determine</b> the safe stress of the structural component using failure theories. <b>(Apply)</b>	3									2				3
<b>BAN401</b>		3									2		2	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN40 2.1</b>	<b>Recall</b> the concepts of various types of flow and <b>Identify</b> types of flows based on mathematical equations. <b>(Understand)</b>	3									2				3
<b>BAN40 2.2</b>	<b>Apply</b> the concept of inviscid flow theory to solve flow over basic aerodynamic shapes. <b>(Apply)</b>	3													3
<b>BAN40 2.3</b>	<b>Practice</b> the construction of	3				1							3	3	

	airfoils numerically with the help of mathematical transformations. <b>(Apply)</b>														
<b>BAN40 2.4</b>	<b>Describe</b> the concept of lift generation for efficient wing design. <b>(Understand)</b>	3											3	3	
<b>BAN40 2.5</b>	<b>Determine</b> the skin friction drag over surfaces. <b>(Apply)</b>	3									2			3	
<b>BAN402</b>		3				1					2		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN40 3.1</b>	<b>Compare</b> the performance characteristics of turbojet, turbofan, turboprop and propeller engines. <b>(Understand)</b>	3												3	
<b>BAN40 3.2</b>	<b>Identify</b> the engine starting problems associated with inlets. <b>(Understand)</b>	3												3	
<b>BAN40 3.3</b>	<b>Discuss</b> the types of nozzles and the losses in nozzles. <b>(Understand)</b>	3											3	3	
<b>BAN40 3.4</b>	<b>Explain</b> the working principle of axial and	3									2		3	3	

	centrifugal flow compressors. (Understand)														
<b>BAN40 3.5</b>	<b>Discuss</b> important factors affecting combustion chamber design and the problems associated with flame stabilization. (Understand)	3											3	3	
<b>BAN40 3.6</b>	<b>Analyze</b> the working principle of axial and radial flow turbines and their overall performance. (Analyze)	3									2			3	
<b>BAN403</b>		3									2		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2
<b>BAN40 4.1</b>	<b>Identify</b> the components of Hydraulic, Pneumatic, Landing gear and brake system. (Understand )	3									3			3	3
<b>BAN40 4.2</b>	<b>Compare</b> the advantages and disadvantages of conventional and modern flight control systems.	3												3	3

	(Understand )													
<b>BAN40 4.3</b>	<b>Explain</b> the operating principle of various systems associated with the aircraft engines. (Understand )	3											3	3
<b>BAN40 4.4</b>	<b>Describe</b> the working principle of air-conditioning, oxygen, fire protection and ice protection systems. (Understand )	3								3			3	3
<b>BAN40 4.5</b>	<b>Describe</b> the operating principle of flight and navigation instruments. (Understand )	3											3	3
<b>BAN40 4.6</b>	<b>Summarize</b> the working principle of engine instruments such as tachometers, temperature gauges and Pressure gauges. (Understand )	3											3	3
<b>BAN404</b>		3								3			3	3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BCE40 7.1	<b>Summarize</b> the types of natural resources and identify the role of an individual in conservation of nature. (Understand)	3					3	3							
BCE40 7.2	<b>Describe</b> different eco systems and energy flow in a defined ecosystem. (Understand)	3					3	3			2				
BCE40 7.3	<b>Define</b> ecosystem bio-diversity and the threats to biodiversity. (Remember)	3					3	3			2				
BCE40 7.4	<b>Define</b> types of pollution, effects and control measures of pollution. (Remember)	3					3	3							
BCE40 7.5	<b>Explain</b> the need for sustainable development and water conservation. (Understand)	3					3	3		1					
BCE40 7.6	<b>Express</b> the need for population control and the impact of population growth in economy. (Understand)	3			1		3	3							

<b>BCE407</b>	3			1		3	3		1	2				
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Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN4 L1.1</b>	<b>Demonstrate</b> structural mechanics principles/phe nomenon using simple experiments. <b>(Manipulation)</b>	3								3	3			3	
<b>BAN4 L1.2</b>	<b>Observe</b> deformation of structural members or/and failure of materials under given loads. <b>(Imitation)</b>	3								3	3			3	
<b>BAN4 L1.3</b>	<b>Perform</b> comparative study between the obtained experimental results and theoretical values. <b>(Precision)</b>	3								3	3			3	
<b>BAN4L1</b>		3								3	3			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BME4 L1.1</b>	<b>Carry out</b> different machining operations on center lathe <b>(Imitation)</b>	3								3			3		
<b>BME4 L1.2</b>	<b>Perform</b> drilling, reaming and boring processes. <b>(Precision)</b>	3								3	2		3		

<b>BME4 L1.3</b>	<b>Observe</b> the working of Planner shaper miller and grinder. <b>(Imitation)</b>														
		3								3			3		
<b>BME4L1</b>		3								3	2		3		

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN4 L2.1</b>	<b>Master</b> the geometrical profile and modification tools. <b>(Precision)</b>	3				3					3			3	
<b>BAN4 L2.2</b>	<b>Create</b> 3-Dimensional models from 2-Dimensional geometries. <b>(Naturalization)</b>	3				3				3	3		2	3	
<b>BAN4 L2.3</b>	<b>Design</b> basic Aerospace components using CADD. <b>(Articulation)</b>	3	2	2		3				3	3			3	
<b>BAN4L2</b>		3	2	2		3				3	3		2	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN50 1.1</b>	<b>Compute</b> the bending stress distribution in beams of symmetric and unsymmetrical sections. <b>(Apply)</b>	3									3			3	
<b>BAN50 1.2</b>	<b>Calculate</b> the shear flow distribution in symmetrical and unsymmetrical thin-walled open section	3									3			3	

	and its shear center. <b>(Apply)</b>														
<b>BAN50 1.3</b>	<b>Calculate</b> the shear flow distribution in thin walled single and multi-cell structures subjected to combined loading. <b>(Apply)</b>	3									3			3	
<b>BAN50 1.4</b>	<b>Compute</b> the crippling strength of thin plates and effective width of sheet stiffener panels. <b>(Apply)</b>	3												3	
<b>BAN50 1.5</b>	<b>Analyze</b> the stress developed in aircraft wings and fuselage. <b>(Analyze)</b>	3												3	
<b>BAN501</b>		3									3			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN50 2.1</b>	<b>Apply</b> the concepts of isentropic flow for problems related to variable area ducts. <b>(Apply)</b>	3											3	3	
<b>BAN50 2.2</b>	<b>Calculate</b> the properties of flow through shock and expansion waves. <b>(Apply)</b>	3											3	3	

<b>BAN50 2.3</b>	<b>Determine</b> the aerodynamic coefficients of compressible flows based on linearized flow theory. <b>(Apply)</b>	3		1									3	3	
<b>BAN50 2.4</b>	<b>Categorize</b> various aircrafts intended for subsonic and supersonic regimes based on wing and fuselage design. <b>(Analyze)</b>	3				2					1		3	3	
<b>BAN50 2.5</b>	<b>Describe</b> flow measurement and visualization techniques for high-speed flows. <b>(Understand)</b>	3				2							3	3	
<b>BAN502</b>		3		1		2					1		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN50 3.1</b>	<b>Explain</b> the working principle, modes of operation and performance parameters of Ramjet engine. <b>(Understand)</b>	3												3	
<b>BAN50 3.2</b>	<b>Discuss</b> supersonic combustion and the challenges involved in scramjet	3												3	

	design. <b>(Understand)</b>														
<b>BAN50 3.3</b>	<b>Explain</b> the operating principle of solid propellant rockets and selection of propellant grain. <b>(Understand)</b>	3									2			3	
<b>BAN50 3.4</b>	<b>Describe</b> various feed systems, cooling methods in liquid propellant rockets. <b>(Understand)</b>	3									2			3	
<b>BAN50 3.5</b>	<b>Explain</b> the working principle and the practical limitations of hybrid rockets. <b>(Understand)</b>	3												3	
<b>BAN503</b>		3									2			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN50 4.1</b>	<b>Calculate</b> thrust and power required for propeller driven and jet powered aircraft at steady level flight. <b>(Apply)</b>	3												3	
<b>BAN50 4.2</b>	<b>Evaluate</b> the Range, Endurance, glide and climb	3												3	

	performances. <b>(Evaluate)</b>														
<b>BAN50 4.3</b>	<b>Estimate</b> the take-off, landing, turning performance using V-n diagram. <b>(Evaluate)</b>	3													3
<b>BAN50 4.4</b>	<b>Describe</b> the characteristics of longitudinal stability. <b>(Understand)</b>	3									3			3	
<b>BAN50 4.5</b>	<b>Evaluate</b> the lateral and directional stability characteristics. <b>(Evaluate)</b>	3									3			3	
<b>BAN504</b>		3									3			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BME5 05.1</b>	<b>Describe</b> various metal forming process and different types of welding. <b>(Understand)</b>	3													
<b>BME5 05.2</b>	<b>Estimate</b> the tool life, machining time and the forces involved in metal cutting process. <b>(Apply)</b>	3										1			
<b>BME5 05.3</b>	<b>Describe</b> types of lathe and their construction. <b>(Understand)</b>	3													

<b>BME5 05.4</b>	<b>Explain</b> the process of shaping, planing and milling operations. (Understand)	3									2				
<b>BME5 05.5</b>	<b>Discuss</b> the process involved in drilling, boring, broaching, surface finishing. (Understand)	3													
<b>BME5 05.6</b>	<b>Describe</b> the working principle of various Non-traditional machining techniques. (Understand)	3									2		1		
<b>BME505</b>		3									2	1	1		

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN5 V1.1</b>	<b>Demonstrate</b> team work and leadership quality (Apply)						3		3	3					
<b>BAN5 V1.2</b>	<b>Demonstrate</b> communication and interpersonal skills (Apply)						3		3	3					
<b>BAN5 V1.3</b>	<b>Express</b> the need for Social responsibilities (Understand)						3	2	3	3					
<b>BAN5V1</b>							3	2	3	3					

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN5 L1.1</b>	<b>Carry out</b> flow analysis	3								3	3			3	

	over various aerodynamic models. ( <b>Imitation</b> )														
<b>BAN5 L1.2</b>	<b>Demonstrate</b> the usage of mechanical and electronic instruments in data acquisition. ( <b>Manipulation</b> )	3								3	3			3	
<b>BAN5 L1.3</b>	<b>Conduct</b> experiments at various orientation of models to characterize the flow. ( <b>Articulation</b> )	3								3	3		2	3	
<b>BAN5L1</b>		3								3	3		2	3	

Course	Statement	PO 1	P O2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN5 L2.1</b>	<b>Design</b> and fabricate the Aircraft Structural components with appropriate materials. ( <b>Naturalization</b> )	3		3						3	3			3	
<b>BAN5 L2.2</b>	<b>Conduct</b> flight testing of powered glider and RC plane. ( <b>Precision</b> )	3		3						3	3			3	
<b>BAN5 L2.3</b>	<b>Observe</b> Performance characteristics of Glider and RC plane. ( <b>Imitation</b> )	3						2		3	3		2	3	
<b>BAN5L2</b>		3		3				2		3	3		2	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN5 L3.1</b>	<b>Design</b> the structural components under static and dynamic loading. <b>(Precision)</b>	3				3				3	3		3	3	
<b>BAN5 L3.2</b>	<b>Observe</b> temperature distribution for structure under thermal loading. <b>(Imitation)</b>	3				3				3	3		3	3	
<b>BAN5 L3.3</b>	<b>Carry out</b> the flow analysis over aerodynamic shapes. <b>(Imitation)</b>	3	2			3				3	3		3	3	
<b>BAN5L3</b>		3	2			3				3	3		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BSS60 1.1</b>	<b>Describe</b> the meaning and philosophy of life and the qualities an individual must possess. <b>(Understand)</b>								3						
<b>BSS60 1.2</b>	<b>Explain</b> the individual responsibility towards family and society. <b>(Understand)</b>								3	3		1	2		
<b>BSS60 1.3</b>	<b>Discuss</b> the methods to maintain proper physical and mental health. <b>(Understand)</b>								3				2		

<b>BSS60 1.4</b>	<b>Summarize</b> the importance of safety during social experimentation. (Understand)														
<b>BSS60 1.5</b>	<b>Express</b> the rights and responsibilities of engineer on global issues. (Understand)														
<b>BSS601</b>								2	3	3	1	1	2		

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN60 1.1</b>	<b>Discuss</b> various materials used in aerospace applications. (Understand)	3												3	
<b>BAN60 1.2</b>	<b>Compute</b> the properties of isotropic, anisotropic and orthotropic materials. (Apply)	3											2	3	
<b>BAN60 1.3</b>	<b>Calculate</b> the properties of laminated composites along natural and arbitrary axis. (Apply)	3									2		2	3	
<b>BAN60 1.4</b>	<b>Determine</b> the stiffness matrix, stress and strain of laminated composite plate with different orientations. (Apply)	3												3	



	axi-symmetric structures. <b>(Apply)</b>														
<b>BAN60 2.5</b>	<b>Analyze</b> the static and dynamic behavior of structures. <b>(Analyze)</b>	3				1								3	
<b>BAN602</b>		3				1					2		2	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN60 3.1</b>	<b>Analyze</b> mathematical model for mechanical and Electrical systems. <b>(Analyze)</b>	3												3	
<b>BAN60 3.2</b>	<b>Analyze</b> time response of the system with various test inputs and steady state errors. <b>(Analyze)</b>	3									2			3	
<b>BAN60 3.3</b>	<b>Analyze</b> the frequency response of the system and Correlate frequency - time domain specifications. <b>(Analyze)</b>	3												3	
<b>BAN60 3.4</b>	<b>Predict</b> the stability of the system using Root Locus and Routh Hurwitz stability criterion. <b>(Evaluate)</b>	3									2			3	

<b>BAN60 3.5</b>	<b>Discuss</b> the basic components of Digital Control System. <b>(Understand)</b>														
		3												3	
<b>BAN603</b>		3									2			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN6 V1.1</b>	<b>Acquire</b> written communication & its importance in current scenario. <b>(Understand)</b>								3	3	3				
<b>BAN6 V1.2</b>	<b>Develop</b> Individual or in-group class presentations skills pertaining to the applications of concepts, theories or issues in human development. <b>(Apply)</b>								3	3	3				
<b>BAN6 V1.3</b>	<b>Develop</b> analytical problem-solving skills. <b>(Apply)</b>														
<b>BAN6V1</b>									3	3	3				

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN6 L1.1</b>	<b>Observe</b> Aircraft ground operations. <b>(Imitation)</b>	3								3	3				3

<b>BAN6 L1.2</b>	<b>Conduct</b> Checks to ensure the airworthiness of aircraft. ( <b>Precision</b> )	3								3	3				3
<b>BAN6 L1.3</b>	<b>Refine</b> the performance of aircraft systems. ( <b>Articulation</b> )	3								3	3				3
BAN6L1		3								3	3				3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN6 L2.1</b>	<b>Demonstrate</b> the various procedures and techniques for the experiments. ( <b>Manipulation</b> )	3								3	3		3	3	
<b>BAN6 L2.2</b>	<b>Observe</b> the data using the different measuring devices and techniques. ( <b>Imitation</b> )	3								3	3		3	3	
<b>BAN6 L2.3</b>	<b>Follow</b> the mathematical concepts/equations to obtain quantitative results. ( <b>Imitation</b> )	3								3	3			3	
BAN6L2		3								3	3		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN6 L3.1</b>	<b>Acquire</b> the design parameters of various aircrafts necessary for the suitable	3								3	3		3	3	

	preliminary design. (Manipulation)														
<b>BAN6 L3.2</b>	<b>Acquire</b> aerodynamic and geometric parameters for detailed aircraft design. (Manipulation)	3								3	3		3	3	
<b>BAN6 L3.3</b>	<b>Integrate</b> performance and stability parameters for different phases of flight. (Precision)	3								3	3		3	3	
	BAN6L3	3								3	3		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN70 1.1</b>	<b>Solve</b> the well posed and ill posed problems. (Apply)	3									3			3	
<b>BAN70 1.2</b>	<b>Apply</b> appropriate Finite Difference schemes for solving PDE. (Apply)	3											3	3	
<b>BAN70 1.3</b>	<b>Analyze</b> various explicit and implicit methods for a converging solution. (Analyze)	3												3	
<b>BAN70 1.4</b>	<b>Solve</b> the steady state diffusion and convection	3									3		3	3	

	problems using finite volume method. (Apply)														
<b>BAN70 1.5</b>	<b>Identify</b> suitable turbulence model for fluid flow problems. (Understand)	3											3	3	
BAN701		3									3		3	3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN70 2.1</b>	<b>Describe</b> the needs for avionics in different fields of aviation. (Understand)	3													3
<b>BAN70 2.2</b>	<b>Explain</b> the architecture of microprocessor and combinational logic circuits. (Understand)	3									2				3
<b>BAN70 2.3</b>	<b>Discuss</b> Avionics system architecture and various data-buses. (Understand)	3													3
<b>BAN70 2.4</b>	<b>Compare</b> various display technologies used in civil and military cockpits. (Understand)	3													3
<b>BAN70 2.5</b>	<b>Discuss</b> the working principles of various avionic sub-	3									2				3

systems. <b>(Understand)</b>															
BAN702	3										2				3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BAN70 3.1	<b>Solve</b> one dimensional steady state heat conduction problems. <b>(Apply)</b>	3									2			3	
BAN70 3.2	<b>Estimate</b> heat transfer rate of semi-infinite and infinite solids. <b>(Evaluate)</b>	3												3	
BAN70 3.3	<b>Estimate</b> heat transfer coefficient for flow over a flat plate and circular pipe. <b>(Evaluate)</b>	3									2			3	
BAN70 3.4	<b>Calculate</b> radiative heat transfer of black and gray surfaces. <b>(Apply)</b>	3												3	
BAN70 3.5	<b>Compare</b> different types of heat exchangers and their performance. <b>(Analyze)</b>	3												3	
BAN70 3.6	<b>Solve</b> heat transfer problems related to aerospace applications. <b>(Apply)</b>	3				1								3	
BAN703		3				1					2			3	

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BAN7 L1.1	<b>Demonstrate</b> the various procedures and techniques for the Airframe repair ( <b>Manipulation</b> )	3						3		3	3				3
BAN7 L1.2	<b>Demonstrate</b> the procedures and techniques followed in Aero Engine inspection ( <b>Manipulation</b> )	3						3		3	3				3
BAN7 L1.3	<b>Perform</b> engine dismantling and Assembling ( <b>Precision</b> )	3						3		3	3				3
BAN7L1		3						3		3	3				3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BAN7 L2.1	<b>Demonstrate</b> combinational, sequential and wave shaping circuits in digital electronics. ( <b>Manipulation</b> )	3								3	3				3
BAN7 L2.2	<b>Perform</b> arithmetic, logical operation and storing the data in microprocessor. ( <b>Precision</b> )	3								3	3				3
BAN7 L2.3	<b>Design</b> avionics control system using MATLAB. ( <b>Articulation</b> )	3	2			2				3	3		2		3
BAN7L2		3	2			2				3	3		2		3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
BAN7 L3.1	<b>Observe</b> safety flying	3	3	3						3	3		3	3	

	critical flying load limits. <b>(Imitation)</b>														
<b>BAN7 L3.2</b>	<b>Design</b> of fuselage and wing structural members. <b>(Articulation)</b>	3	3	3		3					3	3		3	3
<b>BAN7 L3.3</b>	<b>Integrate</b> all the design parameters to assemble an aircraft. <b>(Articulation)</b>	3	3	3		3					3	3		3	3
	<b>BAN7L3</b>	3	3	3		3					3	3		3	3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	
<b>BAN7 P1.1</b>	<b>Observe</b> the current market scenario to develop new or modify the existing product. <b>(Imitation)</b>	3	3							3	3	3	3		3	3
<b>BAN7 P1.2</b>	<b>Complete</b> the conceptional design of the project. <b>(Manipulation)</b>	3	3	3	3	3	3			3	3	3	3	3	3	3
<b>BAN7 P1.3</b>	<b>Point out</b> the methodology for implementation of design. <b>(Manipulation)</b>	3	3	3	3	3	3			3	3	3	3	3	3	3
	<b>BAN7P1</b>	3	3	3	3	3	3			3	3	3	3	3	3	3

Course	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
<b>BAN8 P1.1</b>	<b>Express</b> the method of achieving perfection in project	3	3							3	3	3	3	3	3

	implementation & completion. (Imitation)															
<b>BAN8 P1.2</b>	<b>Build</b> the skills, competencies and point of view of designed concepts. (Naturalization)	3	3	3	3	3	3			3	3	3	3	3	3	3
<b>BAN8 P1.3</b>	<b>Replicate</b> professional skills in Presentation, Technical report writing, critical thinking and decision making. (Manipulation)	3	3	3	3	3	3			3	3	3	3	3	3	3
	<b>BAN8P1</b>	3	3	3	3	3	3			3	3	3	3	3	3	3
Course	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
<b>BAN8 C1.1</b>	<b>Recollect</b> the core engineering concepts. (Remember)	3														
<b>BAN8 C1.2</b>	<b>Acquire</b> Presentation Skills to face job interviews. (Apply)	3								3						
<b>BAN8 C1.3</b>	<b>Write</b> competitive examinations for successful career. (Apply)	3								3	2					
	<b>BAN8C1</b>	3								3	2					

**3.1.D Explanation of Program Articulation Matrix tables to be ascertained**

Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation of COs with POs and PSOs is indicated as “3” for high correlation, “2” for medium correlation and “1” for low correlation. If the course outcomes are attained, the POs correlated to these course outcomes are also attained.

**The Program Articulation Matrix for B. Tech- Aeronautical Engineering 2015 Regulation is given below:**

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
BMA301	3	3	3	1	3							3		
BAN301	3				1					2		3	3	
BAN302	3									3		1	3	
BAN303	3									2		2	3	
BAN304	3				2					3		2	3	
BAN305	3				3					3			3	
BCE3L1	3								3	3			3	
BCE3L2	3								3	3			3	
BME3L1	3	3							3	3			3	
BMA402	3	3	3		3							3		
BAN401	3									2		2	3	
BAN402	3				1					2		3	3	
BAN403	3									2		3	3	
BAN404	3									3			3	3
BCE407	3			1		3	3		1	2				
BAN4L1	3								3	3			3	
BME4L1	3								3	2		3		
BAN4L2	3	2	2		3				3	3		2	3	
BAN501	3									3			3	

BAN502	3		1		2					1		3	3	
BAN503	3									2			3	
BAN504	3									3			3	
BME505	3									2	1	1		
BAN5V1						3	2	3	3					
BAN5L1	3								3	3		2	3	
BAN5L2	3		3				2		3	3		2	3	
BAN5L3	3	2			3				3	3		3	3	
BSS601							2	3	3	1	1	2		
BAN601	3									2		2	3	
BAN602	3				1					2		2	3	
BAN603	3									2			3	
BAN6V1								3	3	3				
BAN6L1	3								3	3				3
BAN6L2	3								3	3		3	3	
BAN6L3	3								3	3		3	3	
BAN701	3									3		3	3	
BAN702	3									2				3
BAN703	3				1					2			3	
BAN7L1	3						3		3	3				3
BAN7L2	3	2			2				3	3		2		3
BAN7L3	3	3	3		3				3	3		3	3	
BAN7P1	3	3	3	3	3	3		3	3	3	3	3	3	3
BAN8P1	3	3	3	3	3	3		3	3	3	3	3	3	3
BAN8C1	3								3	2				

### 3.2. Attainment of Course Outcomes

#### 3.2.1.A Assessment Methods- COs

Type of Assessment	Assessment tool	Process
Direct Assessment tools	Internal Tests	Besides the University examinations, internal tests and Model examination are conducted to achieve the identified COs. Internal tests are planned and conducted at regular intervals. Three tests (Two Internal Tests and one Model Exam) are scheduled per course in a semester. Questions in the question paper are mapped to COs.
	Assignments	Assignment works submitted by students are assessed towards attainment of COs based on rubrics.
	Semester End Examinations	At end of each semester, semester end examination is conducted for all courses. The questions for this examination cover entire syllabus of the courses are mapped with the COs.
	Projects	It provides an opportunity to students to demonstrate independence and originality, to plan and organize a project over a given period, and to put into practice, the techniques that have been taught. COs are framed for Projects and attained through periodic reviews and respective rubrics; it is ensured that stated COs are achieved.
	Laboratory courses	Performance of evaluation of students for laboratory courses is based on an explicit set of rubrics.
Indirect assessment tools	Student feedback on Course	On completion of every semester, a feedback is obtained from the students for all courses which they have learnt.

#### 3.2.1.B The quality /relevance of assessment processes & tools used

Assessment of course outcome is done periodically using assessment tools. The following sample is an example of how assessment is done.



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### DEPARTMENT OF AERONAUTICAL ENGINEERING

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173, Agaram Road, Selaiyur, Tambaram,  
Chennai - 600 073, Tamil Nadu.



**Internal Assessment Exam – I / II**

Name - <i>Bandaru Kota Nagendra Suresh</i>	Register Number - <i>UISAE 006</i>
Program - B. Tech Aeronautical /Aerospace	Year/ Sem/Section - <i>III/V</i>
Course Code/Name- <i>BAN504 FM</i>	Date of Exam - <i>29/8/17</i>

*Suresh*  
Signature of Student

*M. Suresh*  
Signature of Investigator

	Q.No	Marks							Q.No	Marks						
		CO 1	CO 2	CO 3	CO 4	CO 5	CO 6			CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	
Part - A	1	<i>01</i>						Part - B	7	a	<i>06</i>					
	2	<i>02</i>							b							
	3	<i>02</i>							8	a						
	4		<i>02</i>						b	<i>05</i>						
	5		<i>02</i>						9	a		<i>03</i>				
	6		<i>02</i>						b							
Part - C	Q.No		Marks						Grand Total		<i>42</i>					
			CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	Grand Total (In Words)							
	10	a							<i>FOUR TWO</i>							
		b	<i>07</i>													
11	a		<i>10</i>													
	b															

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	Total
Maximum Marks Allotted	<i>28</i>	<i>22</i>					<i>50</i>
Marks Obtained	<i>28</i>	<i>19</i>					<i>42</i>

Date	Name of Examiner	Signature of Examiner
<i>31.08.17</i>	<i>MR. S.R. VIMBURAJ</i>	<i>S.R. Vimal R.</i>

Comments

*Fair Valuation*

*[Signature]*  
Signature of scrutiny officer



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Chennai - 600 073, Tamil Nadu

### Assignment - 2

Name - SRI SRI BORRA	Register Number - U17AE130
Program - B. Tech Aeronautical / Aerospace	Year/ Sem/Section - III / 5 <sup>th</sup>
Course Code/Name - BANS04 / FLIGHT MECHANICS	Date of Submission - 21-10-2019

	CO	Maximum marks	Marks obtained
Assignment 2	CO5	5	5

Assessment Pattern				Marks obtained
Quality of reply	Response relevant to posting with factual Information (3 Marks)	Response relevant to posting but fails to give factual Information (2 Marks)	Response not relevant to posting (0 Marks)	3 / 3
Understanding of Reading and outside source material	Responds to question posted and demonstrates understanding of material and outside source material and properly cites information. (1 Marks)	Responds to the question posted but does not mention materials from the outsource material (0 Marks)		1 / 1
Timeliness	Turned in on time (1 Marks)	Turned in late (0 Marks)		1 / 1
Total Marks Allotted				5 / 5
Comments				
 Signature of Faculty				



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Chennai - 600 073. Tamil Nadu.

#### Model Exam

Name - <u>DEVALA VINODKUMAR</u>	Register Number - <u>UISAE 012</u>
Program - <u>B. Tech Aeronautical / Aerospace</u>	Year/ Sem/Section - <u>III/V</u>
Course Code/Name- <u>BAN504 - FM</u>	Date of Exam - <u>06/11/17</u>

[Signature]  
Signature of Student

[Signature]  
Signature of Invigilator

Part - A	Q.No	Marks						Part - B	Q.No	Marks									
		CO 1	CO 2	CO 3	CO 4	CO 5	CO 6			CO 1	CO 2	CO 3	CO 4	CO 5	CO 6				
	1	01																	
	2	02							11	a									
	3		02						b	05									
	4		00						12	a		04							
	5			02					b										
	6			00					13	a			05						
	7				01				b										
	8				02				14	a					06				
	9					01			b										
	10					01			15	a									
									b							02			
Part - C	Q.No	Marks						Grand Total											
		CO 1	CO 2	CO 3	CO 4	CO 5	CO 6												
	16	a	09					83											
		b																	
	17	a		10				Grand Total (In Words)											
		b																	
	18	a			10			EIGHT THREE.											
		b																	
19	a				10														
	b																		
20	a					10													
	b																		

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	Total
Maximum Marks Allotted	20	20	20	20	20		100
Marks Obtained	17	16	17	19	14		83
Date	Name of Examiner			Signature of Examiner			
09.11.2017	Mr. S.R. VIMALRAJ			S.R. Vimalraj			
Comments							
 Signature of scrutiny officer							

**3.2.2 Attainment of Course Outcomes of all courses with respect to set attainment levels– (2015-19 Batch)**

Course Code	Course Outcomes																	
	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status
BMA301/Mathematics – III	60	60	Attained	65	63	Not Attained	60	62	Attained	65	65	Attained	65	66	Attained	70	68	Not Attained
BAN301-Fundamentals of Aeronautics and Astronautics	65	66	Attained	65	65	Attained	60	60	Attained	65	67	Attained	65	64	Not Attained			
BAN302 Fundamentals of Fluid Mechanics	65	64	Not Attained	65	67	Attained	60	62	Attained	60	60	Attained	65	63	Not Attained			
BAN303 Fundamentals of Aero - Thermodynamics																		

	65	62	Not Attained	65	67	Attained	60	63	Attained	65	69	Attained	60	65	Attained			
BAN304 Fundamentals of Structural Mechanics	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	65	64	Not Attained	65	63	Not Attained	65	67	Attained	65	65	Attained	60	61	Attained			
BAN305 Mechanics of Machines	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	65	63	Not Attained	65	66	Attained	60	61	Attained	65	64	Not Attained	65	65	Attained			
BCE3L1Fluid Mechanics and Machineries Laboratory	CO1			CO2			CO3											
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status									
	70	71	Attained	65	70	Attained	70	72	Attained									

BCE3L2 Strength of Materials Laboratory	CO1			CO2			CO3											
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status									

	70	73	Attained	70	72	Attained	70	75	Attained									
BME3L1 Machine Drawing	CO1			CO2			CO3											
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status									
	65	71	Attained	65	70	Attained	70	74	Attained									
BMA402 Numerical Methods	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status
	60	64	Attained	65	62	Not Attained	60	66	Attained	65	65	Attained	65	63	Not Attained	70	66	Not Attained
BAN401 Aircraft Structures – I	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status			
	60	62	Attained	65	64	Not Attained	60	61	Attained	60	61	Attained	65	66	Attained			
BAN402 Aerodynamics – I	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status			
	60	63	Attained	60	62	Attained	65	64	Not Attained	65	67	Attained	65	65	Attained			

	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status
	BAN403 Aircraft Propulsion	65	64	Not Attained	60	61	Attained	60	62	Attained	65	65	Attained	65	66	Attained	70	67
	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status
	BAN404 Aircraft Systems and Instrumentation	65	66	Attained	65	64	Not Attained	65	63	Not Attained	65	66	Attained	60	61	Attained	65	65
	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status
	BCE407 Environmental Studies	65	66	Attained	65	65	Attained	60	63	Attained	65	66	Attained	70	68	Not Attained	65	66

	CO1			CO2			CO3								
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status						
	BAN4L1 Aircraft Structures Laboratory	65	65	Attained	65	69	Attained	70	71	Attained					

BME4L1 Manufacturing Engineering Laboratory	CO1			CO2			CO3											
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status									
	65	71	Attained	65	69	Attained	65	66	Attained									
BAN4L2 Computer Aided Design and Drafting	CO1			CO2			CO3											
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status									
	65	65	Attained	65	67	Attained	70	75	Attained									
BAN501 Aircraft Structures – II	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status			
	60	62	Attained	65	65	Attained	65	64	Not Attained	65	66	Attained	60	61	Attained			
BAN502 Aerodynamics – II	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status			
	65	65	Attained	65	67	Attained	60	60	Attained	70	68	Not Attained	60	62	Attained			
	CO1			CO2			CO3			CO4			CO5					

BAN503 Advanced Aerospace Propulsion	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status			
	60	64	Atta ined	60	62	Atta ined	65	67	Attain ed	65	65	Attain ed	65	66	Attain ed			
BAN504 Flight mechanics	CO1			CO2			CO3			CO4			CO5					
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status			
	60	61	Atta ined	60	63	Atta ined	65	62	Not Attain ed	65	64	Not Attain ed	65	66	Attain ed			
BME505 Manufacturing Engineering	CO1			CO2			CO3			CO4			CO5			CO6		
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status									
	60	62	Atta ined	65	65	Atta ined	60	60	Attain ed	65	66	Attain ed	65	61	Not Attain ed	70	67	Not Attain ed

BANE01 Basics of Aircraft Maintenance and Repair	CO1			CO2			CO3			CO4			CO5					
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status			
	60	64	Atta ined	65	68	Atta ined	70	63	Not Attain ed	65	67	Attain ed	70	71	Attain ed			
BANE03 Experimental Stress Analysis	CO1			CO2			CO3			CO4			CO5					
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status			

	60	63	Attained	65	66	Attained	65	64	Not Attained	65	62	Not Attained	65	66	Attained			
BAN5V1 Value Added Program I	CO1			CO2			CO3											
	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status									
	70	78	Attained	70	79	Attained	70	79	Attained									
BAN5L1 Aerodynamics Laboratory	CO1			CO2			CO3											
	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status									
	70	70	Attained	70	72	Attained	70	73	Attained									
BAN5L2 Aero Design and Modeling Laboratory	CO1			CO2			CO3											
	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status									
	65	70	Attained	70	71	Attained	70	72	Attained									
BAN5L3 Computer Aided Analysis	CO1			CO2			CO3											
	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status									
	65	70	Attained	65	66	Attained	65	69	Attained									
BSS601 Value Education and professional Ethics	CO1			CO2			CO3			CO4			CO5					
	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status			
	65	65	Attained	60	60	Attained	60	61	Attained	70	64	Not Attained	65	66	Attained			

BAN601 Aerospace Structural Materials and Composites	CO1			CO2			CO3			CO4			CO5			CO6		
	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us
	65	66	Attained	60	61	Attained	65	65	Attained	65	66	Attained	65	62	Not Attained	65	65	Attained

BAN602 Finite Element Methods	CO1			CO2			CO3			CO4			CO5					
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status			
	60	61	Attained	65	67	Attained	65	63	Not Attained	65	65	Attained	65	64	Not Attained			
BAN603 Control Engineering	CO1			CO2			CO3			CO4			CO5					
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status			
	70	65	Not Attained	65	70	Attained	70	60	Not Attained	65	69	Attained	65	68	Attained			
BANE06 Space Mechanics	CO1			CO2			CO3			CO4			CO5					
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status			
	65	67	Attained	65	65	Attained	65	64	Not Attained	60	63	Attained	65	67	Attained			
BANE07 Theory of Vibrations	CO1			CO2			CO3			CO4			CO5			CO6		
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us

	65	66	Attained	65	67	Attained	65	63	Not Attained	60	62	Attained	60	61	Attained	65	65	Attained
BANE13 An Introduction to Combustion	CO1			CO2			CO3			CO4			CO5					
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status			
	60	63	Attained	65	67	Attained	60	60	Attained	65	66	Attained	65	63	Not Attained			
BANE14 Principles of Turbo machinery in Air breathing Engines	CO1			CO2			CO3			CO4			CO5			CO6		
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us
	60	62	Attained	60	65	Attained	65	64	Not Attained	60	66	Attained	60	63	Attained	60	61	Attained
BAN6V1 Value Added Program – II	CO1			CO2			CO3											
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status									
	70	73	Attained	70	72	Attained	70	73	Attained									
BAN6L1 Aircraft System Laboratory	CO1			CO2			CO3											
	Targ et%	Attai ned%	Status	Targ et%	Attai ned%	Stat us	Targ et%	Attai ned%	Status									
	65	70	Attained	65	67	Attained	70	74	Attained									

BAN6L2 Propulsion Laboratory	CO1			CO2			CO3											
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status									
	65	66	Attained	65	68	Attained	65	69	Attained									
BAN6L3 Aircraft Design Project – I	CO1			CO2			CO3											
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status									
	70	77	Attained	70	78	Attained	75	83	Attained									
BAN701 Computational Fluid Dynamics	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	60	65	Attained	65	62	Not Attained	65	67	Attained	60	63	Attained	60	61	Attained			
BAN702 Avionics	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	60	60	Attained	70	66	Not Attained	60	63	Attained	70	64	Not Attained	60	62	Attained			
	CO1			CO2			CO3			CO4			CO5			CO6		

BAN703 Heat Transfer	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status
	60	61	Attained	65	66	Attained	65	67	Attained	60	60	Attained	65	65	Attained	70	63	Not Attained
BANE09 Aircraft Engine Repair and Maintenance	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	65	63	Not Attained	60	61	Attained	65	66	Attained	65	67	Attained	65	65	Attained			
BANE12 Hypersonic Aerodynamics	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	70	67	Not Attained	65	66	Attained	65	63	Not Attained	60	61	Attained	60	62	Attained			
BANE17 Boundary Layer Theory	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status	Target %	Attained %	Status			
	60	61	Attained	60	62	Attained	65	65	Attained	60	60	Attained	65	63	Not Attained			

	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status
BANE19 High Temperature Materials	60	63	Attained	65	63	Not Attained	60	62	Attained	65	64	Not Attained	65	66	Attained	65	67	Attained
BBA001 Principles of Management and Organizational Behavior	CO1			CO2			CO3			CO4			CO5			CO6		
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status
	60	60	Attained	65	67	Attained	60	63	Attained	65	66	Attained	65	66	Attained	70	66	Not Attained
BANE23 Airport Management	CO1			CO2			CO3			CO4			CO5					
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status			
	60	60	Attained	60	62	Attained	65	65	Attained	65	62	Not Attained	65	66	Attained			
BAN7L1 Airframe and Aero Engine Repair Lab	CO1			CO2			CO3											
	Target %	Attained%	Status	Target %	Attained%	Status	Target %	Attained%	Status									
	65	66	Attained	65	71	Attained	65	68	Attained									
	CO1			CO2			CO3											

BAN7L2 Avionics Laboratory	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status									
	65	69	Atta ined	65	65	Attain ed	65	68	Attain ed									
BAN7L3 Aircraft Design Project – II	CO1			CO2			CO3											
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status									
	70	71	Atta ined	75	82	Attain ed	70	77	Attain ed									
BAN7P1 Project Phase - I	CO1			CO2			CO3											
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status									
	70	75	Atta ined	70	71	Attain ed	70	73	Attain ed									
BANE21 Satellite Technology	CO1			CO2			CO3			CO4			CO5					
	Tar get %	Attai ned%	Stat us	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status	Tar get %	Attai ned%	Status			
	60	60	Atta ined	65	67	Attain ed	65	62	Not Attain ed	65	66	Attain ed	65	64	Not Attain ed			

	CO1			CO2			CO3			CO4			CO5		
	Target%	Attained%	Status	Target%	Attained%	Status									
BANE22 Aircraft Rules and Regulations CAR I and II	60	62	Attained	65	64	Not Attained	65	66	Attained	60	63	Attained	60	61	Attained
BBA008 Total Quality Management	CO1			CO2			CO3			CO4			CO5		
	Target%	Attained%	Status	Target%	Attained%	Status									
	60	62	Attained	65	66	Attained	65	64	Not Attained	60	62	Attained	65	65	Attained
BANE25 Industrial Aerodynamics	CO1			CO2			CO3			CO4			CO5		
	Target%	Attained%	Status	Target%	Attained%	Status									
	70	67	Not Attained	65	68	Attained	65	66	Attained	75	73	Not Attained	70	71	Attained
BAN8P1 Project Phase - II	CO1			CO2			CO3								
	Target%	Attained%	Status	Target%	Attained%	Status	Target%	Attained%	Status						
	70	76	Attained	70	77	Attained	75	83	Attained						
BAN8C1 Comprehension	CO1			CO2			CO3								
	Target%	Attained%	Status	Target%	Attained%	Status	Target%	Attained%	Status						
	75	78	Attained	75	77	Attained	75	75	Attained						

### 3.3. Attainment of Program Outcomes and Program Specific Outcomes.

#### 3.3.1. Describe assessment tools and processes used for measuring the attainment of each Program Outcome and Program Specific Outcomes

##### **PO ASSESSMENT TOOLS:**

Assessment tools for Program outcomes and Program Specific outcomes are categorized into two namely Direct and Indirect assessment methods.

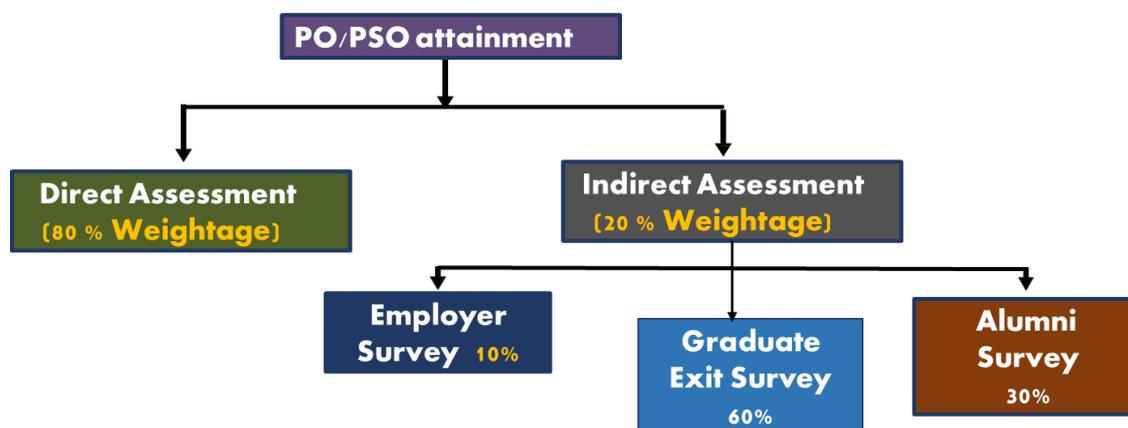
##### **Direct Assessment Tools:**

Direct assessment tools display the knowledge and skills of students based on their performance. They include tests, assignments, and examinations etc. which are based on the questions that relate to specific course outcomes in each course. As COs are mapped to the POs and PSOs, the direct assessment tools used for COs can also be used for POs and PSOs.

##### **Indirect Assessment Tools:**

Attainment of Program Outcome and Program Specific Outcome is also measured through Indirect Assessment tools.

1. Graduate Exit Survey (60%)
2. Alumni Survey (30%)
3. Employer Survey (10%)



**PO PSO Assessment Methodology**

**3.3.2. Provide results of evaluation of each PO & PSO.**

PO, PSO Attainment Matrix- (2015-2019) Batch															
Course Code	Course Name	Program Outcome Attainment													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BMA301	Mathematics – III	63.89	63.89	65.11	67.11	63.70							63.89		
BAN301	Fundamentals of Aeronautics and Astronautics	64.42				65.09					62.97		63.55	64.42	
BAN302	Fundamentals of Fluid Mechanics	63.08									61.28		61.92	63.08	
BAN303	Fundamentals of Aero - Thermodynamics	65.28									64.18		65.11	65.28	
BAN304	Fundamentals of Structural Mechanics	63.94				62.09					62.80		65.72	63.94	
BAN305	Mechanics of Machines	63.67				62.62					62.62			63.67	
BCE3L1	Fluid Mechanics and Machineries Laboratory	70.99								70.99	70.99			70.99	
BCE3L2	Strength of Materials Laboratory	72.98								72.98	72.98			72.98	
BME3L1	Machine Drawing	72.01	72.01							72.01	72.01			72.01	

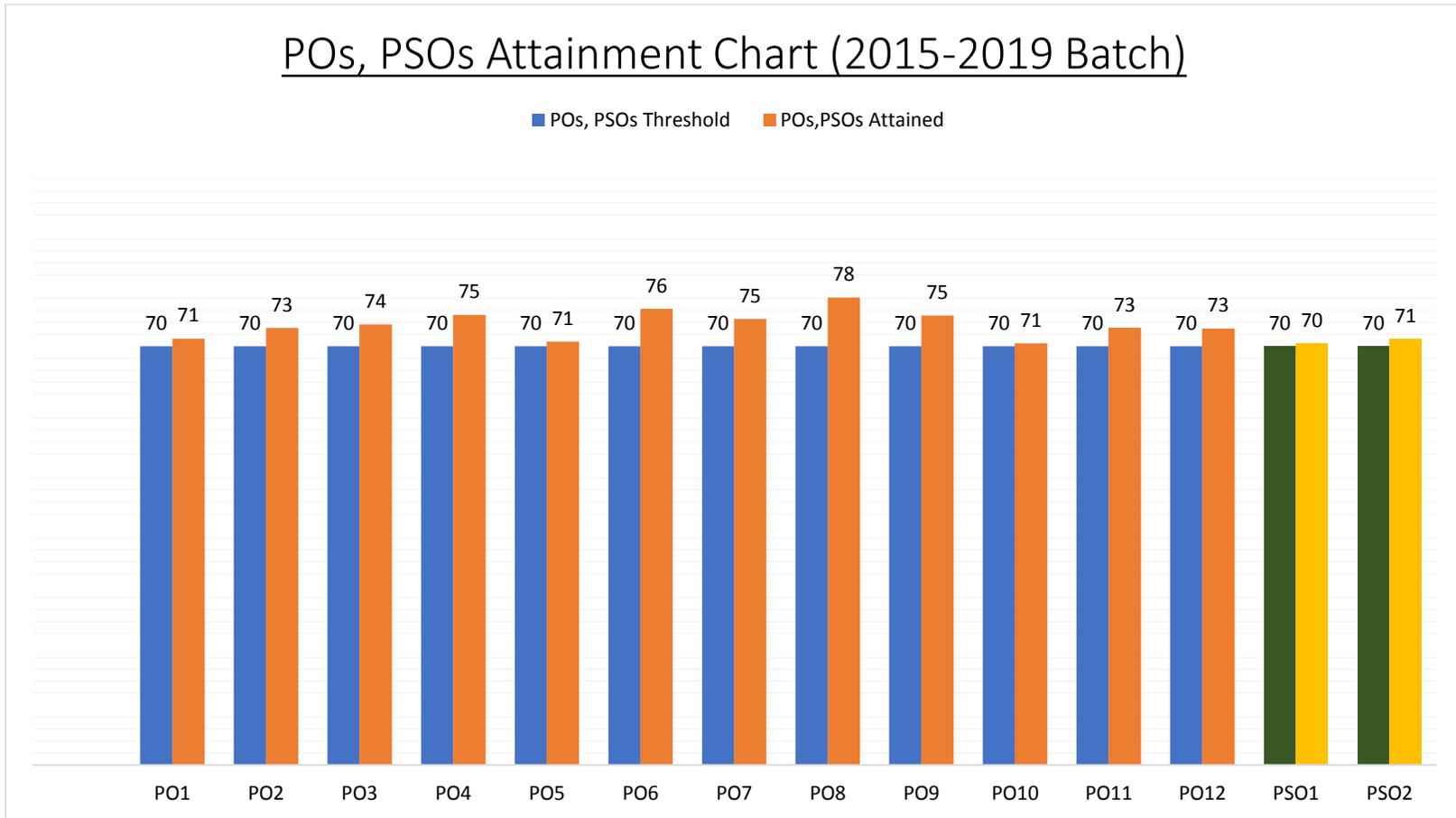
BMA402	Numerical Methods	64.31	64.31	64.31		64.04							64.31		
BAN401	Aircraft Structures – I	62.81									64.21		62.56	62.81	
BAN402	Aerodynamics – I	64.28				64.03					64.33		65.41	64.28	
BAN403	Aircraft Propulsion	64.23									65.97		64.23	64.23	
BAN404	Aircraft Systems and Instrumentation	64.43									66.40			64.43	64.43
BCE407	Environmental Studies	65.69			66.18		65.69	65.69		68.08	64.06				
BAN4L1	Aircraft Structures Laboratory	68.20								68.20	68.20			68.20	
BME4L1	Manufacturing Engineering Laboratory	68.41								68.41	69.02		68.41		
BAN4L2	Computer Aided Design and Drafting	68.97	74.95	74.95		68.97				70.88	68.97		66.81	68.97	
BAN501	Aircraft Structures – II	63.76									64.07			63.76	
BAN502	Aerodynamics – II	64.56		60.31		65.32					68.31		64.56	64.56	

BAN503	Advanced Aerospace Propulsion	64.60									65.73			64.60
BAN504	Flight mechanics	63.33									65.02			63.33
BME505	Manufacturing Engineering	63.48									66.56	64.56	67.29	
BAN5V1	Value Added Program I						78.79	78.92	78.79	78.79				
BAN5L1	Aerodynamics Laboratory	71.65								71.65	71.65		73.08	71.65
BAN5L2	Aero Design and Modelling Laboratory	71.04		70.61				71.90		71.04	71.04		71.90	71.04
BAN5L3	Computer Aided Analysis	68.31	68.51			68.31				68.31	68.31		68.31	68.31
BSS601	Value Education and professional Ethics							65.25	63.31	63.59	66.31	60.27	60.58	
BAN601	Aerospace Structural Materials and Composites	64.29									65.03		63.40	64.29
BAN602	Finite Element Methods	63.77				63.63					62.88		64.72	63.77
BAN603	Control Engineering	66.65									69.77			66.65

BAN6V1	Value Added Program – II								72.75	72.75	72.75				
BAN6L1	Aircraft System Laboratory	70.29								70.29	70.29				70.29
BAN6L2	Propulsion Laboratory	67.65								67.65	67.65		66.81	67.65	
BAN6L3	Aircraft Design Project – I	79.42								79.42	79.42		79.42	79.42	
BAN701	Computational Fluid Dynamics	63.29									63.79		61.71	63.29	
BAN702	Avionics	63.15									64.16				63.15
BAN703	Heat Transfer	63.62				63.32					63.73			63.62	
BAN7L1	Airframe and Aero Engine Repair Lab	68.68						68.68		68.68	68.68				68.68
BAN7L2	Avionics Laboratory	67.66	68.41			68.41				67.66	67.66		68.41		67.66
BAN7L3	Aircraft Design Project – II	76.68	76.68	76.68		79.37				76.68	76.68		76.68	76.68	
BAN7P1	Project Phase -I	79.35	79.35	79.61	77.75	79.61	74.41	75.61	79.35	79.35	79.35	79.35	79.35	76.41	88.14

BAN8P1	Project Phase -II	76.16	76.16	77.06	76.89	77.06	77.48	83.83	76.16	78.85	76.16	76.16	76.20	76.30	75.74
BAN8C1	Comprehension	76.44								75.76	76.61				
<b>Direct PO Attainment</b>		67.55	71.59	71.08	71.98	67.70	74.09	72.84	74.07	71.91	68.11	70.09	67.47	67.57	71.16
No of Subjects Contributing Towards PO Delivery		41	9	8	4	15	4	5	5	22	41	4	26	31	7
<b>Indirect PO Attainment</b>		86.7	80.6	86.4	91.1	84.4	84.9	92.5	97.7	89.4	80.5	89.1	95	82.3	78.8
PO Attainment		71.38	73.39	74.14	75.81	71.04	76.25	76.77	78.80	75.41	70.59	73.89	72.18	70.51	72.68
PO Attainment -Rounded		71	73	74	76	71	76	77	79	75	71	74	73	71	73
PO, PSO Threshold		70	70	70	70	70	70	70	70	70	70	70	70	70	70
PO Attained		Yes													

The POs and PSOs attainment chart for B.Tech Aeronautical – 2015 to 2019 Batch is given above. All the POs are attained through various courses.



<b>CRITERION 4</b>	<b>Students' Performance</b>	<b>100</b>
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<b>Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)</b>	<b>CAY 2019-20</b>	<b>CAYm 1 2018- 19</b>	<b>CAYm 2 2017- 18</b>
Sanctioned intake of the program (N)	180	300	180
Total number of students admitted in first year minus number of students migrated to other programs/institutions, plus no. of students migrated to this program (N1)	108	121	174
Number of students admitted in 2nd year in the same batch via lateral entry (N2)	4	3	3
Separate division students, if applicable (N3)	Nil	Nil	Nil
Total number of students admitted in the Program (N1 + N2 + N3)	112	124	177

**CAY – Current Academic Year**

**CAYm1- Current Academic Year minus1= Current Assessment Year**

**CAYm2 - Current Academic Year minus2=Current Assessment Year minus 1**

**LYG – Last Year Graduate minus 1**

**LYGm1 – Last Year Graduate minus 1**

**LYGm2 – Last Year Graduate minus 2**

<b>Year of Entry</b>	<b>N1+N2+N3 (As Defined Above)</b>	<b>Number of Students who have successfully graduated without backlogs in any semester/year of study (Without backlog means no compartment or failures in any semester/year of study)</b>			
		<b>I Year</b>	<b>II Year</b>	<b>III Year</b>	<b>IV Year</b>
CAY (2019-20)	112				
CAYm1 (2018-19)	124	73			
CAYm2 (2017-18)	177	112	115		
CAYm3 (2016-17)	56	26	29	35	
CAYm4 (LYG) (2015-16)	59	45	29	31	52
CAYm5 (LYGm1) (2014-15)	87	48	47	44	53
CAYm6 (LYGm2) (2013-14)	27	14	10	10	17

<b>Year of Entry</b>	<b>N1+N2+N3 (As Defined Above)</b>	<b>Number of Students who have successfully graduated (Students with backlog in stipulated period of study)</b>			
		<b>I Year</b>	<b>II Year</b>	<b>III Year</b>	<b>IV Year</b>
CAY (2019-20)	112				
CAYm1 (2018-19)	124	4			
CAYm2 (2017-18)	177	4	10		
CAYm3 (2016-17)	56	3	3	3	
CAYm4 (LYG)	59	5	4	1	4

(2015-16)					
CAYm5 (LYGm1) (2014-15)	87	1	7	8	29
CAYm6 (LYGm2) (2013-14)	27	2	4	2	8

#### **4.1 Enrolment Ratio.**

**Enrolment Ratio = N1/N**

L Year of Entry	Sanctioned Intake of the Program (N)	Total Number of Students admitted in first year minus number of students migrated to other programs/institutions, plus no. of students migrated to this program (N1)	Enrolment Ratio = N1/N
CAY (2019-20)	180	108	60%
CAYm1 (2018-19)	300	121	40%
CAYm2 (2017-18)	180	174	96%

Item (Students enrolled at the First Year Level on average basis during the previous three academic years starting from current academic year)	Marks
>=90% students enrolled	20
>=80% students enrolled	18
>=70% students enrolled	16
>=60% students enrolled	14
Otherwise	0

#### **4.2. Success Rate in the stipulated period of the program.**

##### **4.2.1. Success rate without backlogs in any semester/year of study**

SI= (Number of students who have graduated from the program without backlog)/ (Number of students admitted in the first year of that batch and actually admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = Mean of Success Index (SI) for past three batches

Success rate without backlogs in any semester/year of study = 15 × Average SI

Item	Last Year of Graduate, LYG	Last Year of Graduate minus 1, LYGm1	Last Year of Graduate minus 2, LYGm2
Number of students admitted in the corresponding first year + admitted in 2 <sup>nd</sup> year via lateral entry and separate division, if applicable	59	87	27

Number of students who have graduated without backlogs in the stipulated period	29	44	10
Success Index (SI)	49%	51%	37%

#### 4.2.2. Success rate with backlogs in stipulated period of study.

SI= (Number of students who graduated from the program in the stipulated period of course duration)/  
(Number of students admitted in the first year of that batch and actually admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = mean of Success Index (SI) for past three batches

Success rate = 5 × Average SI

Item	Last Year of Graduate, LYG	Last Year of Graduate minus 1 , LYGm1	Last Year of Graduate minus 2, LYGm2
Number of students admitted in the corresponding first year + admitted in 2 <sup>nd</sup> year via lateral entry and separate division, if applicable	59	87	27
Number of students who have graduated with backlogs in the stipulated period	56	82	25
Success Index (SI)	95%	94%	93%

Note: If 100% students clear without any backlog then also total marks scored will be 20 as both 4.2.1 & 4.2.2 will be applicable simultaneously.

#### 4.3. Academic Performance in Second Year.

Academic Performance = Average API (Academic Performance Index), where

**API** = ((Mean of 2nd Year Grade Point Average of all successful Students on a 10-point scale) or (Mean of the percentage of marks of all successful students in Second Year/10)) x (number of successful students/number of students appeared in the examination)

Successful students are those who are permitted to proceed to the Third year.

Academic Performance	CAYm1 2018-19	CAYm2 2017-18	CAYm3 2016-17
Mean of CGPA or Mean Percentage of all successful students (X)	7.2	8.08	8.02
Total No. of Successful Students (Y)	28	33	52
Total No. of Students appeared in the examination (Z)	56	59	87
API = X * (Y/Z)	3.6	4.52	4.79
Average API = (AP1+AP2+AP3)/3	4.303		

#### 4.4. Placement, Higher Studies and Entrepreneurship.

Assessment Points =  $30 \times$  average placement

Item	CAYm1 2018-19	CAYm2 2017-18	CAYm3 2016-17
Total No. of Final Year Students (N)	59	87	27
No. of Students placed in companies or Government Sector (X)	50	70	20
No. of Students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level Tests, GRE, GMAT etc.) (Y)	2	3	2
No. of Students turned entrepreneur in engineering/technology (Z)	1	2	1
$X + Y + Z =$	53	75	23
Placement Index: $(X + Y + Z) / N$	0.89	0.86	0.85
Average Placement = $(P1+P2+P3)/3$	0.86		
Assessment Points = $30 \times$ Average Placement	26		

4.4a. Provide the placement data in the below mentioned format with the name of the program and the assessment year:

Placement Details- B.Tech Aeronautical (2013-2017) Batch				
S.No	Name of the student placed	Enrolment No	Name of the Employer	Appointment letter Reference No with Date
1	AATIF KHAN	U13AE001	Interglobe Technologies	797380/15.03.2017
2	AISHWARYA D	U13AE002	Maintec Technologies	EMP/COL/SH/20022017/213-04.05.2017
3	AJITH KUMAR R	U13AE004	Interglobe Technologies	797381/15.03.2017
4	AMJAD RAJA	U13AE005	Interglobe Technologies	797382/15.03.2017
5	ATUL PANCHOLA	U13AE006	Interglobe Technologies	797383/15.03.2017
6	BHARATHI M	U13AE007	Maintec Technologies	EMP/COL/SH/20022017/214-04.05.2017
7	DINESH S	U13AE009	Interglobe Technologies	797384/15.03.2017
8	GAURAV KUMAR	U13AE010	Aegis Limited	Through Email/23/03/2017
9	JOSEPH KANAGARAJ R	U13AE012	Maintec Technologies	EMP/COL/SH/20022017/220-04.05.2017
10	LALATENDU DAS	U13AE013	Interglobe Technologies	797385/15.03.2017
11	MAHENDRA KUMAR	U13AE014	Interglobe Technologies	797386/15.03.2017
12	MRINAL ASHWANI SAXENA	U13AE016	Interglobe Technologies	797387/15.03.2017
13	NAGARAJAN P C	U13AE017	Maintec Technologies	EMP/COL/SH/20022017/222-04.05.2017

14	NASHURUDEEN D	U13AE018	Interglobe Technologies	797388/15.03.2017
15	RAMESH KUMAR RAM	U13AE019	Maintec Technologies	EMP/COL/SH/20022017/235-04.05.2017
16	SHATRUGHNA KUMAR BHARTI	U13AE021	Interglobe Technologies	797389/15.03.2017
17	SHESHNARAYAN	U13AE022	Maintec Technologies	EMP/COL/SH/20022017/240-04.05.2017
18	VIGNESH R	U13AE025	Maintec Technologies	EMP/COL/SH/20022017/242-04.05.2017
19	SOUNDARYA .R	U13AE030	Maintec Technologies	EMP/COL/SH/20022017/245-04.05.2017
20	DIVIYA RAJ B S	U13AE071	Interglobe Technologies	797390/15.03.2017

**Placement Details- B.Tech Aeronautical (2014-2018) Batch**

S.No	Name of the student placed	Enrolment No	Name of the Employer	Appointment letter Reference No with Date
1	ABHISHEK REDDY CHEVELLA	U14AE002	Maintec Technologies	EMP/COL/SH/20022018/353-20.02.2018
2	AFSANA BANU	U14AE004	IDBI Federal	Through Email/21/12/2017
3	ANAND.M	U14AE006	Interglobe Technologies	1004900/ 29.11.2017
4	ANANDH.C	U14AE007	IDBI Federal	Through Email/21/12/2017
5	ANBU KUMAR.P	U14AE008	Interglobe Technologies	1004901/ 29.11.2017
6	ANNAPAREDDY NAGA SAI SRINIVAS	U14AE009	Interglobe Technologies	1004902/ 29.11.2017
7	M. ARUN KUMAR	U14AE010	Interglobe Technologies	1004903/ 29.11.2017
8	BANDARU SANTHOSH KUMAR	U14AE011	Interglobe Technologies	1004904/ 29.11.2017
9	K BALAJI	U14AE013	Maintec Technologies	EMP/COL/SH/20022018/354-20.02.2018
10	BALASUBRAMANIAN PL	U14AE014	Maintec Technologies	EMP/COL/SH/20022018/355-20.02.2018
11	BALINENI ANVESH	U14AE015	Interglobe Technologies	1004905/ 29.11.2017
12	BATTULA SARAN KUMAR	U14AE016	Interglobe Technologies	1004906/ 29.11.2017
13	BHARATH KUMAR.P	U14AE017	Interglobe Technologies	1004907/ 29.11.2017
14	BONALA KAMSALA RAGHAVENDRA	U14AE018	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
15	CHARLES SAMEER TOPPO	U14AE019	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
16	CHARUMATHI.P	U14AE020	Maintec Technologies	EMP/COL/SH/20022018/356-20.02.2018
17	M.DEVA	U14AE022	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018

18	FULWADIYA SHASHI KUMAR	U14AE023	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
19	GANGIPELLI VINEETH	U14AE024	Interglobe Technologies	1004908/ 29.11.2017
20	GODDU RAMESH	U14AE025	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
21	GUMMADI SANTOSH KUMAR	U14AE027	Interglobe Technologies	1004909/ 29.11.2017
22	JAGANRAJ	U14AE028	Interglobe Technologies	1004910/ 29.11.2017
23	JAMPALA LAXMAN SAI	U14AE029	Interglobe Technologies	1004911/ 29.11.2017
24	JAVEED THAMEEM ANSARI.M.S	U14AE030	Interglobe Technologies	1004912/ 29.11.2017
25	JAVID BASHA.G	U14AE031	Interglobe Technologies	1004913/ 29.11.2017
26	JINKA SURESH	U14AE033	Maintec Technologies	EMP/COL/SH/20022018/35 7-20.02.2018
27	JOHN METHUSALA E	U14AE034	Maintec Technologies	EMP/COL/SH/20022018/35 8-20.02.2018
28	KAMAGONDA PRASAD	U14AE035	Interglobe Technologies	1004914/ 29.11.2017
29	SHILPA KONGARA	U14AE036	Maintec Technologies	EMP/COL/SH/20022018/35 9-20.02.2018
30	KUDURUPAKA PREM KUMAR	U14AE038	Maintec Technologies	EMP/COL/SH/20022018/36 0-20.02.2018
31	MANNAVA NAGA DATHA KOUSHIK	U14AE040	IDBI Federal	Through Email/21/12/2017
32	MARIAM AFRAH.A	U14AE041	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
33	MOHAMMAD SADEEQ SHAH	U14AE042	Maintec Technologies	EMP/COL/SH/20022018/36 1-20.02.2018
34	MOHD REHAN	U14AE043	IDBI Federal	Through Email/21/12/2017
35	MONGAM NARENDRA KUMAR	U14AE045	Maintec Technologies	EMP/COL/SH/20022018/36 2-20.02.2018
36	MUKIRI KRISHNA VAMSI	U14AE046	IDBI Federal	Through Email/21/12/2017
37	NADAR TAMILARASAN SELVAN	U14AE048	Interglobe Technologies	1004915/ 29.11.2017
38	NANDKISHOR BHARTI	U14AE049	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
39	NARHARI RAMEKAR	U14AE050	Maintec Technologies	EMP/COL/SH/20022018/36 3-20.02.2018
40	NISHANT SHUKLA	U14AE052	IDBI Federal	Through Email/21/12/2017
41	PADAMATI SUSMITHA	U14AE053	Maintec Technologies	EMP/COL/SH/20022018/36 4-20.02.2018
42	PALANI KANNAN	U14AE055	Maintec Technologies	EMP/COL/SH/20022018/36 5-20.02.2018
43	PENTELE GANESH	U14AE056	Interglobe Technologies	1004916/ 29.11.2017

44	POONAM SHARMA.G	U14AE058	Interglobe Technologies	1004917/ 29.11.2017
45	PRAGATHY.D	U14AE059	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
46	PRATHAP.L	U14AE060	Maintec Technologies	EMP/COL/SH/20022018/36 6-20.02.2018
47	PUSHPENDU GHOSH	U14AE061	Interglobe Technologies	1004918/ 29.11.2017
48	R.RAJESH	U14AE062	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
49	RANGALA DHARMARAJU	U14AE064	Maintec Technologies	EMP/COL/SH/20022018/36 7-20.02.2018
50	PANDIRI SAI MANIKANTA PRASANNA KUMAR	U14AE065	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
51	B.SATHISH KUMAR	U14AE067	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
52	SATHIYA SEELAN.E	U14AE068	Maintec Technologies	EMP/COL/SH/20022018/36 8-20.02.2018
53	SAYAN BHATTACHARJEE	U14AE069	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
54	SHAIK KHADER SHARIEF	U14AE072	IDBI Federal	Through Email/21/12/2017
55	SHANISH KUMAR	U14AE073	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
56	SHANMUGANANDAN. M	U14AE074	IDBI Federal	Through Email/21/12/2017
57	SIDHAREDDY MANIGANDAN	U14AE076	Maintec Technologies	EMP/COL/SH/20022018/36 9-20.02.2018
58	SIMGAVARJULA VEDAVYAS	U14AE077	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
59	SINGANA SRI ARAVIND	U14AE078	IDBI Federal	Through Email/21/12/2017
60	TANDRA ARJUN KUMAR	U14AE081	Maintec Technologies	EMP/COL/SH/20022018/37 0-20.02.2018
61	THOTA. MANIKANTA ANKARAO	U14AE082	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
62	VENKATASUBRAMA NIAN.I	U14AE084	Maintec Technologies	EMP/COL/SH/20022018/37 1-20.02.2018
63	B.VENKATESAN	U14AE085	Hitachi Payment Services Pvt. Ltd	Through Email/26/04/2018
64	VENKATESH P	U14AE086	IDBI Federal	Through Email/21/12/2017
65	VISHWATEJA KUMAR REDDY.V	U14AE088	IDBI Federal	Through Email/21/12/2017
66	YALAMARTHI TULASI RAM	U14AE089	IDBI Federal	Through Email/21/12/2017
67	YASWANTH BAIDUBALLI	U14AE090	Maintec Technologies	EMP/COL/SH/20022018/37 2-20.02.2018
68	YOGRAJ SONAR	U14AE091	IDBI Federal	Through Email/21/12/2017
69	KARANAM SWAPNA SAI CHOWDARY.K	U14AE095	Maintec Technologies	EMP/COL/SH/20022018/37 3-20.02.2018

70	BANAIBOR KHARSHIING	U14AE703	Maintec Technologies	EMP/COL/SH/20022018/37 4-20.02.2018
Placement Details- B.Tech Aeronautical (2015-2019) Batch				
S.No	Name of the student placed	Enrolment No	Name of the Employer	Appointment letter Reference No with Date
1	NAGANANDAN A	U15AE001	Maintec Technologies	Through Email/21/03/2019
2	AJAY S	U15AE002	INTER GLOBE TECHNOLOGY	113478/ 29.09.2018
3	AMUTHAN A	U15AE003	INTER GLOBE TECHNOLOGY	113479/ 29.09.2018
4	ARAVINDAN A	U15AE004	Maintec Technologies	Through Email/21/03/2019
5	ARUP RATAN PARAMANIK	U15AE005	Rubicon	Through Email/10/10/2018
6	BANDARU KOTA NAGENDRA SURESH	U15AE006	GI Retail Pvt Ltd	Through Email/18/03/2019
7	BOJJA MANOJ KUMAR	U15AE007	INTER GLOBE TECHNOLOGY	113483/ 29.09.2018
8	CHILAKALAPUDI YASHWANTH TEJA	U15AE008	Maintec Technologies	Through Email/21/03/2019
9	CHITTOJI THANMAYI	U15AE009	Rubicon	Through Email/10/10/2018
10	DASARI RUFUS	U15AE010	INTER GLOBE TECHNOLOGY	113484/ 29.09.2018
11	DEGALA VINODKUMAR	U15AE012	Maintec Technologies	Through Email/21/03/2019
12	DIVYA A	U15AE013	Maintec Technologies	Through Email/21/03/2019
13	ERLA NAVEEN KUMAR	U15AE015	INTER GLOBE TECHNOLOGY	113485/ 29.09.2018
14	GADDAM MADHUSUDHAN REDDY	U15AE016	GI Retail Pvt Ltd	Through Email/18/03/2019
15	GANDLA SAI KEERTHANA	U15AE017	Rubicon	Through Email/10/10/2018
16	VASUDEVA REDDY I	U15AE018	Maintec Technologies	Through Email/21/03/2019
17	ISHANT DUBEY	U15AE019	INTER GLOBE TECHNOLOGY	113486/ 29.09.2018
18	KARRI ASHOK KUMAR REDDY	U15AE020	GI Retail Pvt Ltd	Through Email/18/03/2019
19	KARTHIKEYAN R	U15AE021	Maintec Technologies	Through Email/21/03/2019
20	JUHI GUPTA	U15AE022	INTER GLOBE TECHNOLOGY	113487/ 29.09.2018
21	KOLA JOHN HANNA JAYASHREE	U15AE023	Capgemini	HR/Campus/20182246/ 26/12/2018

22	KUSUNURI JYOTHI SAI PAVAN	U15AE024	GI Retail Pvt Ltd	Through Email/18/03/2019
23	MD ALAM	U15AE025	GI Retail Pvt Ltd	Through Email/18/03/2019
24	MD MUDEE ALAM	U15AE026	INTER GLOBE TECHNOLOGY	113492/ 29.09.2018
25	MERLIN TERESA P	U15AE027	Maintec Technologies	Through Email/21/03/2019
26	NINGKHANRIN N G	U15AE030	GI Retail Pvt Ltd	Through Email/18/03/2019
27	PARASA MAHENDRA	U15AE031	INTER GLOBE TECHNOLOGY	113493/ 29.09.2018
28	PAVULURI MOHITH CHOWDARY	U15AE032	Maintec Technologies	Through Email/21/03/2019
29	PERCIYAL.A	U15AE033	INTER GLOBE TECHNOLOGY	113494/ 29.09.2018
30	PULUSU PARDHU SREE	U15AE034	INTER GLOBE TECHNOLOGY	113495/ 29.09.2018
31	RAVILLA VISHNU VARADHAN NAIDU	U15AE035	GI Retail Pvt Ltd	Through Email/18/03/2019
32	ROSELIN L	U15AE036	INTER GLOBE TECHNOLOGY	113496/ 29.09.2018
33	RUTHRA S	U15AE037	INTER GLOBE TECHNOLOGY	113497/ 29.09.2018
34	KARISHMA CHANDINI S	U15AE038	Rubicon	Through Email/10/10/2018
35	SAMPATHARAO PARDHU	U15AE039	Rubicon	Through Email/10/10/2018
36	SANGEETHA N	U15AE040	INTER GLOBE TECHNOLOGY	113501/ 29.09.2018
37	SHIVA SHANKAR V N	U15AE042	GI Retail Pvt Ltd	Through Email/18/03/2019
38	SWATHITH K S	U15AE043	INTER GLOBE TECHNOLOGY	113502/ 29.09.2018
39	TYAGARAJAN BHAVANI SHANKAR	U15AE046	Maintec Technologies	Through Email/21/03/2019
40	YALAMARTHI SRAVANI	U15AE049	INTER GLOBE TECHNOLOGY	113503/ 29.09.2018
41	JAKKULA RAM SARATH YADAV	U15AE051	INTER GLOBE TECHNOLOGY	113504/ 29.09.2018
42	MANE JERMIAH	U15AE052	GI Retail Pvt Ltd	Through Email/18/03/2019
43	ANBARASAN.R	U15AE054	INTER GLOBE TECHNOLOGY	113505/ 29.09.2018
44	DIVYA CHALAMPALEM	U15AE057	Rubicon	Through Email/10/10/2018
45	SANTHOSHRAJ K	U15AE059	INTER GLOBE TECHNOLOGY	113508/ 29.09.2018
46	MUHAMMAD RAAZEE	U15AE060	Maintec Technologies	Through Email/21/03/2019

47	MOHAMMAD ALAM K A	U15AE061	INTER GLOBE TECHNOLOGY	113509/ 29.09.2018
48	G.M.SANDEEP	U15AE062	GI Retail Pvt Ltd	Through Email/18/03/2019
49	VITTAL ZAHID AHMED	U15AE063	Maintec Technologies	Through Email/21/03/2019
50	MOHD AMIR	U15AE701	INTER GLOBE TECHNOLOGY	113512/ 29.09.2018

#### 4.5. Professional Activities

##### 4.5.1.A Professional societies/chapters- Availability & activities.

S.No	Date	Event Name	Topic / Location	In Association with	Delivered By/ Chief Guest
1	31.01.2018	Workshop	Composite Design, Analysis and Manufacture	IAAA	Dr. Vijay Sahadeven, GKN Aerospace, Filton UK
2	10.10.2018	Seminar	Fundamental of Fluid Mechanics	National Society of Fluid Mechanics and Fluid Power	Prof.Dr.S.Vengadesan, Dept of Applied Mechanics, IIT Madras.
3	26.10.2018	International Seminar	Analysis of Aero Engine Turbines	National Society of Fluid Mechanics and Fluid Power	Dr.Ramesh Rajasekaran, Department of Design, Bellevue, United States.
4	08.08.2019	Seminar	Evolution of Communication Spacecraft, The Indian Scenario & Emerging Trends	IAAA	Shri.T.K.Sundaramurthy, Former Mission Director ISRO.



Dean Aeronautical Dr.S. Elangovan is felicitating our chief guest Dr.Ramesh Rajasekaran Department of Design, Bellevue, United States.

**4.5.1B Number, quality of engineering events (organized at institute)**

**ACADEMIC EVENTS DETAILS FOR THE ACADEMIC YEAR 2017-2018**

**ODD SEMESTER 2017-2018**

S.No	Date	Event Name	Topic / Location	Delivered By/ Chief Guest
1	02.08.2017	Guest Lecture	Aerospace Challenges of 21 <sup>st</sup> Century	Dr.R.Ganesh Rajagopalan, Professor – IOWA State University , USA



**Dr.R.Ganesh Rajagopalan, Professor IOWA State University, USA is delivering his address on Aerospace Challenges of 21<sup>st</sup> century to Final year and Third year students**

**EVEN SEMESTER 2017-2018**

S.No	Date	Event Name	Topic / Location	Delivered By/ Chief Guest
1	07.03.2018	Guest Lecture	Introduction to Combustion	Dr.K.Jayaraman, Principle Project Officer, IIT Madras
2	27.03.2018	Guest Lecture	Navigation Systems	Dr.G.Anitha, Assistant Professor (Senior Grade), Avionics Division, MIT Campus, Chennai.



**Professor Siva Kumar is felicitating our guest Dr.K.Jayaraman Principle project officer, IIT Madras.**



**Dr.G.Anitha, Assistant Professor (Senior Grade), Avionics Division, MIT Campus, Chennai is delivering the lecture on Navigation Systems with our students**

**ACADEMIC EVENTS DETAILS FOR THE ACADEMIC YEAR 2018-2019****ODD SEMESTER 2018-2019**

S.No	Date	Event Name	Topic / Location	Delivered By/ Chief Guest
1	31.05.2018 to 02.06.2018	FDP	Vibration and Aero-Elasticity	<p><b>Dr.K.Jayaraman,</b> Professor of Eminence, Dept. of Aerospace Engg, MIT Campus, Anna University, Chennai</p> <p><b>Mr.T.M.Naidu</b> Former Project Director, Aeronautical Development Agency (ADA), Bangalore</p> <p><b>Dr.K.Vadivuchezian</b> Assistant Professor, Dept of Applied Mechanics and Hydraulics, NIT Mangalore, Karnataka</p> <p><b>Mr.GovardhanaGiri,</b> Managing Director, ATALON Services, Chennai</p> <p><b>Dr.S.Sivakumar</b> Associate Professor, Dept of Aeronautical Engg BIHER, Chennai.</p>
2	09.10.2018	Guest Lecture	High Temperature Applications for Aerospace Applications	<b>Dr.N.V. Ravikumar,</b> Professor, Department of Metallurgy and Materials Engineering, IIT Madras, Chennai – 600036.
3	12.10.2018	Guest Lecture	Indian Space Program – An Overview	<b>Shri.R.Arunachalam,</b> Scientist (Retd) ISRO Satellite Centre.
4	12.11.2018	Guest Lecture	Military, Logistics and Aviation	<p><b>Major Lee Davis,</b> Veteran USA Army,</p> <p><b>Major Sunil Shetty,</b> SENA Medal Veteran Indian Army</p>

**Faculty Development Programme 31/05/2018 to 02/06/2018**



**Resource person Dr. K. Jayaraman, Professor of Eminence, Dept. of Aerospace Engineering, MIT Campus, Anna University, Chennai.**



**Resource person Mr. T. M. Naidu, Former Project Director, Aeronautical Development Agency (ADA), Bangalore, is addressing the gathering.**



**Resource person Dr. K. Vadivuchezhian, Assistant Professor, Dept. of Applied Mechanics and Hydraulics, NIT, Mangalore, Karnataka**



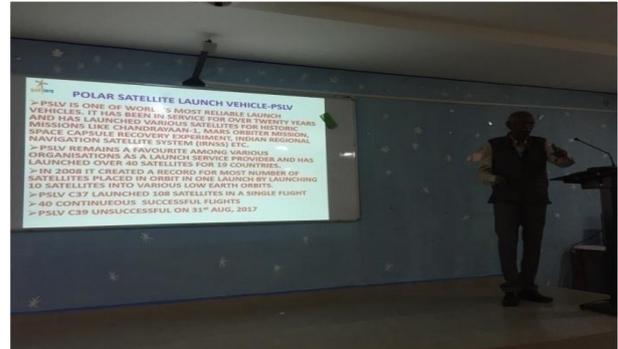
**Resource person Dr. N. Gnanasekaran, Assistant Professor, Dept. of Mechanical Engineering, NIT, Mangalore, Karnataka**



**Resource person Dr. S. Sivakumar, Associate Professor, Dept. of Aeronautical Engineering, BIHER, Chennai**



**Our Head Of the Department and Dean is Felicitating our chief guest Dr.N V Ravi Kumar, Professor Department of Metallurgy and Materials Engineering, IIT Madras.**



**Our Chief Guest Shri.R.Arunachalam, Scientist (Retd) ISRO Satellite Centre is addressing to our students about Indian Space Program –An overview**



**Our Dean is felicitating the chief guest Major Lee Davis, Veteran USA army and Major Sunil Shetty, SENA medal, Veteran Indian Army**

**EVEN SEMESTER 2018-2019**

S.No	Date	Event Name	Topic / Location	Delivered By/ Chief Guest
1	06.03.2019	Guest Lecture	Finite Element Method in Aerospace Application	<b>Dr. K. Jayabal</b> Associate Professor, Department of Mechanical Engineering, IIIDM Kanchipuram.
2	13.03.2019	Guest Lecture	Aerospace Structural Materials and Composites	<b>Dr. M.Raguraman</b> Assistant Professor, Department of Mechanical Engineering, IIIDM Kanchipuram.

3	29.03.2019	National Conference	National Conference on Recent trends in Aerospace NCRTAT 2019	<b>Dr.G. Giridhar</b> Deputy Director General, Ministry of New and Renewable Energy
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**Our Dean and Dr.C. Suresh Kumar Felicitating our chief guest Dr.K.Jayabal, Associate professor, Department of Mechanical Engineering IIITDM Kanchipuram**



**Our Head of Department is honoring the Chief Guest Dr.M.Raguraman, Assistant professor, Department of Mechanical Engineering IIITDM Kanchipuram.**

### National Conference on recent trends in Aerospace NCRTAT 2019



**Our chief guest. Dr. Giridhar G, Deputy Director General MINISTRY OF NEW AND RENEWABLE ENERGY lighting the kuthuvelakku.**

### ACADEMIC EVENTS DETAILS FOR THE ACADEMIC YEAR 2019-2020 ODD SEMESTER 2019-2020

S.No	Date	Event Name	Topic / Location	Delivered By/ Chief Guest
1	21.09.2019	Special Lecture	Civil Service Exam Preparation Guidance	<b>Mr.Manikandan</b> IAS Officer
2	26.09.2019	Guest Lecture	Job Opportunities in Aircraft Maintenance	<b>Mr.Sampath,</b> Orient Flight Club

### EVEN SEMESTER 2019-2020

S.No	Date	Event Name	Topic / Location	Delivered By/ Chief Guest
1	19.12.2019 & 20.12.2019	FDP	Flow Measurements & Data Acquisition	<b>Dr.Rinku Mukherjee</b> Associate Professor, IIT Madras. <b>Mr. Vasanth Kumar</b> VI Solutions, Bangalore

2	16.05.2020	Webinar	Advance in Space Technology	<b>Mr. Ranganath Ekkundi</b> Former Deputy Director U R RAO Satellite Centre, ISRO, Bangalore
3	19.05.2020	Webinar	Satellite Design	<b>Dr. Sharan Asundi</b> Asst. Professor, Old Dominion University, Norfolk, VA, USA
4	22.05.2020	Webinar	Handling Uncertainty and Anxiety due to COVID-19	<b>Dr. Rajkumar.S.Pant</b> Professor, Department of Aerospace engineering IIT Bombay
5	23.05.2020	Webinar	Applications of Advanced Finite Element Methods	<b>Dr. K. Jayabal</b> Associate Professor, IITDM Kanchipuram
6	27.05.2020	Webinar	Civil Services Preparation Strategy for Engineering Students	<b>Mr. J. Sivaramakrishnan</b> Faculty, Times groups of Chennai
7	27.05.2020	Webinar	Motivational Speech	<b>Mr.V. Nandakumar IRS,</b> Department of Revenue, Government of India

#### **4.5.2. Publication of technical magazines, newsletters, etc.**

The department encourages students to actively participate in writing articles for Department's technical magazine and newsletters. Summary of in-house magazines/ newsletters during the previous academic years is presented below.

Technical Magazine have been published once in each year.

S.No	Technical Magazine	Month & Year
1	Mach Book	March 2018
2	Mach Book	March 2019
3	Mach Book	March 2020

Newsletter have been published once in each semester.

S.No	Newsletter	Month & Year
1	Sonic Boom	October 2018
2	Sonic Boom	May 2018
3	Sonic Boom	October 2019
4	Sonic Boom	May 2019
5	Sonic Boom	October 2020
6	Sonic Boom	May 2020

#### **4.5.3. Participation in inter-institute events by students of the program of study**

The department promotes students' participation in inter-institute technical events, workshops and conferences to improve their technical knowledge, interpersonal skill, networking skill and presentation skills. The following tables documents the active participation of students in such events.

**STUDENT EVENTS PARTICIPATION DETAILS FOR THE ACADEMIC YEAR 2017-2018****ODD SEMESTER 2017-2018**

S.No	Name of Student	Event Name	Organized By	Date of Event	Award/Recognition
1	MUHAMMAD RAAZEE	PAPER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	II Prize
2	ARUP RATAN PARAMANIK	PAPER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	II Prize
3	ISHANT DUBEY	PAPER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	II Prize
4	C DIVYA	PAPER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	II Prize
5	THANMAYI CHITTOJI	PAPER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	II Prize
6	MUHAMMAD RAAZEE	POSTER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
7	ARUP RATAN PARAMANIK	POSTER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
8	ISHANT DUBEY	POSTER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
9	C DIVYA	POSTER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
10	THANMAYI CHITTOJI	POSTER PRESENTATION	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
11	ARUP RATAN PARAMANIK	ROBO RACE	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION

12	MUHAMMAD RAAZEE	ROBO RACE	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
13	V ZAHID AHMED	ROBO RACE	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	PARTICIPATION
14	M ANAND	PROJECT DESIGN CONTEST	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	I PRIZE
15	DHARMARAJ	PROJECT DESIGN CONTEST	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	I PRIZE
16	MARIYAM AFRAH	PROJECT DESIGN CONTEST	ROBOTSAVAM 2017, AMRITA VISWA VIDYAPEETHAM	28 – 30 JUL 2017	I PRIZE
17	ARUP RATAN PARAMANIK	FLYING RADIO	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	PARTICIPATION
18	MUHAMMAD RAAZEE	WATER ROCKETRY	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	PARTICIPATION
19	V ZAHID AHMED	WATER ROCKETRY	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	PARTICIPATION
20	ALAM K A	WATER ROCKETRY	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	PARTICIPATION
21	VITAL ZAHID AHMED	PROJECT DESIGN	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	PARTICIPATION
22	VITAL ZAHID AHMED	FLYING RODEO	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	PARTICIPATION

23	M. ANAND	PAPER PRESENTATION	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	FIRST PRIZE
24	M. ANAND	PROJECT DESIGN CONTEST	FUTURA17, BANNARI AMMAN INSTITUTE OF TECHNOLOGY	7 – 9 SEP 2017	FIRST PRIZE
25	MUHAMMAD RAAZEE	WATER ROCKET	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	PARTICIPATION
26	ZAHID AHMED	WATER ROCKET	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	PARTICIPATION
27	ALAM K A	PAPER PLANE	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	PARTICIPATION
28	MUHAMMAD RAAZEE	PAPER PLANE	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	PARTICIPATION
29	ZAHID AHMED	BOOMERANG	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	II PRIZE
30	MUHAMMAD RAAZEE	BOOMERANG	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	II PRIZE
31	ZAHID AHMED	PICK AND PLACE	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	PARTICIPATION
32	MUHAMMAD RAAZEE	PICK AND PLACE	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	PARTICIPATION
33	ZAHID AHMED	GLIDER	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	II PRIZE
34	MUHAMMAD RAAZEE	GLIDER	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	II PRIZE

35	ZAHID AHMED	PARA GLIDING	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	II PRIZE
36	MUHAMMAD RAAZEE	PARA GLIDING	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	II PRIZE
37	ZAHID AHMED	TECHNICAL CONNECTION	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	I PRIZE
38	MUHAMMAD RAAZEE	TECHNICAL CONNECTION	AERISTA-2K17, EXCEL ENGINEERING COLLEGE	26 SEP 2017	I PRIZE
39	ISHANTH DUBEY	PAPER PRESENTATION	INTERNATIONAL JOURNAL OF SCIENTIFIC & RESEARCH	29 SEP 2017	PARTICIPATION
40	ISHANTH DUBEY	WORKSHOP	JEUNE SCIENTIST PRIVATE LIMITED	01 OCT 2017	PARTICIPATION
41	ISHANTH DUBEY	FABRICATED PROJECT	UNISPARK-17 DHANALAKSHMI COLLEGE OF ENGINEERING	10 OCT 2017	PARTICIPATION
42	ISHANTH DUBEY	PAPER PRESENTATION	UNISPARK-17 DHANALAKSHMI COLLEGE OF ENGINEERING	10 OCT 2017	PARTICIPATION
43	ASHOK KUMAR REDDY	PAPER PRESENTATION	UNISPARK-17 DHANALAKSHMI COLLEGE OF ENGINEERING	10 OCT 2017	PARTICIPATION
44	ASHOK KUMAR REDDY	FABRICATED PROJECT	UNISPARK-17 DHANALAKSHMI COLLEGE OF ENGINEERING	10 OCT 2017	PARTICIPATION
45	MUHAMMAD RAAZEE	CHUCK GLIDER	AVYASYON'17 KUMARAGURU COLLEGE OF ENGINEERING	13 OCT 2017	PARTICIPATION
46	ZAHID AHMED	CHUCK GLIDER	AVYASYON'17 KUMARAGURU COLLEGE OF ENGINEERING	13 OCT 2017	PARTICIPATION
47	MUHAMMAD RAAZEE	MAKE YOUR PLANE	AVYASYON'17	13 OCT 2017	PARTICIPATION

			KUMARAGURU COLLEGE OF ENGINEERING		
48	MUHAMMAD RAAZEE	AQUA MISSILE	AVYASYON'17 KUMARAGURU COLLEGE OF ENGINEERING	13 OCT 2017	PARTICIPATION
49	MUHAMMAD RAAZEE	MAKE YOUR PLANE	AVYASYON'17 KUMARAGURU COLLEGE OF ENGINEERING	13 OCT 2017	PARTICIPATION
50	ZAHID AHMED	AQUA MISSILE	AVYASYON'17 KUMARAGURU COLLEGE OF ENGINEERING	13 OCT 2017	PARTICIPATION

**EVEN SEMESTER 2017-2018**

S.No	Name of Student	Event Name	Organized By	Date of Event	Award/Recognition
1	A PUNITHAN	DRONE CHAMPIONSHIP	DHRUVA KARPAGAM COLLEGE OF ENGINEERING	1-3 FEB 2018	PARTICIPATION
2	PRITHVI RAJAN SM	DRONE CHAMPIONSHIP	DHRUVA KARPAGAM COLLEGE OF ENGINEERING	1-3 FEB 2018	PARTICIPATION
3	A PUNITHAN	ENGINEERS WORLD RECORD ATTEMPT	DHRUVA KARPAGAM COLLEGE OF ENGINEERING	1-3 FEB 2018	PARTICIPATION
4	PRITHVI RAJAN SM	ENGINEERS WORLD RECORD ATTEMPT	DHRUVA KARPAGAM COLLEGE OF ENGINEERING	1-3 FEB 2018	PARTICIPATION
5	ISHANTH DUBEY	PROJECT DESIGN CONTEST	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	PARTICIPATION
6	ISHANTH DUBEY	PAPER PRESENTATION	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	PARTICIPATION
7	M ANAND	PROJECT DESIGN CONTEST	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	II PRIZE
8	M ANAND	PAPER PRESENTATION	STEPSTONE2018	2-4 FEB 2018	I PRIZE

			GMR INSTITUTE OF TECHNOLOGY		
9	M ANAND	PAPER PRESENTATION	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	II PRIZE
10	PENTE LA GANESH	PROJECT DESIGN CONTEST	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	PARTICIPATION
11	ABHISHEK REDDY	PROJECT DESIGN CONTEST	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	PARTICIPATION
12	VISHWATEJA	PROJECT DESIGN CONTEST	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	PARTICIPATION
13	G VINEETH	PROJECT DESIGN CONTEST	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	PARTICIPATION
14	PENTE LA GANESH	PAPER PRESENTATION	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	I PRIZE
15	ABHISHEK REDDY	PAPER PRESENTATION	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	I PRIZE
16	G VINEETH	PAPER PRESENTATION	STEPSTONE2018 GMR INSTITUTE OF TECHNOLOGY	2-4 FEB 2018	I PRIZE
17	SANTHOSH SAHU	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
18	V MAMATHA SRI	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
19	MUHAMMAD RAZEE	TECHNICAL QUIZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
20	ALAM K A	AEROBUZZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION

21	AHLIN KUMAR	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
22	ABHIJITH SARKAR	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
23	G PRATHUSHA	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
24	MUHAMMAD RAZEE	TECHNICAL CONNECTIONS	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
25	ZAHEED AHMED	WOODEN GLIDER	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
26	MUHAMMAD RAZEE	AEROBUZZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
27	KA ALAM	TECHNICAL QUIZZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
28	KA ALAM	BOTTLE ROCKETRY	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
29	KA ALAM	TECHNICAL CONNECTIONS	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
30	ZAHID AHMED	PARADIVE	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
31	K SAIBAVANA	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
32	T NATARAJAN	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
33	ALAM KA	WOODEN GLIDER	FLIGHT'18	16-17 MARCH 2018	PARTICIPATION

			MADRAS INSTITUTE OF TECHNOLOGY		
34	MUHAMMAD RAZEE	AERO BUZZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	I PLACE
35	ALAM KA	PARADIVE	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	I PRIZE
36	ALAM KA	AEROBUZZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	I PRIZE
37	MUKAMMAD ALAM	BOTTLE ROCKETRY	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
38	ZAHID AHMED	BOTTLE ROCKETRY	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
39	MUHAMMAD RAZEE	WOODEN GLIDER	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
40	MUHUNTHAN I.B	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
41	MOUNIKA VEMAGIRI	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
42	VISHWAK PS	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
43	S DURGA LAKSHMI PRIYANKA	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
44	BHAVANA M	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION

45	S SARATH KUMAR	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
46	ANTANIES KEMIN Y	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
47	KS GANESH	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
48	SHAIK GAFOOR	TECHNICAL QUIZ	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
49	SHAIK GAFOOR	CAD MODELLING	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
50	K GAMANA	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
51	KESAVA RAJU	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
52	ANIL KUMAR A	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
53	UJWAL KUMAR SINGH	WORKSHOP	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	PARTICIPATION
54	MUHAMMAD RAZEE	PARADIVE	FLIGHT'18 MADRAS INSTITUTE OF TECHNOLOGY	16-17 MARCH 2018	I PRIZE
55	RUFUS DASARI	INTERNATION AL CONFERENCE	IIST MUN 2018	7-8 APR 2018	PARTICIPATION
56	ISHANTH DUBEY	INTERNATION AL CONFERENCE	IIST MUN 2018	7-8 APR 2018	PARTICIPATION

**STUDENT EVENTS PARTICIPATION DETAILS FOR THE ACADEMIC YEAR 2018-2019**  
**ODD SEMESTER 2018-2019**

S.No	Name of Student	Event Name	Organized By	Date of Event	Award/Recognition
1	KS GANESH	INTERNSHIP	AEGIS OF EXPERTS HUB INDUSTRY	13-20 JULY 2018	PARTICIPATION
2	S SARH KUMAR	INTERNSHIP	AEGIS OF EXPERTS HUB INDUSTRY	13-20 JULY 2018	PARTICIPATION
3	UJWAL KUMAR SINGH	PROJECT DISPLAY	DR.APJ.ABDUL KALAM INTERNATIONAL FOUNDATION	7 OCTOBER 2018	I PRIZE [YOUNG SCIENTIST AWARD]
4	K SANTHOSH	PROJECT DISPLAY	DR.APJ.ABDUL KALAM INTERNATIONAL FOUNDATION	7 OCTOBER 2018	I PRIZE [YOUNG SCIENTIST AWARD]
5	K SARKAR ABHIJITH	PROJECT DISPLAY	DR.APJ.ABDUL KALAM INTERNATIONAL FOUNDATION	7 OCTOBER 2018	I PRIZE [YOUNG SCIENTIST AWARD]
6	A ANIL KUMAR	PROJECT DISPLAY	DR.APJ.ABDUL KALAM INTERNATIONAL FOUNDATION	7 OCTOBER 2018	I PRIZE [YOUNG SCIENTIST AWARD]
7	DASARI RUFUS	PROJECT DISPLAY	QUEST GLOBAL PVT LIMITED	4 To 6 OCTOBER 2018	IV PRIZE [ JURY AWARD]
8	SAI KEERTHANA	PROJECT DISPLAY	QUEST GLOBAL PVT LIMITED	4 To 6 OCTOBER 2018	IV PRIZE [ JURY AWARD]
9	JUHI GUPTHA	PROJECT DISPLAY	QUEST GLOBAL PVT LIMITED	4 To 6 OCTOBER 2018	IV PRIZE [ JURY AWARD]

**EVEN SEMESTER 2018-2019**

S.No	Name of Student	Event Name	Organized By	Date of Event	Award/Recognition
1	Chitti Sai Sravan Kumar	Internship	DRDL Hyderabad	May/June 2019	Participation
2	Kandala Ravi Teja	Internship	DRDL Hyderabad	May/June 2019	Participation

**STUDENT EVENTS PARTICIPATION DETAILS FOR THE ACADEMIC YEAR 2019-2020****ODD SEMESTER 2019-2020**

S.No	Name of Student	Event Name	Organized By	Date of Event	Award/Recognition
1	P.Rishikesh	South India Electric UAV Fabrication Workshop	Dr A P J Abdul Kalam Center For Aerospace Excellence And Skill Development East West College Of Engineering	25 <sup>th</sup> To 27 <sup>th</sup> Sep 2019	Participation
2	Shaik Darbar Basha	South India Electric UAV Fabrication Workshop	Dr A P J Abdul Kalam Center For Aerospace Excellence And Skill Development East West College Of Engineering	25 <sup>th</sup> To 27 <sup>th</sup> Sep 2019	Participation
3	Manav.J	Mayvi Make Your Vimana	Hindustan Institute Of Technology And Science	5 To 6 Oct 2019	Participation
4	D.Lokesh	Machine Learning Workshop	National Students Space Challenge	1 To 3 Nov 2019	Participation

**EVEN SEMESTER 2019-2020**

S.No	Name of Student	Event Name	Organized By	Date of Event	Award/Recognition
1	Lokesh Kumar. R	Vibrance 2020 Xflr And Ansys Workshop	Mechanical Department Of VIT College Chennai.	05/02/2020	Participation
2	Sunayani	Vibrance 2020 Xflr And Ansys Workshop	Mechanical Department Of VIT College Chennai.	05/02/2020	Participation
3	Nithyasree V	Vibrance 2020 Xflr And Ansys Workshop	Mechanical Department Of VIT College Chennai.	05/02/2020	Participation
4	Monisha	Vibrance 2020 Xflr And Ansys Workshop	Mechanical Department Of VIT College Chennai.	05/02/2020	Participation
5	M.Kavya	Design And Development Of Cubesat	B.S.Abdur Rahman Crescent Institute Of Science And Technology	02 To 03 Mar 2020	Participation
6	N.Prasanna Lakshmi	Design And Development Of Cubesat	B.S.Abdur Rahman Crescent Institute Of Science And Technology	02 To 03 Mar 2020	Participation

7	P.Mythilhi	Design and Development Of Cubesat	B.S.Abdur Rahman Crescent Institute Of Science And Technology	02 To 03 Mar 2020	Participation
8	S.Pushpalatha	Design and Development Of Cubesat	B.S.Abdur Rahman Crescent Institute Of Science And Technology	02 To 03 Mar 2020	Participation
9	P.Sreenidhi Mathangee	Design and Development Of Cubesat	B.S.Abdur Rahman Crescent Institute Of Science And Technology	02 To 03 Mar 2020	Participation
10	K.C.Rakshitha	Design and Development Of Cubesat	B.S.Abdur Rahman Crescent Institute Of Science And Technology	02 To 03 Mar 2020	Participation
11	Guru Sankar Duppa	Basic Principles Of Remote Sensing Technology	Indian Institute Of Remote Sensing, Isro Dehradun	13-04-2020 To 25-04-2020	Participation
12	Arisetty Navya	Basic Principles Of Remote Sensing Technology	Indian Institute Of Remote Sensing, Isro Dehradun	13-04-2020 To 25-04-2020	Participation
13	Aduri Naga Saikiranmai	Basic Principles Of Remote Sensing Technology	Indian Institute Of Remote Sensing, Isro Dehradun	13-04-2020 To 25-04-2020	Participation

<b>CRITERION 5</b>	<b>Faculty Information and Contributions</b>	<b>200</b>
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Name of the Faculty Member	Qualification			Association with the Institution	Designation	Date on which Designated as Professor/Associate Professor	Date of Joining the Institution	Department	Specialization	Academic Research			Sponsored research (Funded research)	Consultancy & product development
	Degree	University	Year of attaining higher qualification							Research Paper Publications	Ph. D. Guidance	Faculty Receiving Ph. D. during the Assessment Years		
<b>Dr.M.SUNDARARAJ</b>	Ph D	Anna University	2013	Yes	Prof & Head	05/11/2013	22/08/2012	Aeronautical	Aeronautical Engineering	14	3	-	2	10
<b>Dr. S. ELANGO VAN</b>	Ph D	IIT	1997	Yes	Professor	10/01/2013	10/01/2013	Aeronautical	Aerospace Propulsion	20	3	-	2	10

<b>Dr.KISHORE KUMAR BRAHMA</b>	Ph D	IISC	1988	Yes	Professor	22/07/2019	22/07/2019	Aeronautical	Aeronautical Engineering	-	-	-	-	-
<b>Dr.M.N.HUSSIAN</b>	Ph D	BITS	2009	Yes	Professor	22/07/2019	22/07/2019	Aeronautical	Space Engineering and Rockets	-	-	-	-	-
<b>Dr.MALLIKARJU N.R.VAGGAR</b>	Ph D	NAL	2013	Yes	Professor	15/07/2019	15/07/2019	Aeronautical	Mechanical Air Armament	-	-	-	-	-
<b>Dr.S.SIVAKUMAR</b>	Ph D	Anna University		No	Associate Professor		10.07.2017	Aeronautical	Aeronautical Engineering	-	-	-	-	-
<b>Dr. C. SURESH KUMAR</b>	Ph D	Anna University	2018	Yes	Associate Professor	06/08/2018	06/08/2018	Aeronautical	Aeronautical Engineering	10	-	-	-	-
<b>Mr. D. HASEN</b>	M. E	MIT	2012	Yes	Assistant Professor		22/07/2014	Aeronautical	Aeronautical Engineering	9	-	-	-	-
<b>Mr. A.ADAIKALARAJ</b>	M. E	MIT	2013	Yes	Assistant Professor		10/07/2017	Aeronautical	Aeronautical Engineering	-	-	-	-	-
<b>Mr. M. SYEDHALEEM</b>	M. E	MIT	2015	Yes	Assistant Professor		09/07/2015	Aeronautical	Aeronautical Engineering	2	-	--	-	-
<b>Mr. S. R. VIMAL RAJ</b>	M. E	MIT	2015	No	Assistant Professor		01/04/2016	Aeronautical	Aeronautical Engineering	-	-	-	-	-
<b>Mrs. P. DIVYABARATHI</b>	M. Tech	Hindustan University	2015	Yes	Assistant Professor		09/07/2015	Aeronautical	Aeronautical Engineering	6	-	-	-	-
<b>Mr. N. KALAIMANI</b>	M. E	MIT	2012	Yes	Assistant Professor		03/08/2018	Aeronautical	Avionics	-	-	-	-	-

<b>Mr. R. NALLAPPAN</b>	M. E	Anna University	2011	Yes	Assistant Professor		03/08/2018	Aeronautical	Aeronautical Engineering	1	-	-	-	-
<b>Mr. R. KARTHIKEYAN</b>	M. E	Anna University	2016	Yes	Assistant Professor		06/03/2013	Aeronautical	CAD	4	-	-	-	-
<b>Mr.V.P.DURAIRAJ</b>	M. E	MIT	2013	Yes	Assistant Professor		04/08/2014	Aeronautical	Manufacturing Engineering	-	-	-	-	-
<b>Mr.ARUN.V.REJUSKUMAR</b>	M. E	Anna University	2012	Yes	Assistant Professor		07/02/2017	Aeronautical	Manufacturing Engineering	1	-	-	-	-
<b>Mr.J.MANIKANDAN</b>	M. E	SCSUMU	2013	Yes	Assistant Professor		01/08/2014	Aeronautical	Aeronautical Engineering	4	-	-	-	-
<b>Mr.S.MANAVALAN</b>	M. E	Anna University	2012	No	Assistant Professor		01/07/2013	Aeronautical	IC Engines	5	-	-	1	1
<b>Dr.D.RAVI</b>	Ph D	Anna University	2017	Yes	Associate Professor	11/12/2017	04/01/2013	Aeronautical	Aeronautical Engineering	5	-	-	1	-
<b>Mr.R.ARUN</b>	M. E	Anna University	2015	Yes	Assistant Professor		12/09/2015	Aeronautical	Industrial Engineering	-	-	-	-	-
<b>Mr.R.SHARAVANAN</b>	M. E	SRM	2013	Yes	Assistant Professor		05/08/2015	Aeronautical	CAD	3	-	-	-	-
<b>Mr.A.SARAVANA KUMAR</b>	M. E	Anna University	2015	Yes	Assistant Professor		19/12/2017	Aeronautical	Quality Engineering Management	3	-	-	-	-
<b>Mr.S.KARTHIKEYAN</b>	M. E	Anna University	2015	Yes	Assistant Professor		08/01/2018	Aeronautical	Energy Engineering	1	-	-	-	-

<b>Mr.S. JEEVABHARATH I</b>	M. E	Anna University	2016	Yes	Assistant Professor		08/09/2016	Aeronautical	CAD/CAM	1	-	-	-	-
<b>Mr.N.LENINRAKESH</b>	M. E	SATHYA BAMA	2012	Yes	Assistant Professor		02/01/2013	Aeronautical	CAD/CAM	4	-	-	-	-
<b>Dr.N.S.SENTHUR</b>	Ph D	Anna University	2019	Yes	Associate Professor		21.01.2019	Aeronautical	CAD/CAM	20	-	-	-	-
<b>Mr. RAMAKRISHNA MADHIRA</b>	ME	BIT	2009	Yes	Assistant Professor		05/08/2019	Aeronautical	Space Engineering and Rocketry	4	-	-	-	-
<b>Mr. V. GIRIDHARAN</b>	ME	MIT	2007	Yes	Assistant Professor		29/07/2019	Aeronautical	Aeronautical Engineering	3	-	-	-	-
<b>Mr. M.K. KARTHIK</b>	ME	MIT	2009	Yes	Assistant Professor		29/07/2019	Aeronautical	Aeronautical Engineering	7	-	-	-	-
<b>Mr. R MANIKANDAN</b>	ME	Anna University	2012	Yes	Assistant Professor		29/07/2019	Aeronautical	CAD/CAM	3	-	-	-	-
<b>Mrs. PRIYAMOHA D</b>	M. Tech	IIT KGP	2014	Yes	Assistant Professor		29/07/2019	Aeronautical	Aerospace Engineering	2	-	-	-	-
<b>Mr. P S MOHANA SARAVANAN</b>	ME	TRPEC	2015	Yes	Assistant Professor		29/07/2019	Aeronautical	Thermal Engineering	2	-	-	-	-
<b>Mrs. S SWETHA</b>	ME	MIT	2016	Yes	Assistant Professor		29/07/2019	Aeronautical	Aerospace Engineering	-	-	-	-	-
<b>Mr. E MAHAVISHNU</b>	ME	Anna University	2019	Yes	Assistant Professor		29/07/2019	Aeronautical	Aeronautical Engineering	1	-	-	-	-

<b>Mr.B.VIKRAM</b>	ME	PSG	2014	Yes	Assistant Professor		29/07/2019	Aeronautical	Lean Manufacturing	2	-	-	-	-
<b>Mr.N.ELUMALAI</b>	ME	Anna University	2016	Yes	Assistant Professor		29/07/2019	Aeronautical	Industrial Engineering	4	-	-	-	-
<b>Dr.S.THIRUMAV ALAVAN</b>	Ph D	Sathyabama	2017	Yes	Associate Professor		01.07.2013	Aeronautical	CAD		-	-	-	-
<b>Mr.K.SATHISH KUMAR</b>	ME	Hindustan University	2013	Yes	Assistant Professor		10/06/2019	Aeronautical	Aeronautical Engineering		-	-	-	-
<b>Mrs.G.SELVAKU MARI</b>	M. E	Hindustan University	2011	Yes	Assistant Professor		01.07.2019	Aeronautical	Aeronautical Engineering		-	-	-	-
<b>Mr.R.PRASHANT H</b>	M. E	Anna University	2015	Yes	Assistant Professor		03.07.2019	Aeronautical	CAD/CAM		-	-	-	-
<b>Mr.N.PANDIYAR AJAN</b>	M. Tech	JNTU	2014	Yes	Assistant Professor		03.07.2019	Aeronautical	Aeronautical Engineering		-	-	-	-
<b>Mr.K.KAVIN KUMAR</b>	M. E	Hindustan University	2011	Yes	Assistant Professor		03.07.2019	Aeronautical	Aeronautical Engineering		-	-	-	-
<b>Mr.J. STEPHEN</b>	M. E	Anna University	2015	Yes	Assistant Professor		10.06.2019	Aeronautical	CAD/CAM		-	-	-	-
<b>Mr.M.VELAYUTHAM</b>	M. E	Anna University	2013	Yes	Assistant Professor		01.07.2019	Aeronautical	Aeronautical Engineering		-	-	-	-
<b>Mr.T. ARUL MANI</b>	M. E	Anna University	2016	Yes	Assistant Professor		29.07.2019	Aeronautical	Aeronautical Engineering		-	-	-	-

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<b>Ms.V.JAYALAKS HMI</b>	M. E	Anna University	2016	Yes	Assistant Professor		13.08.2019	Aeronautical	Aeronautical Engineering		-	-	-	-
<b>Mr.ABINICKS RAJA</b>	M. E	Anna University	2019	Yes	Assistant Professor		01.07.2019	Aeronautical	Aeronautical Engineering		-	-	-	-

**5.1. Student-Faculty Ratio (SFR)***(To be calculated at Department Level)*

No. of UG Programs in the Department (n): 2

No. of PG Programs in the Department (m): Nil

No. of Students in UG 2<sup>nd</sup> Year= **u1**No. of Students in UG 3<sup>rd</sup> Year= **u2**No. of Students in UG 4<sup>th</sup> Year= **u3**No. of Students in PG 1<sup>st</sup> Year= **p1**No. of Students in PG 2<sup>nd</sup> Year= **p2****No. of Students = Sanctioned Intake + Actual admitted lateral entry students***(The above data to be provided considering all the UG and PG programs of the department) S=Number of Students in the Department =*

$$UG1+UG2+UG3+PG1+PG2$$

*F = Total Number of Faculty Members in the Department (excluding first year faculty)***Student Faculty Ratio (SFR) = S / F**

Year	CAY	CAYm1	CAYm2
u1.1	(300+ 60+3)363	(180+30+3)213	(60+30+2)92
u1.2	(180+30+3)213	(60+30+2)92	(60+1)61
u1.3	(60+30+2)92	(60+1)61	(90+3)93
UG1	<b>u1.1+u1.2+u1.3</b>	<b>u1.1+u1.2+u1.3</b>	<b>u1.1+u1.2+u1.3</b>
Total No. of Students in the Department ( <b>S</b> )	668	366	246
No. of Faculty in the Department ( <b>F</b> )	<b>F1 = 44</b>	<b>F2 = 22</b>	<b>F3 = 18</b>
Student Faculty Ration (SFR)	<b>SFR1=S1/F1= 15.18</b>	<b>SFR2= S2/F2=16.63</b>	<b>SFR3= S3/F3=13.67</b>
Average SFR	<b>SFR=(SFR1+SFR2+SFR3)/3 = (15.18+16.63+13.67)/3 =15.15</b>		

**5.1. Provide the information about the regular and contractual faculty as per the format mentioned below:**

	Total number of regular faculty in the department	Total number of contractual faculty in the department
<b>CAY</b>	44	NIL
<b>CAYm1</b>	22	NIL
<b>CAYm2</b>	18	NIL

**5.2. Faculty Cadre Proportion**

The reference Faculty cadre proportion is 1(F1):2(F2):6(F3)

F1: Number of Professors required =  $1/9 \times$  Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

F2: Number of Associate Professors required =  $2/9 \times$  Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

F3: Number of Assistant Professors required =  $6/9 \times$  Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

Year	Professors		Associate Professors		Assistant Professors	
	Required F1	Available	Required F2	Available	Required F3	Available
<b>CAY</b>	4	5	7	4	23	35
<b>CAYm1</b>	2	1	4	3	13	18
<b>CAYm2</b>	1	1	3	2	9	15
<b>Average Numbers</b>	RF1=2.33	AF1=2.33	RF2=4.67	AF2=3	RF3=15	AF3=22.67

$$\text{Cadre Ratio Marks} = \left[ \left( \frac{AF1}{RF1} \right) + \left( \frac{AF2 * 0.6}{RF2} \right) + \left( \frac{AF3 * 0.4}{RF3} \right) \right] * 10$$

$$= 19.89$$

**5.3. Faculty Qualification**

$FQ = 2.0 \times [(10X + 4Y)/F]$  where x is no. of regular faculty with Ph.D., Y is no. of regular faculty with M. Tech., F is no. of regular faculty required to comply 20:1 Faculty Student ratio (no. of faculty and no. of students required are to be calculated as per 5.1)

	X	Y	F	$FQ = 2.0 \times [(10X + 4Y)/F]$
<b>CAY</b>	9	35	34	13.53
<b>CAYm1</b>	4	18	19	11.79
<b>CAYm2</b>	3	15	13	13.84
<b>Average Assessment</b>				<b>13.05</b>

**5.4. Faculty Retention****FACULTY RETENTION RATIO**

S.NO	ACADEMIC YEAR	NO.OF FACULTIES
1.	2017-2018	18
2.	2018-2019	15
3.	2019-2020	13
	Retention Percentage	= 13/18 = 72.22%

**SUMMARY**

Total Faculties in CAYm2 = 2017-2018 = 18

Faculties Retained in CAY = 2019-2020 = 13

Retention Percentage =  $13/18 = 72.22\%$

### **5.5 Faculty Competencies in correlation to Program Specific Criteria**

- Faculty members with various specializations are categorized into three specific domains namely: Aerodynamics, Propulsion and Aircraft Structures.
- Faculty members impart their domain specific knowledge to the students for helping them to excel in academic and encourage them to participate in various events like paper presentation, project exhibition competition, Aircraft design contest etc.
- Faculty members have published in renowned Journals and received funds from various organisations for sponsored research and consultancy project.
- Faculty competencies are correlated with specific domain through their specialization along with research paper, FDP, Workshop, Conference, Patent filed, and Product developed as specified under the title of domain in the tables shown below.

<b>Name of the Faculty</b>	<b>Specialization</b>	<b>Domain</b>
Dr. M. Sundararaj	Propulsion	Aircraft Propulsion
Dr. S. Elangovan	Aerospace Propulsion	Aerodynamics
Dr.C.Suresh Kumar	Aeronautical Engineering	Aircraft Structures
Dr. D. Ravi	Aeronautical Engineering	Propulsion
Dr. Kishore Kumar Brahma	Aeronautical Engineering	Aircraft Structures
Dr. M. N. Hussian	Space Engineering and Rockets	Aircraft Propulsion
Dr. S. Thirumavalavan	CAD	Aircraft Propulsion
Dr. Mallikarjun. R. Vaggar	Mechanical Air Armament	Aircraft Structures
Dr. N. S. Senthur	CAD/CAM	Aircraft Structures
Mr. N. Lenin Rakesh	CAD/CAM	Aircraft Structures
Mr. R. Karthikeyan	CAD	Aircraft Structures
Mr. S. Manavalan	IC Engines	Aircraft Propulsion
Mr. J. Manikandan	Thermal Engineering	Aircraft Propulsion
Mr. V .P. Durairaj	Manufacturing Engineering	Aircraft Structures
Mr.D.Hasen	Aeronautical Engineering	Aircraft Propulsion
Mr. M. Syedhaleem	Aeronautical Engineering	Aircraft Structures

Mrs. P. Divyabarathi	Aeronautical Engineering	Aircraft Structures
Mr. R. Sharavanan	CAD	Aircraft Structures
Mr. S. R. VimalRaj	Aeronautical Engineering	Aerodynamics
Mr. Arun. V. Rejuskumar	Manufacturing Engineering	Aircraft Structures
Mr. S. Karthikeyan	Energy Engineering	Aircraft Structures
Mr. S. Jeevabarathi	CAD/CAM	Aircraft Structures
Mr. A. Adaikalaraj	Aeronautical Engineering	Aerodynamics
Mr. R. Arun	Industrial Engineering	Aircraft Structures
Mr. A. Saravanakumar	Quality Engineering and Management	Aircraft Structures
Mr. N. Kalaimani	Avionics	Aerodynamics
Mr. R. Nallapan	Aeronautical Engineering	Aircraft Propulsion
Mr. Ramakrishna Madhira	Space Engineering and Rocketry	Aerodynamics
Mr. M. K. Karthik	Aeronautical Engineering	Aircraft Structures
Mr. R. Manikandan	CAD/CAM	Aircraft Structures
Mr. P. S. Mohanasaravanan	Thermal Engineering	Aircraft Propulsion
Mr. E. Mahavishnu	Aeronautical Engineering	Aerodynamics
Mr. B. Vikram	Lean Manufacturing	Aerodynamics
Mr. V. Giridharan	Aeronautical Engineering	Aircraft Structures
Mr. N. Elumalai	Industrial Engineering	Aircraft Structures
Mrs. Priya Mohad	Aerospace Engineering	Aircraft Structures
Mrs. S. Swetha	Aeronautical Engineering	Aircraft Structures
Mr. K Sathish Kumar	Aeronautical Engineering	Aircraft Propulsion
Mr. B. Venkadesh	Aeronautical Engineering	Aerodynamics
Ms. G. Selvakumari	Aeronautical Engineering	Aircraft Propulsion
Mr. R Prashanth	CAD/CAM	Aircraft Structures
Mr. N Pandirajan	Aerospace Engineering	Aircraft Propulsion
Mr. K. Kavinkumar	Aeronautical Engineering	Aircraft Structures
Mr. J Stephan	CAD/CAM	Aircraft Structures
Mr. P. Sureshkumar	CAD/CAM	Aircraft Structures
Mr. M. Velayudham	Aeronautical Engineering	Aerodynamics
Mr. T. Arul Mani	Aeronautical Engineering	Aircraft Propulsion
Ms. V. Jayalakshmi	Aeronautical Engineering	Aerodynamics

### **5.6 Innovations by the Faculty in Teaching and Learning**

Faculty members provide quality study materials to enrich students. Mode of teaching in this department is not only limited to the traditional chalk & talk methods, but also an amalgamation of the modern technology (e.g., power point presentation, audio-visual teaching etc.). The innovative methods so far practiced are listed below:

- Use of modern teaching aids like LCD projectors, Interactive boards with wireless pad, Internet enabled computer systems and Wi-Fi enabled laptops are usually employed in classrooms and other student learning environments.
- The Lesson plan is distributed among the students by the subject teacher well in advance of the commencement of the class. Faculty shares the study materials among the students.
- The biggest resource for self-learning is obviously the central library. The central library not only possesses plenty of books to meet the student's syllabus-oriented needs, and it contains numerous books by eminent national and international authors on a variety of topics which students may regularly access to sharpen and broaden their knowledge.
- Moreover, the department library also possesses numerous books to enhance the student's core competence in the field of Aeronautics and Aerospace.
- The department library also holds several magazines related to different domain of Aeronautical Engineering which the students may readily access.
- The department library also subscribes to a host of online and printed journals, which are also made readily available to the students.
- The library also includes a computer room with Internet access which is often used by students to access various forms of e-materials for their self-development.
- Students are encouraged to attend NPTEL, MOOC courses and refer online educational content to increase their knowledge base about the subject.
- Smart classroom is provided to students for the better understanding of concepts.
- Organizing conference, seminar, guest lecturers/webinar, workshop, symposium etc. to improve the quality of students and faculty.
- Providing the flight simulator training and in-plant training for students to enhance the hand on experience in the field of Aeronautics.

- Well-equipped laboratories in the campus strengthen the students to do research activities.
- Students are taken to industries, research institutes and field visits to expose them to the latest developments in their discipline.
- Tutorial sessions for analytical subjects to enhance the problem-solving skills are being conducted regularly.
- To support the student learning process, Instructional materials are uploaded in department website.
- The faculty members are encouraged to participate in short term courses, staff development programs and workshops on advanced topics to keep pace with the advanced level of knowledge and skills.

### **Methodologies for Improving the Teaching and Learning Process**

- The faculty members are constantly motivated to adopt innovative approaches in the classroom.
- Seminar presentations by the students are conducted on various topics to have better understanding in the subject.
- Industry Institute Interaction is given importance for the benefit of the students.
- Regular industrial visits are being arranged for the students to gain overall idea of industrial arena.
- Efforts are also made to improve the communication skills of the students by conducting placement and training Sessions.
- In order to enhance the confidence level in students, Mock Interviews are being conducted for the students by industry people.

**5.7. Faculty as participants in Faculty development/training activities/STTPs**

NAME OF THE FACULTY	Max. 5 per Faculty		
	CAY (2019- 2020)	CAYm1 (2018-2019)	CAYm2 (2017-2018)
Dr.M.Sundararaj	5	5	
Dr. S. Elangovan			
Dr. C. Suresh Kumar	5	5	
Mr. D. Hasen			5
Dr.Kishore Kumar			
Dr.M.N.Hussian			
Dr.Mallikarjun.R.Vaggar			
Mr. A.Adaikalaraj		5	
Mr. M. Syedhaleem		5	5
Mr. S. R. Vimal Raj			5
Mrs. P. Divyabarathi	5	5	
Mr. N. Kalaimani	5	5	
Mr. R. Nallappan			
Mr. R. Karthikeyan	5	5	5
Mr.V.P.Durairaj			
Mr.Arun.V.Rejuskumar			5
Mr.J.Manikandan	5	5	
Mr.S.Manavalan	5	5	5
Dr.D.Ravi			
Mr.R.Arun		5	5
R.Sharavanan	5	5	
S.Karthikeyan			
S.Jeevabharathi			
N.Leninrakesh			5
Mr.V.Giridharan			
Dr.S.Thirumalavan	5		
Dr.N.S.Senthur			

Mr.M.K.Karthik	5		
Mr.R.Manikandan	5		
Mrs.Priya Mohad			
Mrs.S.Swetha			
Mr.P.S.Mohanasaravanan	5		
Mr.B.Vehkatesh			
Mr.E.Mahavishnu	5		
Mr.B.Vikram	5		
Mr.N.Elumalai	5		
Mr.K.Sathish Kumar			
Ms.G.Selvakumari.	5		
Mr.R.Prashanth.	5		
MrN..Pandirajan.			
Mr.K.Kavinkumar			
Mr.J.Stephan	5		
Mr.M.Velayudham			
Mr.T.Arul Mani	5		
Ms.V.Jayalakshmi			
Mr.M.Ramakrishna	5		
Mr.P.Suresh kumar			
<b>SUM</b>	100	55	40
<b>RF= Number of Faculty required to comply with 20:1 Student-Faculty ratio as per 5.1</b>	34	19	13
<b>Assessment = <math>3 \times (\text{Sum}/0.5 \text{ RF})</math> (Marks limited to 15)</b>	17.64	17.36	18.46
<b>Average assessment over last three years (Marks limited to 15): 17.82</b>			

### **5.8 Research and Development**

The Department promotes and supports research culture among the faculty and students. The Department encourages its faculty members to do quality academic, applied and industrial research. The Department provides facilities, buys licenses of commercial engineering software

and plagiarism software and provides manpower, logistical and legal support for patent filing and product development. The Department also educates its faculty members about the different funding agencies to secure sponsored consultancy and research grants.

### **5.8.1 Academic Research**

#### **A. Number of quality publications on refereed/SCI Journals, Citations, Books/Book chapters etc**

Faculty members in the department are encouraged to publish their research work in various peer reviewed journals and book chapters. The details of the published work have been presented as the following.

<b>Academic Year</b>	<b>2019-2020</b>	<b>2018-2019</b>	<b>2017-2018</b>
<b>Number of Publications</b>	53	22	10

#### **2019-2020**

1. Meenakshi CM, Sucharitha S, Ravi, D. A novel work on the thermal behaviour of natural fiber reinforced epoxy composites. International Journal of Engineering and Advanced Technology 2019; 8(2): 590-592.
2. Jayakanth JJ, Ramasubramanian S, Chandrasekaran M, Manavalan S. A review on regenerative braking methodology in electric vehicle. International Journal of Psychosocial Rehabilitation 2019; 23(4): 220-226.
3. Elangovan S, Sundararaj M, Nallapan R. CFD analysis of controlling the airflow over airfoils using dimples. International Journal of Vehicle Structures and Systems 2019, 11(5), pp. 527–533
4. Adaikalaraj A, Sundararaj M, Syedhaleem M. Computational analysis of flow over bluff bodies using aero spikes. International Journal of Vehicle Structures and Systems 2019; 11(2): 220-223.
5. Hasen D, Karthikeyan R, Sundararaj M, Parammasivam KM. Computational analysis of mixing in scramjet combustor using cross flow injection technique. International Journal of Vehicle Structures and Systems 2019; 11(2): 224-227.
6. C.M. Meenakshi, Jeeva Bharathi, S Karthikeyan. Experiment work on the effect of hygrothermal environment on the mechanical behaviour of natural fiber reinforced epoxy

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  10. Elangovan S, Sundararaj M, Hasen D, Parammasivam KM. Influence of turbulence modelling on predicting the round jet flow field. *International Journal of Vehicle Structures and Systems* 2019; 11(5), pp. 534–535
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  12. Lenin Rakesh N, Sabarish R, Karthikeyan S. Performance analysis of jet engine of aircraft. *International Journal of Engineering and Advanced Technology* 2019; 8(2): 606-610.
  13. Ravi D. Performance evaluation of solar flat plate heat collector with parallel and series flow configurations. *International Journal of Engineering and Advanced Technology* 2019; 8(6): 762-764.
  14. Karthikeyan S, Raman Balasubramanian SR, Ramesh B, Raghul S. Quality management through six sigma method. *International Journal of Engineering and Advanced Technology* 2019; 8(2): 619-621.
  15. Hariharan R, Lenin Rakesh N, Ravi D. Reusable rockets and multi-planetary human life. *International Journal of Engineering and Advanced Technology* 2019; 8(2): 576-579.
  16. Thirumavalavan S, Sabarish R, Karthikeyan S. Test and determine the strength of ferrule joint pipe fitting. *International Journal of Engineering and Advanced Technology* 2019; 8(2): 758-761.
  17. Manikandan J, Arun M. The restoration of main turbine barring gear stoppage issue in thermal power station. *International Journal of Mechanical and Production Engineering Research and Development* 2019; 9(4): 1219-1234.

18. Meenakshi CM, Sucharitha S, Ravi D. A novel work on the thermal behaviour of natural fiber reinforced epoxy composites. *International Journal of Engineering and Advanced Technology* 2019; 8(2): 590-592.
19. Manavalan S, Balakrishnan S, Ramasubramaniam S. An effect of cobalt oxide nano additive with biodiesel blends using CIDI diesel engine. *International Journal of Mechanical and Production Engineering Research and Development* 2019; 9(3): 211-218.
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**Details of number of papers published in SCI journals, H-Index and Citations for some faculty members in the department during the assessment period.**

Faculty Name	Number of Quality paper published in SCI Journal	Google Scholar		Scopus Index	
		H-Index	Citations	H-Index	Citations
Dr. M. Sundararaj	3	2	71	2	61
Dr. S. Elangovan	3	9	267	7	172
Dr. C. Suresh Kumar	14	10	380	10	327
Dr. D. Ravi		2	24	2	40
Mr. R. Karthikeyan	1	1	6	3	17
Mr. J. Manikandan		5	444	3	1

Mrs. P. Divyabarathi				1	1
Mr. K. Sathish Kumar				1	54
Mr. M. Ramakrishna		1	1		
Ms. V. Jayalakshmi		4	67	4	182
Mr. M. Syedhaleem		1	3	1	1
Mr. N. Lenin Rakesh		1	4	1	13
Mr. S. Manavalan				3	45
Mr. R. Sharavanan				2	38
<b>Cumulative H-Index and Citations</b>		<b>36</b>	<b>1267</b>	<b>40</b>	<b>952</b>

### B. Details of PhD Guidance during the assessment period

Faculty Name of the Research Supervisor	Name of the Scholar & Reg. No	Research Topic	Year of Registration	Status
Dr. Sundararaj M	A. Arunachaleswaran (D17AE501)	Extraction of Wind Energy using Variable Pitch Propeller – An Industrial Approach.	2017	Confirmation completed
Dr. Sundararaj M	G. Mahindra Perumal (D17AE502)	Experimental and Numerical Investigation of Co-axial Jets.	2017	Course Work completed
Dr. Sundararaj M	S. Dilip Sankar (D18AE001)	Experimental studies on mixing characteristics of high-speed jets.	2018	Course Work completed

### 5.8.2 Sponsored Research during the assessment period

The Department is prompt in taking up valuable sponsored research. The completed and ongoing sponsored research projects are listed below.

S. No	Name of the Project	Funding Agency	Amount in Lakhs	Status
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1	Effect of variation of nose bluntness on the hypersonic air intake flow field	AR & DB	7.51	Completed
2	Plant E-Energy	Accord Energy Corporation India	4.8	Completed
3	Design of Hydro powered motor vehicle	Accord Energy Corporation India	3.95	Completed
4	Delamination behaviour of Sandwich composite structures	Big Bang Boom Solutions Private Limited	4.98	Completed
5	Design and Fabrication of Anti Drone for defence application	Big Bang Boom Solutions Private Limited	6.34	Completed
6	Design of Balloon satellite	Accord Energy Corporation India	9.45	Completed
7	Design and fabrication of Cube sat	Jasan Infra Private limited	3.95	Completed
8	Design of Micro UAV with negative altitude for surveillance	Big Bang Boom Solutions Private Limited	2.5	Completed
9	A novel pipe-line for damage detection in different of fiber reinforced polymer composites	Big Bang Boom Solutions Private Limited	3.8	Completed
10	Studies on Pitch, Yaw and Roll Control Through Secondary Injection in A Transitional Convergent-Divergent Nozzle	AR & DB	7.26	On-going

### 5.8.3 Development Activities

The department of Aeronautical Engineering conducts many vibrant activities such as product development, project exhibition etc. and also the department has well equipped research laboratories, working models, charts and instructional materials. Few of our departmental activities are given below.

#### A. Product Development

Students and Faculty members have contributed towards development of various products, few of which are given as follows:

- 32 Channel pressure scanner
- Weather monitoring system

- Cube SAT
- Surveillance drone
- RC fixed wing plane
- Rotorcraft

## B. Research Laboratories

The department provides facilities to the students to do project work and to improve their core knowledge in the field of Aeronautics. Advanced design and analysis software and state-of-art equipment are available in the department, few of which are mentioned below.

- High performance computer (HPC): Intel Xeon E5 2600 V3 processor-88 cores
- Subsonic wind tunnel (Test section size: 2 ft \* 2 ft, Max velocity: 50 m/s)
- High speed jet facility
- Hot-wire anemometer (30 m/s)
- Schlieren & Shadowgraph
- 32 Channel pressure scanner
- 200 kN Capacity computer controlled Universal Testing Machine (UTM)
- Hand lay-up facility for fabricating fiber reinforced polymer (FRP) composite laminates.

Our students and faculty did many projects and participated in various competitions, symposium, conference etc. The following are the major outcomes from the research laboratory.

- Project display
- Research publications
- Patent filing

S. No	Patent Title	Application Number	Date	Status
1	Hybrid Powered Motor Vehicle with Energy Saver	201841049514	28-12-2018	Published
2	Plant E-Energy	201941007104	22-02-2019	Published
3	Wind Tunnel Test Section Side Wall Mounted Traverse Mechanism	762/CHE/2014	18-02-2014	Published

## C. Instructional materials

- Course delivery plan

- Lecture notes
- Course file
- Lab manuals
- Interactive videos
- Power point materials

#### D. Working models/chart/monogram etc.

- **Working model**
  - Rotorcraft
  - Newtonian Telescope
  - Weather monitoring system
- **Chart/monogram etc**
  - Instructional charts
  - Safety charts
  - Concept and results charts

#### 5.8.4 Consultancy (From Industry) during the assessment period

Department of Aeronautical Engineering has three specific domains namely Aerodynamics, Propulsion and Aircraft structures. The faculty members and students are exponentially involved in various consultancy projects and the detail of work done by the department is given below.

S. NO	Name of the Project	Funding Agency	Amount in Rs	Status
1	Design and Fabrication of Passenger Drone	Big Bang Boom Solutions Private Limited	1,90,000	Completed
2	Design and Fabrication of Autonomous and remotely operated Underwater vehicle.	Sphere Tech Innovations	2,15,000	Completed
3	Development of Solar Powered UAV.	ARIES Solutions Private Limited	2,00,000	Completed
4	Design of Cluster UAV for Stealth operations.	ARIES Solutions Private Limited	1,25,000	Completed
5	Fabrication of Brain Controlled Drone	Accord Energy Corporation India	2,35,000	Completed
6	Design and Construction of Multi-tasking Drone	Jasan Infra Private limited	2,18,000	Completed

7	Development Bi-Wing ornithopter	Equipmen Technologies	64,000	Completed
8	Design of Hybrid para-motor powered Glider	Big Bang boom Solutions Private limited	1,13,510	Completed
9	Development of RC fixed wing plane for Surveillance	Equipmen Technologies	85,000	On-going

### **5.9. Faculty Performance Appraisal and Development System (FPADS)**

Bharath Institute of Higher Education and Research (BIHER) has a well-designed FPADS to recognise and reward its faculty members' contributions in the success of Institution and Department. BIHER acknowledges that an effective performance appraisal system for Faculty is vital for optimizing the faculty's performance. The existing system accounts for each component of their contributions towards teaching, research, mentoring and administrative duties. The template to access the faculty's performance has been shared below.

### **FACULTY OF ENGINEERING & TECHNOLOGY ACADEMIC PERFORMANCE INDICATORS (APIs) - FACULTY ACADEMIC YEAR - EVALUATION FORM**

Name:		Qualification:				
Designation:		Dt. of Joining (BIST):				
Department: Aeronautical Engineering		Dt. of Promotion to the present Post: -				
Total Experience (in years & months): 13 + yrs(A) Teaching (12 yrs 8 months ) (B) Industry ( 6 months ) (C) Research ( )						
S.No	Activity	Max. Points / Entry	No. of Entries	Total points Apparaisee	Total Points Appraiser	Total points Committee
<b>A</b>	<b>ACADEMIC COURSES</b>					
1	Teaching and evaluation of a full semester theory course	20				
2	Teaching and evaluation of a full semester lab course - Main	10				
3	Teaching and evaluation of a full semester lab course - Assits	5				
4	University Result : Above 85% – 10 marks 70%-84% - 5 marks	10/5				
5	Guiding Masters Dissertation	10				
6	Guiding UG .Project (per batch)	5				
7	Development of new syllabus	5				

8	Innovation of new experiment / Teaching aid	5				
10	Faculty Advisor	15				
11	Project Evaluation Co-ordinator / Member	10/5				
12	Faculty Development Program (Attended)-5 days/2 days	5/2				
13	Faculty Development Program - Coordinator(Conducted) 5days/2days	10/5				
14	Faculty Development Program – co-coordinator(Conducted) 5days/2days	5/2				
15	Certificate Program (Conducted)-Coordinator- 5days/2days	20/10				
16	Certificate Program (Conducted)-Co-coordinator- 5days/2days	10/5				
17	Seminars / Workshops (Attended)	3				
18	Seminars / Workshops - Coordinator(Conducted)-2days/1day	4/2				
19	Seminars / Workshops Co-coordinator(Conducted)-2days/1day	2/1				
20	Lab in-charge and Maintenance	10				
21	Lab Modernization / Purchases	15				
22	Time Table (Main)	10				
23	Time Table (Support)	5				
24	Invigilation (per session)	1				
25	Others					
<b>SUB TOTAL</b>						
<b>B</b>						
1	Guiding Ph.D. (max up to 3 years)	15				
2	Ph.D. Successful completion by student	30				
3	Journal paper with Paper with H-Indexing	25				
4	International Journal Paper with Scopus Indexed and Impact factor (Thomson Reuters/Web of Sciences – Annexure-I of Anna University)	20				
5	International Journal Paper with Scopus Indexed and Impact factor (Thomson Reuters/Web of Sciences – Annexure-I I of Anna University)	15				
6	International Conference paper with Scopus Indexed	10				
7	Refereed International Journal paper	8				
8	Refereed National Journal Paper	6				
9	International Conference Refereed paper	4				
10	National Conference refereed paper	2				
11	Reviewing Journal Papers ( per paper)	5				
12	Submitting a Research proposal for funding	5				

13	Receiving Project funding (every 10 Lakhs)- PI (External funding)	15				
14	Receiving Project funding (every 10 Lakhs)- Co-PI (External funding)	10				
15	Receiving Project funding (below 10 Lakhs)- PI (External funding)	10				
16	Receiving Project funding (below 10 Lakhs)- Co-PI (External funding)	5				
17	Completion report of funded project(every 10 Lakhs) PI (External funding)	10				
18	Completion report of funded project(below 10 Lakhs)Co- PI (External funding)	5				
19	Books (International ) Reviewed with ISBN- single author/Co-author	40/20				
20	Books (National) Reviewed with ISBN- single author/Co-author	30/15				
21	Organizing International Conference Organizing Chair / Secretary	20				
22	International Conference Executive Committee member	5				
23	Organizing National Conference Organizing Chair / Secretary	15				
24	National Conference Member Executive Committee	3				
25	Patent Registered	15				
26	Patent Obtained	30				
27	Patent Sold	40				
27	Consultancy (per 10 Lakhs)	15				
28	Recognition / Awards (International, National, State, Region)	30/20/ 15/10				
29	Invited Lectures/Key note speaker	7				
30	Chair – Conferences	5				
31	Others					
	<b>SUB TOTAL</b>					
<b>C</b>	<b>ADMINISTRATIVE WORK</b>					
1	Faculty Advisor (Societies / Clubs)	10				
2	Industrial Visits	3				
3	Social work (Co-ordinator / Support)	10/5				
4	Admission Counseling (Co-ordinator / Support)	15/10				
	NCC Officer	15				
5	NSS, YRC, Extension (Co-ordinator/ Support)	10/5				
6	Student convention, Symposia (>600,300 – 600, <300)	10/7/5				
7	Sports Day (Co-ordinator/ Support)	10/5				

8	Cultural Clubs (Co-ordinator / Support)	7/5			
9	Convocation (Co-ordinator /Support)	7/5			
10	Entrepreneurship Promotion cell (Co-ordinator / Support)	10/5			
11	General Administration	15			
12	Alumni (Co-ordinator / Support )	10/5			
13	Partnership outside the Institution	10			
14	Member, Boards(National / State)	15/10			
15	Interaction with Industry	20			
16	ISO (Institute / Department/Support)	20/15/10			
17	Professional Society Membership Paid (International / National)	10/5			
18	Committee Members	5			
19	Others				
	<b>SUB TOTAL</b>				
	<b>TOTAL</b>				

<b>CRITERION 6</b>	<b>Facilities and Technical Support</b>	<b>80</b>
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### **6.1 Adequate and well-equipped laboratories, and technical manpower**

S.No	Name of the laboratory	No of students per setup (Batch Size)	Weekly Utilization status (all the courses for which the lab is utilized) maximum	Technical Manpower support		
				Name of the technical staff	Designation	Qualification
1.	AERODYNAMICS LAB	30	24 periods	Mr. Pavin	Lab Engineer	B. E.
2.	AIRCRAFT STRUCTURES LAB	30	24 periods	Mr. Sathish	Lab Engineer	B. E.
3.	PROPULSION LAB	30	24 periods	Mr. Shanmugam	Lab Engineer	B. E.
4.	COMPUTER CENTER	30	30 periods	Mr. K S Mahesh	Lab Engineer	B. E.
5.	AVIONICS LAB	30	12 periods	Ms. Viji	Lab Engineer	B. E.
6.	AIRCRAFT SYSTEMS & MAINTENANCE LAB	30	24 periods	Mr. T.Sahoo	Aircraft Engineer	Diploma (DME)
7.	FLIGHT SIMULATION LAB	30	18 periods	Mr. Bijay Kumar Mohanty	Aircraft Engineer	Diploma (DME)
8.	AERO DESIGN & MODELLING LAB	30	24 periods	Mr. Bala Shanmugam	Lab Engineer	B. E.

### **6.2. Laboratories maintenance and overall ambiance**

- Department has enough labs which are used throughout the year on timetable basis to meet the curriculum requirements.
- Well trained lab technicians are available for maintenance of equipment on regular basis.
- All lab equipments are calibrated once in year on regular basis.
- Minor repairs found during the scheduled check-up will be carried out by the lab instructor.

- The servicing of the equipment is done by concerned agencies in the presence of lab instructors on a regular basis to make arrangements for proper usage of equipment's throughout the academic year.
- Lab in-charges maintains a Stock register for equipment and consumable items of the laboratory.
- One Teaching faculty and a Lab instructor are in-charge of the overall functioning/maintenance of each lab.
- Every year stock verification is done to ensure that the equipment available in the laboratory as per the records/ stock register and to know that the equipment health conditions.

### **Overall Ambience**

- All Laboratories are equipped with state of art equipment to meet the requirements of curriculum and beyond the curriculum.
- Labs with nominal power requirement are supported by Uninterrupted Power Supply which ensures that laboratory slots are utilized effectively.
- All laboratories are well furnished.
- Adequate lighting provided for smooth functioning of the labs with good visibility.
- All Labs are open for students and faculties for research.
- The courses which have practical work are scheduled in the labs every week.
- Labs are equipped with sufficient hardware and licensed software to run program specific curriculum and off program curriculum.
- Lab facility is provided for all students to carry research work and projects.

### **6.3. Safety measures in laboratories**

Safety measures in all terms are maintained in the laboratories based on the type of the laboratory and equipment present. The safety of the students is given utmost priority. Students are made educated about the operation & safety of the equipment in the introduction classes.

- Safety boards and charts are displayed on the walls of the laboratories.
- Circuit breakers and non-conductive floor is facilitated in the laboratories where heavy machinery is present.

- Students are instructed to wear Lab Aprons & Safety shoes while operating machinery in the laboratories under presence of lab instructor.
- Fire-Extinguishers are serviced based on the due dates.
- Heavy Machinery equipment laboratories are designed with emergency exit.

SNO	Name of the laboratory	Safety measures
1.	AERODYNAMICS LAB	First aid kit & Fire Extinguishers
2.	AIRCRAFT STRUCTURES LAB	First aid kit & Fire Extinguishers
3.	PROPULSION LAB	First aid kit & Fire Extinguishers
4.	COMPUTER CENTER	Circuit breakers
5.	AVIONICS LAB	First aid kit, Circuit breakers
6.	AIRCRAFT SYSTEMS & MAINTENANCE LAB	First aid kit & Fire Extinguishers
7.	FLIGHT SIMULATION LAB	Circuit breakers
8.	AERO DESIGN & MODELLING LAB	Circuit breakers & First aid kit

#### 6.4. Project laboratory

The Department has adequate facilities in laboratories for students to carry out in-house projects and research activities. These facilities are created to make students involve in innovative projects which have some identifiable application. Some of the notable facilities include

S. No.	Name of the Equipment	Name of the Laboratory
1	Hot-Wire Anemometer	Aerodynamics Laboratory
2	35 Channel Pressure Scanner	Aerodynamics Laboratory
3	Laser Smoke Flow Visualization	Aerodynamics Laboratory
4	8 Channel Pressure Scanner	Propulsion Laboratory
5	Digital Universal Testing Machine	Aircraft Structures Laboratory
6	TIG & MIG welding	Aircraft Systems & Maintenance Laboratory
7	Fibers & Resins	Aircraft Structures Laboratory (Composites)

## LIST OF RESEARCH LABS

- CENTER OF EXCELLENCE FOR DEFENCE APPLICATIONS
- AERODYNAMICS LABORATORY
- PROPULSION LABORATORY
- AIRCRAFT STRUCTURES LABORATORY

### AERODYNAMICS LABORATORY



### SUBSONIC WIND TUNNEL

#### Specifications

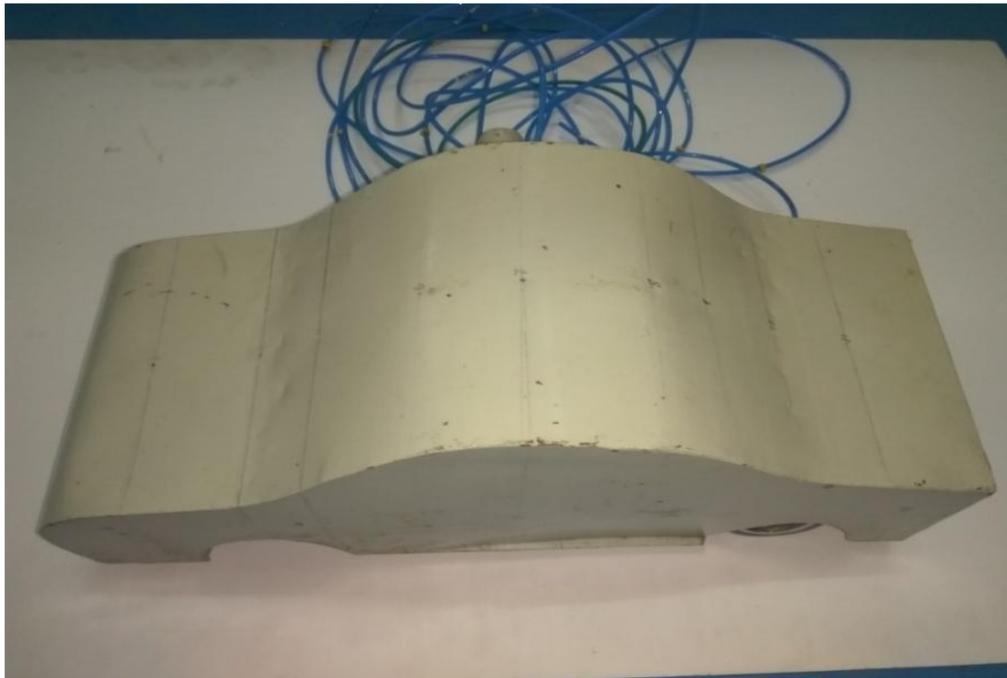
Test section Length	6 ft
Test section Width	2 ft
Test section Height	2 ft
Motor Power	20 hp
Maximum Velocity	50 m/s



**PRESSURE SCANNER FOR LOW-SPEED WIND TUNNEL APPLICATIONS**



**MISSILE AND DELTA WING MODELS**



**AUTOMOBILE MODEL**



**PRESSURE SCANNER FOR HIGH PRESSURE APPLICATIONS**



**SCHLIEREN FLOW VISUALIZATION SYSTEM**



**CYLINDER MODELS AND YAW SPHERE**



**WING MODELS**

**AIRCRAFT STRUCTURES LABORATORY**



**UNIVERSAL TESTING MACHINE – 200KN**



**SIMPLY SUPPORTED AND FIXED BEAM SETUP**



**COLUMN TEST APPARATUS**



**SPRING TEST SETUP, FATIGUE TESTING MACHINE WITH 200 kgf CAPACITY AND TORSION TESTING MACHINE WITH 20 kg – m CAPACITY**



**ROCKWELL HARDNESS TESTING MACHINE**



**CONSTANT STRENGTH BEAM TEST SETUP**



**WAGNER BEAM WITH STRAIN INDICATOR**



**COMBINED BENDING AND TORSION SETUP**

**PROPULSION LABORATORY**



**LOW SPEED JET TEST FACILITY WITH 3D TRAVERSE**



**HIGH SPEED JET TEST FACILITY**



**PROPELLER PERFORMANCE TEST RIG AND RAMJET ENGINE TEST SETUP**



**FREE JET AND WALL JET TEST SETUP AND FREE / FORCED CONVECTION TEST SETUP**

### AIRCRAFT SYSTEMS AND MAINTENANCE LABORATORY

#### **THORP – 211 AIRCRAFT**

The specifications are given in the table below,

<b>Crew</b>	1 pilot	
<b>Capacity</b>	1 passenger	
<b>Length</b>	5.49 m	18 ft 2 in
<b>Wingspan</b>	7.62 m	25 ft 0 in
<b>Height</b>	1.92 m	6 ft 1 in
<b>Wing area</b>	9.67 m <sup>2</sup>	105 ft <sup>2</sup>
<b>Empty weight</b>	339 kg	750 lb
<b>Max. takeoff weight</b>	575 kg	1,270 lb
<b>Powerplant 1 × Continental O-200-A,</b>	75 kW	100 hp
<b>Fuel capacity</b>	78 litres	21 gal
<b>Baggage capacity</b>	18 kg	40 lb
<b>Maximum speed</b>	193 kmph	120 mph
<b>Range</b>	764 km	375 miles
<b>Service ceiling</b>	3,810 m	12,500 ft
<b>Rate of climb</b>	229 m/min	750 ft/min

<b>Wing loading</b>	60 kg/m <sup>2</sup>	12.1 lb/ft <sup>2</sup>
<b>Power/mass</b>	0.13 kW/kg	0.08 hp/lb



**THORP 211 AIRCRAFT**



**HAWKER SIDDELEY 125 F400B**

**AIRFRAME AND AERO ENGINE REPAIR LABORATORY****TUMANSKY R – 13 GAS TURBINE ENGINE**

<b>Specifications</b>	
<b>Type</b>	Turbojet
<b>Compressor</b>	2 Spool, Axial Type, 3 LP Stages, 5 HP Stages
<b>Pressure Ratio</b>	8.9 : 1
<b>Turbine</b>	2 Stage Turbine
<b>Thrust (Max)</b>	39.9 kN (idle)
	63.7 kN (afterburner)
<b>Length</b>	4,605 mm
<b>Diameter</b>	1,095 mm
<b>Dry Weight</b>	1,205 kg
<b>Used in</b>	MIG 21 MF, Sukhoi Su – 15M & TM

**COMPUTER CENTER****Dr. S. PANNEERSELVAM HIGH PERFORMANCE COMPUTATIONAL FACILITY**

The department has a high-performance computational facility with the following specifications.

<b>Description</b>	<b>Specification</b>
Processor	Intel Xeon E5 2600 v3 processors – 56 cores
Operating System	Windows HPC server 2008 R2 (64 Bit)
RAM	256 GB

Hard Disk	17 TB
Graphics Card	40K Tesla GPU
Ethernet	LAN with Speed of 10 Gbps
Monitor	21 inch Full HD



### Dr. S. PANNEERSELVAM HIGH PERFORMANCE COMPUTATIONAL FACILITY

### OTHER COMPUTATIONAL FACILITY

Other computational facilities available in the department have been listed below,

S.No.	Description	Specification	Quantity
1	Server system	<b>Processor:</b> Intel – Xeon <b>Operating System :</b> Windows 7 (64 bit) <b>RAM:</b> 32 GB <b>Hard disc :</b> 2 TB <b>Graphics Card :</b> NVIDIA (2GB dedicated memory)	1 No
2	Client System	<b>Processor:</b> Intel – i3 <b>Operating System :</b> Windows 7 (64 bit) <b>RAM:</b> 2 GB <b>Hard disc :</b> 500 GB	50 No's
3	Accessories	UPS	1 No
		Laser Printers	4 Nos



**COMPUTER CENTER**

### SOFTWARE PACKAGES AVAILABLE

Other software packages available in the department have been listed below,

Software Package	No. of Licenses
CATIA V6	30
MATLAB	30
ANSYS Academic Teaching Introductory Version (32,000 nodes)	50
ANSYS Academic Research MECHANICAL & CFD (unlimited nodes)	1
MIDAS NFX	30

### AVIONICS LABORATORY



**FLIGHT SIMULATION LABORATORY**



### **SMART FLY ADVENT PA – I PRO FLIGHT SIMULATOR**

A flight simulator is a device that artificially re-creates aircraft flight and the environment in which it flies, for pilot training, design, or other purposes. It includes replicating the equations that govern how aircraft fly, how they react to applications of flight controls, the effects of other aircraft systems, and how the aircraft reacts to external factors such as air density, turbulence, wind shear, cloud, precipitation, etc.

### **LIBRARY FACILITY**

Adequate number of books, journals covering core areas of aeronautics and aerospace are available in the Department. The students are entitled to access the library to enrich their knowledge. More than 700 books in the areas of aerodynamics, aircraft structures, propulsion, flight dynamics, gas dynamics etc. are available in the library.

<b>CRITERION 7</b>	<b>Continuous Improvement</b>	<b>75</b>
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### **7.1. Actions taken based on the results of evaluation of each of the COs, POs & PSOs**

Identify the areas of weaknesses in the program based on the analysis of evaluation of COs, POs & PSOs attainment levels. Measures identified and implemented to improve POs& PSOs attainment levels for the assessment year including curriculum intervention, pedagogical initiatives, support system improvements, etc.

<b>POs Attainment level and actions taken for improvement</b>			
<b>POs</b>	<b>Target level</b>	<b>Attainment level</b>	<b>Observations</b>
<b>PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and Engg. specialization to the solution of complex engineering problems</b>			
PO1	67%	71%	Target Achieved
Action Taken: Nil			
<b>PO2: Problem analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.</b>			
PO2	67%	73%	Target Achieved
Action Taken: Nil			
<b>PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.</b>			
PO3	67%	74 %	Target Achieved
Action Taken: Nil			
<b>PO4: Conduct investigations of complex problems: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.</b>			
PO4	67%	75 %	Target Achieved
Action Taken: Nil			
<b>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.</b>			
PO5	67%	71%	Target Achieved
Action Taken: Nil			

<b>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.</b>			
PO6	67%	76%	Target Achieved
Action Taken : Nil			
POs	Target level	Attainment level	Observations
<b>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.</b>			
PO7	73%	75%	Target Achieved
Action Taken : Nil			
<b>PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</b>			
PO8	73%	78%	Target Achieved
Action Taken Nil			
<b>PO9: Individual and teamwork: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.</b>			
PO9	73%	75%	Target Achieved
Action Taken Nil			
<b>PO10: Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations and give and receive clear instructions.</b>			
PO10	67%	71%	Target Achieved
Action Taken: Nil			
<b>PO 11: Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.</b>			
PO11	73%	73%	Target Achieved
Action Taken: Nil			
<b>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.</b>			
PO12	73%	73%	Target Achieved
Action Taken: Nil			
PSOs	Target level	Attainment level	Observations

<b>PSO 1:Apply their skills in the field of Aerodynamics, Aircraft Propulsion, and Aircraft Structures and Predict the Aircraft performance characteristics along with stability analysis.</b>			
PSO1	67%	70%	Target Achieved
Action Taken: Nil			
<b>PSO 2:Conduct maintenance procedures in Aircraft Engines, Airframe, and Avionics systems for Continuous Airworthiness.</b>			
PSO2	67%	71%	Target Achieved
Action Taken: Nil			

### **7.2 Academic Audit and actions taken during the period of Assessment**

Academic audits are performed two times a year, with one internal and one external audit each semester to enhance the program's consistency and excellence. Course contents, lesson plans, and laboratory guides are verified by senior faculty members in the department, and finally approved by the HOD at the start of each semester. During the end of each semester, the auditing team verifies the following aspects:

- Process of Teaching and Learning
- Teaching Excellence
- Effective Utilization of Laboratory
- Internal/External Assessment Quality
- Co-Curricular Activities: Seminar, Guest Lecture, Conference Workshop, FDP, Internship, In-Plant training, Webinar, Summer Internships etc.
- Research Activities: Publications, Patents, Proposal
- Review of faculty members
- Feedback from the students

During academic audit the following documents of the faculty members are verified:

1. Syllabus Copy
2. Approved Lesson plan
3. Study materials
4. Scheme of Evaluation of Internal marks
5. Internal Assessment test - Details
  - Question paper
  - Sample Answer sheets

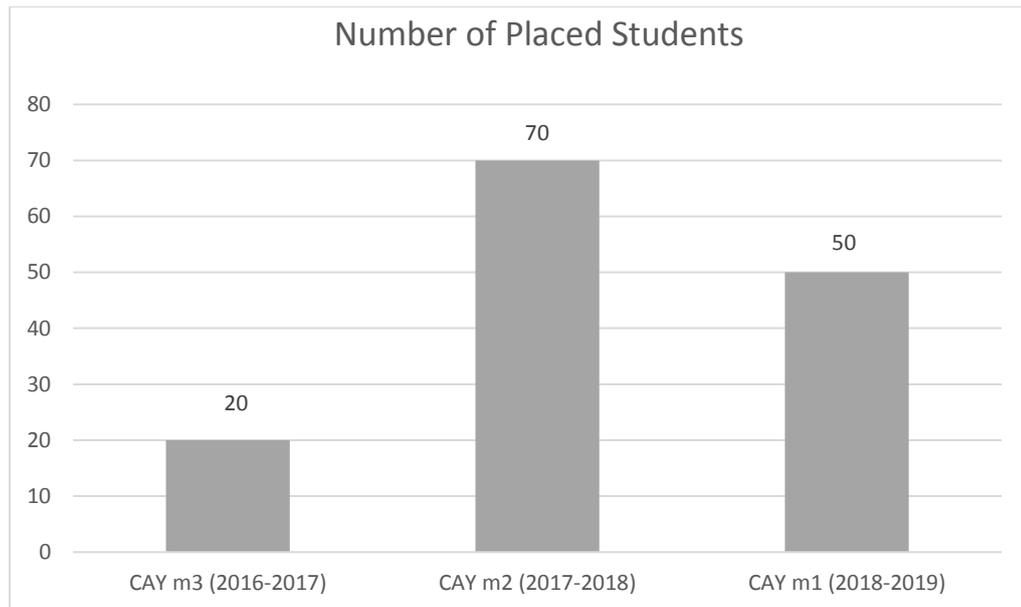
- Result Analysis
  - Identification of slow learners
6. Samples of Assignment Sheets
  7. CO-PO attainment
  8. Internal mark Evaluation sheet

### **7.3. Improvement in placement, Higher Studies and Entrepreneurship**

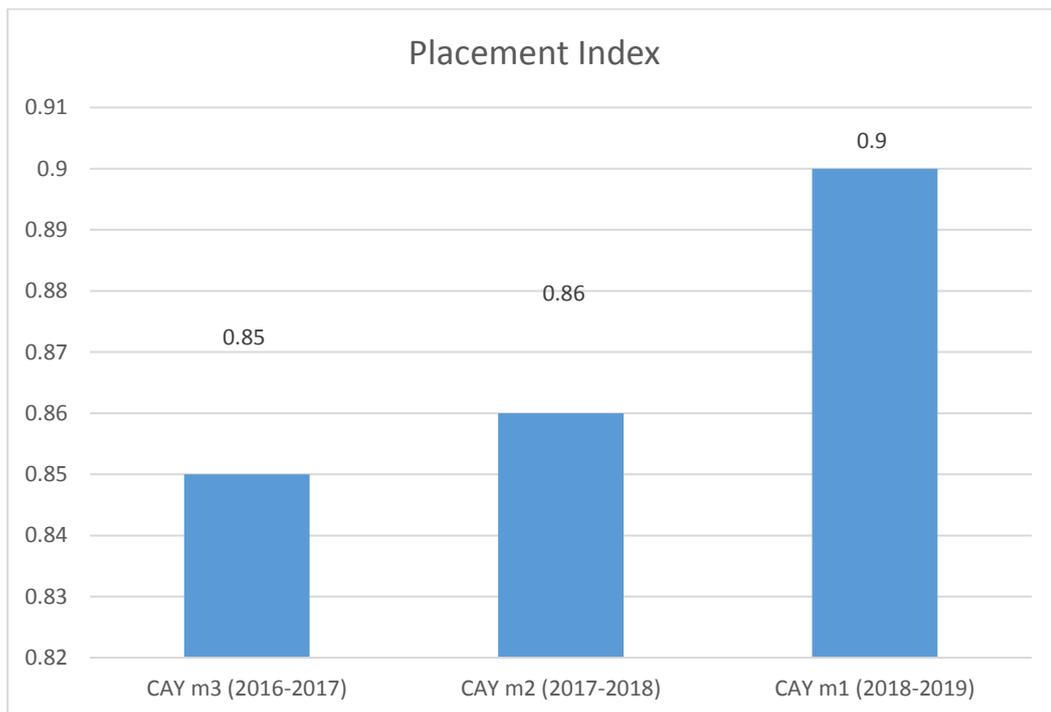
Placement, Higher studies, and Entrepreneurship have special focus of students. The department organizes Various events such as Orientation address, lectures, training on aptitude, logical, verbal ability, programming and soft skills, practice tests, mock recruitment drives, Alumni interactions to achieve placements for all students aspiring to join various organizations.

Career guidance programs, GATE training, German training etc are organized by the department to help students who pursue higher studies. Entrepreneurship awareness, workshops, Guest lectures are organized by the department to help students interested to become entrepreneurs. The following table shows the details of Placements, Higher studies, and Entrepreneurships for three consecutive years namely.

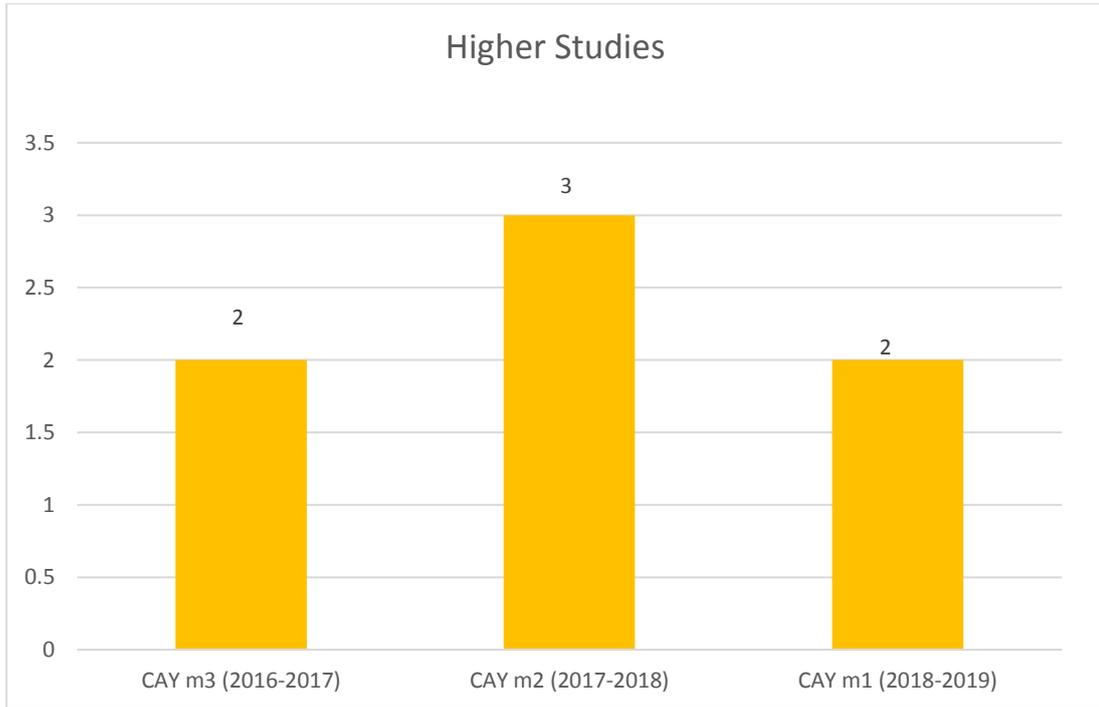
Category	CAY m1 (2018-2019)	CAYm2 (2017-2018)	CAY m3 (2016-2017)
Total No. of Final Year Students appeared in final year examination (N)	59	87	27
No. of Students placed in companies (X)	50	70	20
No. of Students admitted to higher studies with valid qualifying scores (Y)	2	3	2
No. of students turned entrepreneur in engineering technology (Z)	1	2	1
Total No. of Students Placed + Admitted for Higher Studies + Entrepreneurs	53	75	23
Placement Index: $(X+Y+Z)/N$	0.90	0.86	0.85



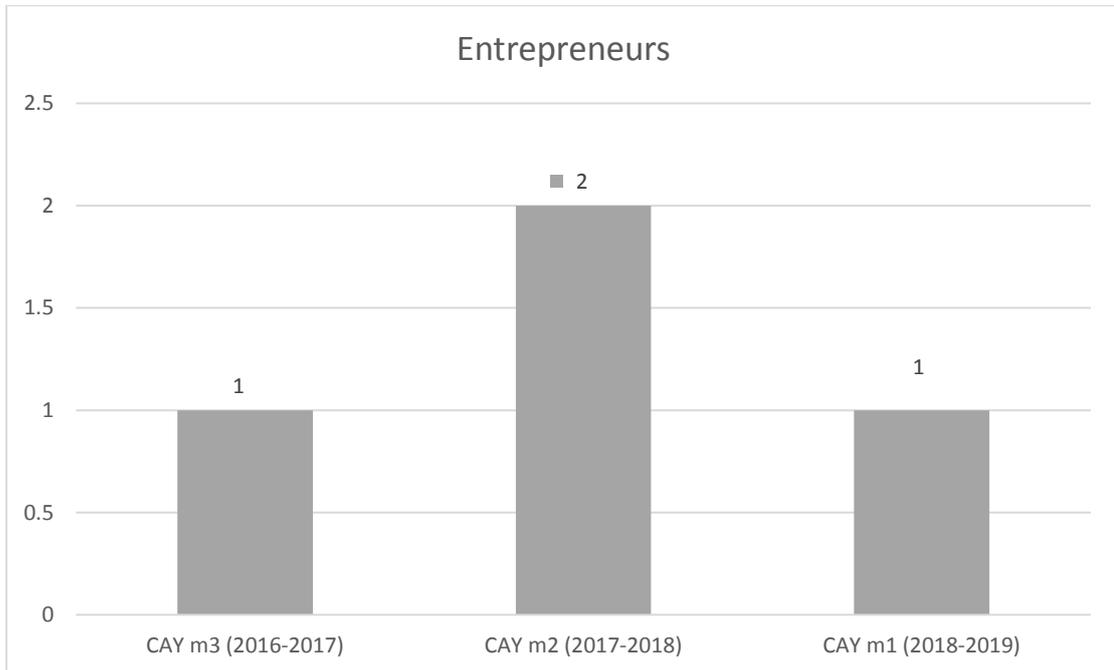
### Number of placed students



### Overall Placement Index



### Overall Higher Studies

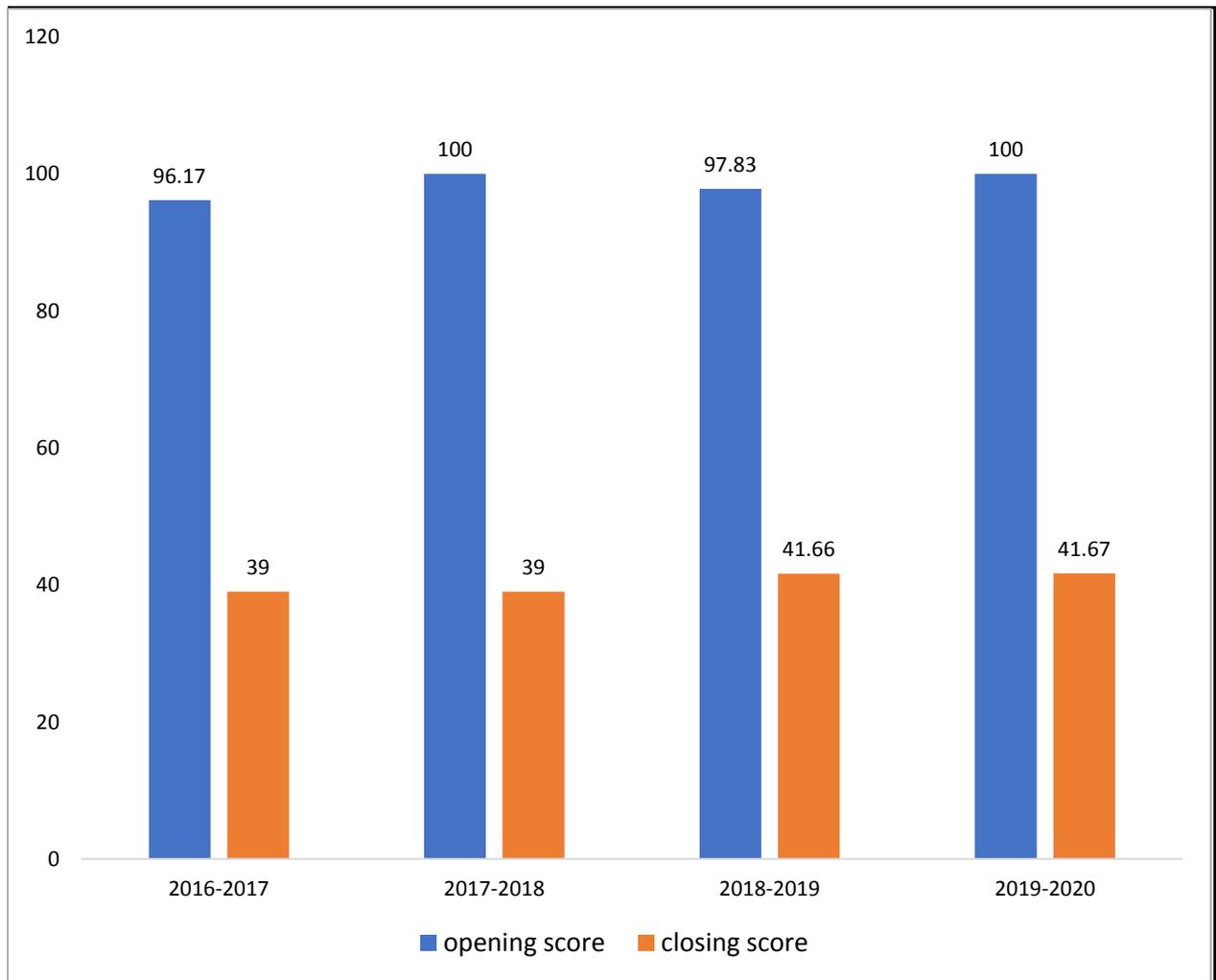


### Overall Entrepreneurs

**7.4 Improvement in the quality of students admitted to the program**

The percentage obtained in the subjects of Physics, Chemistry, and Mathematics in higher secondary school, including lateral entry students' percentage points, is used to assess students.

ITEM		CAY (2019-2020)	CAYm1 (2018- 2019)	CAYm2 (2017-2018)	CAYm3 (2016-2017)
National Level Entrance Examination					
National Level Entrance Examination (Bharath Engineering Entrance Examination)	Number of Students admitted	109	135	196	55
	Opening Score/Rank	93/45	95/2	97/1	76/119
	Closing Score/Rank	78/20786	81/9055	79/4727	45/8096
National Level Entrance Examination (Bharath Engineering Entrance Examination)	Number of Students admitted	4	3	3	2
	Opening Score/Rank	87%	81.56%	71.48%	68.59%
	Closing Score/Rank	65.7%	57.3%	63.31%	67%
Average CBSE/Any other Board Result of admitted students (Physics, Chemistry & Maths)	Number of Students admitted	109	135	196	55
	Opening Score/Rank	100%	97.83%	100%	96.17%
	Closing Score/Rank	41.67%	41.66%	39%	39%



**Physics, Chemistry, Maths (PCM) % of Admitted students**

## CRITERION 8

### First Year Academics (50)

#### 8.1. First Year Student-Faculty Ratio (FYSFR) (5)

Data for first year courses to calculate the FYSFR:

Year	Number of students (approved intake strength)	Number of faculty members (considering fractional load)	FYSFR	*Assessment = $(5 \times 20) / \text{FYSFR}$ (Limited to Max. 5)
CAY	2752	183	15	5
CAYm1	5040	316	15.9	5
CAYm2	2400	133	18	5
Average	3397	210	16.3	5

**Table B.8.1.**

**\*Note:** If FYSFR is greater than 25, then assessment equal to zero.

#### 8.2. Qualification of Faculty Teaching First Year Common Courses (5)

Assessment of qualification =  $(5x + 3y) / RF$ ,  $x$  = Number of Regular Faculty with Ph.D.,  $y$  = Number of Regular Faculty with Post-graduate qualification  $RF$  = Number of faculty members required as per SFR of 20:1, Faculty definition as defined in 5.1

Year	$x$	$y$	$RF$	Assessment of faculty qualification $(5x + 3y) / RF$
<b>CAY</b>	94	115	137	5.95
<b>CAYm1</b>	101	215	252	4.56
<b>CAYm2</b>	53	80	120	4.2
<b>Average Assessment</b>				<b>4.90</b>

**Table B.8.2**

### 8.3. First Year Academic Performance (10)

*Academic Performance = ((Mean of 1<sup>st</sup> Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks in First Year of all successful students/10)) x (number of successful students/number of students appeared in the examination)*

Academic Performance	CAY 2019-20	CAYm1 2018-19	CAYm2 2017-18
Mean of CGPA or Mean Percentage of all successful students (X)	7.87	6.97	7.24
Total no. of successful students (Y)	21	25	42
Total no. of students appeared in the examination (Z)	25	30	45
API = X* (Y/Z)	6.61	5.81	6.76
Average API = (AP1+AP2+AP3)/3			6.39

### 8.4. Attainment of Course Outcomes of first year courses (10)

#### 8.4.1. Describe the assessment processes used to gather the data upon which the evaluation of Course Outcomes of first year is done (5)

*(Examples of data collection processes may include, but are not limited to, specific exam questions, laboratory tests, internally developed assessment exams, oral exams assignments, presentations, tutorial sheets etc.)*

The assessment process uses both direct and indirect measures to measure the attainment of each outcome. The examples of such measures are given below:

Direct Measures Student

- Assignments
- Examinations

The process adopted to map the assessment questions, parameters of assessment rubrics etc. to the course outcomes to be explained with examples. The process of data collection from different assessment tools and the analysis of collected data to arrive at CO attainment levels need to be explained with examples

#### Direct Test Tools

##### (A) Internal Tests/Exams:

After commencement of the course, the Department will conduct two internal tests, scheduled in accordance with the university and college calendar of events. Care will be taken such that the teaching of at least 1<sup>st</sup>& 2<sup>nd</sup> units for internal test-I and 3<sup>rd</sup>&4<sup>th</sup>&5<sup>th</sup> unit for Internal test – II would be

completed before each test. The entire exam schedule will be monitored by an Internal Test (IT) Coordinator. The Course Coordinator will prepare the Question papers for the respective course and will be submitted to IT coordinator before three days from the commencement of test. The IT coordinator will conduct two IT tests as per calendar of events. The course coordinator will follow scheme and solutions for each test and evaluate the performance of students and the list will be displayed in student's notice board.

**(B) Model Exam:**

After completion of the course, the Department will conduct Model exam, scheduled in accordance with the university and college calendar of events. Care will be taken such that the teaching of all five units would be completed before the exam. The entire exam schedule will be monitored by an Internal Test (IT) Coordinator. The Course Coordinator will prepare the Question papers for the respective course and will be submitted to IT coordinator before three days from the commencement of test. The IT coordinator will conduct model exam as per calendar of events. The course coordinator will follow scheme and solutions for each test and evaluate the performance of students and the list will be displayed in student's notice board.

The distribution of marks for various components for the internal test and Model Exam is shown below in the table:

SI.No	Components for Internal Test	Syllabus Coverage for the test / exam	Duration of the test in Minutes.	Marks (max.)
01.	Internal Test – I	2 Units of the Syllabus	90	5
02.	Internal Test – II	Next 3 Units of the Syllabus	90	5
03	Model Test	Full Syllabus	180	10
04	Seminar/Assignment	-	-	5
06.	Attendance	-	-	5
<b>Total</b>				<b>30</b>

The marks allocated for attendance is given in Table.

% of Attendance	Marks
<75	Nil
76-80	1
81-85	2
86-90	3
91-95	4
96-100	5

**(C) Assignment/Seminar:**

After commencement of the course, the Department will assign two assignments for the students to increase their learning capabilities Homework assignments are a great opportunity for students to apply their knowledge and skills to solve problems. Course Coordinators will check the quality of the assignments that helps students to develop their skills in those particular subjects and also gives a way to express their own thoughts and understanding in a creative manner.

**(D) Laboratory Exam:**

After completion of the course, the Department will conduct lab Model exam, scheduled in accordance with the university and college calendar of events. Care will be taken such that all the experiments given in the curriculum would be completed before the exam. The entire exam schedule will be monitored by an Internal Test (IT) Coordinator. The Course Coordinator will prepare the Question papers for the respective course and will be submitted to IT coordinator before three days from the commencement of test. The IT coordinator will conduct model exam as per calendar of events. The course coordinator will follow scheme and solutions for each test and evaluate the performance of students for allotting Internal marks.

The criteria for awarding marks for internal test are given in **Table below**.

Items	Marks (Maximum)
Observation	7.50
Record	7.50
Model Practical	20
Viva	5
<b>Total</b>	<b>40</b>

The End Semester Examination question paper pattern is given below:

Syllabus Coverage	Duration of the Exam in Hours	Question Pattern
<b>Full Syllabus</b>	<b>3</b>	<b>Part – A, 10x2 = 20</b> Short answer Type, 10 questions each carrying 2 marks. 2 questions from each unit.  <b>Part – B, 5x6 = 30</b> Para /Analytical Type, 5 questions, one from each unit EITHER - OR type.  <b>Part – C, 5x10 = 50</b> Essay/Design/Analytical Type, 5 questions out of 7 covering the full syllabus
		Max mark = 100

### 8.4.2. Record the attainment of Course Outcomes of all first year courses (5)

Program shall have set attainment levels for all first year courses.

(The attainment levels shall be set considering average performance levels in the institution level examination or any higher value set as target for the assessment years. Attainment level is to be measured in terms of student performance in internal assessments with respect the COs of a subject plus the performance in the institution level examination)

Program shall set Course Outcome attainment levels for all courses.

Po's												PSO	
PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
75	80	65	70	75	75	75	75	75	75	75	75	75	75

Total CO'sfor a PO (x)	34	26	28	22	20	13	9	17	25	24	20	11	41	0
Average	2598	1960	2128	1657	1550	948	693	1310	1861	1780	1485	841	3079	0
PO target in % (Y)	70	80	65	70	75	75	75	75	75	75	75	75	75	0
(a) Average ao all Cos for a PO( $\sum/X$ )	76	75	76	75	78	73	77	77	74	74	74	76	75	0
(b) PO Value from Program exit survey	74	89	70	74	74	78	81	93	89	74	70	85	81	0
(c) PO values from Alumni survey	81	85	63	70	81	70	81	78	89	78	78	74	81	0
(z) PO Attainment= $(a+b+c)/3$	77	83	70	73	78	74	80	82	84	75	74	79	79	0
Comparing PO attainment(z) with PO Target (y)	A	A	A	A	A	A	A	A	A	A	A	A	A	A

### 8.5. Attainment of Program Outcomes from first year courses (20)

#### 8.5.1. Indicate results of evaluation of each relevant PO and/or PSO if applicable (10)

The relevant program outcomes that are to be addressed at first year need to be identified by the institution

Program Outcome attainment levels shall be set for all relevant POs and/or PSOs through first year courses.

(Describe the assessment processes that demonstrate the degree to which the Program Outcomes and Program Specific Outcomes are attained through first year courses and document the attainment levels. Also include information on assessment processes used to gather the data upon which the evaluation of each Program Outcome is based indicating the frequency with which these processes are carried out)

**BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH**

**DEPARTMENT OF AUTOMOBILE ENGINEERING**

**MASTER TABLE 2019 BATCH**

SE ME ST ER	COUR SE	CO's	Po's												PSO			
			PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2		
<b>SEMESTER 1</b>	<b>18HSEN101</b>	CO1	76											76		76		
		CO2		83									83				83	
		CO3			74									74			74	
		CO4				81		81									81	
		CO5					81		81	81							81	
		CO6							77					77			77	
	<b>18BSMA101</b>	CO1	82				82		82								82	
		CO2	82		82	82	82				82						82	
		CO3	76				76						76				76	
		CO4	76	76			76						76				76	
		CO5	85		85		85						85				85	
		CO6	65		65		65						65				65	
	<b>18BSPH101</b>	CO1	76	76	76	76	76				76	76	76				76	
		CO2	82	82	82	82	82				82		82				82	
		CO3	78	78	78	78	78				78	78		78	78	78		
		CO4	84	84			84				84	84		84	84	84		
		CO5	77	77							77			77	77	77		
		CO6	74	74	74	74	74				74		74	74	74	74		
	<b>18BSCH101</b>	CO1	80		80	80			80	80			80					
		CO2		82							82			82				
		CO3		80	80	80	80	80				80	80					
		CO4	81												81	81		
		CO5		75		75		75					75		75	75		
		CO6		72	72	72		72					72		72	72		
<b>18EESC101</b>	CO1	72	72	72	72	72	72	72	72	72		72	72	72	72			
	CO2	75	75	75	75	75	75				75			75	75			
	CO3	74	74	74	74		74			74		74		74	74			
	CO4	79	79	79	79	79		79	79	79	79			79	79			

		CO5	77	77	77	77	77	77	77		77	77			77		
		CO6	75	75	75	75	75			75	75	75	75			75	
	18ESME101	CO1	75			75				75						75	
		CO2	82				82									82	
		CO3		74	74			74	74							74	
		CO4			81											81	
		CO5														62	
		CO6	73						73	73						73	
		18BSPH2L	CO1	85		85	85					85	85	85			
	CO2		77	77	77					77	77	77	77				
	CO3		85	85	85						85	85	85				
	18BSCH2L4	CO1	87		87	87					87	87	87			87	
		CO2	84	84	84						84	84	84			84	
		CO3	83	83	83						83	83	83			83	
	18ESC122L	CO1	55		55	55		55	55		55	55	55			55	
		CO2	69				69			69	69	69	69			69	
		CO3		62		62					62						
		CO4		48							48	48	48			48	
		CO5	61		61	61					61	61	61			61	
		CO6	56	56	56			56			56	56	56			56	
	Total CO's for a PO (x)			34	26	28	22	20	13	9	17	25	24	20	11	41	0
	Average			25 98	19 60	212 8	16 57	15 50	94 8	69 3	13 10	18 61	17 80	14 85	84 1	307 9	0
	PO target in % (Y)			70	80	65	70	75	75	75	75	75	75	75	75	75	0
	(a) Average of all Cos for a PO ( $\sum/X$ )			76	75	76	75	78	73	77	77	74	74	74	76	75	0
	(b) PO Value from Program exit survey			74	89	70	74	74	78	81	93	89	74	70	85	81	0
	(c) PO values from Alumni survey			81	85	63	70	81	70	81	78	89	78	78	74	81	0
(z) PO Attainment=(a+b+c)/3			<b>77</b>	<b>83</b>	<b>70</b>	<b>73</b>	<b>78</b>	<b>74</b>	<b>80</b>	<b>82</b>	<b>84</b>	<b>75</b>	<b>74</b>	<b>79</b>	<b>79</b>	<b>0</b>	
Comparing PO attainment(z) with PO Target (y)			A	A	A	A	A	A	A	A	A	A	A	A	A	A	

Table B.8.5.1

### 8.5.2. Actions taken based on the results of evaluation of relevant POs and PSOs (10)

(The attainment levels by direct (student performance) are to be presented through Program level Course-PO matrix as indicated)

#### PO Attainment Levels and Actions for improvement – CAY only – Mention for relevant Pos

<b>POs Attainment level and actions taken for improvement</b>			
POs	Target level	Attainment level	Observations
<b>PO1: An ability to apply knowledge of mathematics, science and engineering.</b>			
PO1	75%	77%	1. Target Achieved 2. Attainment level need to be improved in 16.5% of the courses
Action Taken 1. Additional coaching classes were conducted beyond the regular planned classes 2. In order to get practical exposure allowing students to visit industries 3. Conducted research / innovation awareness program among students and faculty members.			
POs	Target level	Attainment level	Observations
<b>PO2: An ability to design and conduct experiments as well as to analyze and interpret data.</b>			
PO2	80%	83%	1. Target Achieved 2. Attainment level need to be improved in 14.5% of the courses
Action Taken 1. Students were found lagging in analytical part. To overcome this workshop were conducted with experts from industries. 2. In addition to that tutorial hours are handled by two faculty members.			
POs	Target level	Attainment level	Observations
<b>PO3: An ability to design a hardware and software system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.</b>			
PO3	65 %	70 %	1. Target Achieved 2. Attainment level need to be improved in 13.5% of the courses
Action Taken 1. Conducted workshop handled by industry experts. 2. Conducted research / innovation awareness program among students and faculty members.			
POs	Target level	Attainment level	Observations
<b>PO4: An ability to function on multidisciplinary teams.</b>			
PO4	70%	74%	1. Target Achieved 2. Attainment level need to be improved in 16.5% of the courses
Action Taken 1. In order to get practical exposure allowing students to visit industries 2. Conducted workshop handled by industry experts. 3. Conducted research / innovation awareness program among students and faculty members.			
POs	Target level	Attainment level	Observations
<b>PO5: An ability to identify, formulate and solve engineering problems.</b>			
PO5	75%	78%	1. Target Achieved 2. Attainment level need to be improved in 12.5% of the courses

<p>Action Taken</p> <ol style="list-style-type: none"> <li>1. The students were found lagging in analytical part. To overcome this, workshops were conducted with experts from Industry. In addition to that tutorial hours are handled by two faculty members.</li> <li>2. Additional coaching classes were conducted beyond the regular planned classes.</li> <li>3. Students are given technical training for improving their skills</li> </ol>			
POs	Target level	Attainment level	Observations
<b>PO6: An understanding of Professional and Ethical Responsibility.</b>			
PO6	75%	75%	<ol style="list-style-type: none"> <li>1. Target Achieved</li> <li>2. Attainment level need to be improved in 14.5% of the courses</li> </ol>
<p>Action Taken</p> <ol style="list-style-type: none"> <li>1. Conducted workshop handled by industry experts.</li> <li>2. Conducted awareness program among students and faculty members</li> </ol>			
POs	Target level	Attainment level	Observations
<b>PO7: An ability to communicate effectively.</b>			
PO7	75%	80%	<ol style="list-style-type: none"> <li>1. Target Achieved</li> <li>2. Attainment level need to be improved in 12.5% of the courses</li> </ol>
<p>Action Taken</p> <ol style="list-style-type: none"> <li>1. Students are motivated by using the teaching learning tools like Blackboard and Lecture capture systems.</li> <li>2. In order to get practical exposure allowing students to visit industries</li> </ol>			
POs	Target level	Attainment level	Observations
<b>PO8: The broad education necessary to understand the impact of engineering solutions in a global, economic , environmental and societal context.</b>			
PO8	75%	83%	<ol style="list-style-type: none"> <li>1. Target Achieved</li> <li>2. Attainment level need to be improved in 16.5% of the courses</li> </ol>
<p>Action Taken</p> <ol style="list-style-type: none"> <li>1. Allowing students to visit industries to get practical exposure.</li> <li>2. Conducted workshop handled by industry experts.</li> </ol>			
POs	Target level	Attainment level	Observations
<b>PO9: A Recognition of the need for and an ability to engage in life long learning.</b>			
PO9	75%	85%	<ol style="list-style-type: none"> <li>1. Target Achieved</li> <li>2. Attainment level need to be improved in 15% of the courses</li> </ol>
<p>Action Taken</p> <ol style="list-style-type: none"> <li>1. Conducted workshop handled by industry experts.</li> <li>2. Conducted research / innovation awareness program among students and faculty members.</li> </ol>			
POs	Target level	Attainment level	Observations
<b>PO10: A knowledge of contemporary issues.</b>			
PO10	75%	76%	<ol style="list-style-type: none"> <li>1. Target Achieved</li> <li>2. Attainment level need to be improved in 18.5% of the courses</li> </ol>
<p>Action Taken</p> <ol style="list-style-type: none"> <li>1. Teaching Learning tools – Lecture Capture System, Black board, etc.</li> <li>2. Students are motivated to do mini – projects on recent technologies.</li> </ol>			

POs	Target level	Attainment level	Observations
<b>PO 11:An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.</b>			
PO11	75%	75%	1. Target Achieved 2. Attainment level need to be improved in 14.5% of the courses
Action Taken 1. Teaching Learning tools – Lecture Capture System, Black board, etc. 2. Students are motivated to do mini – projects on recent technologies.			
POs	Target level	Attainment level	Observations
<b>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.</b>			
PO12	75 %	79%	1.Target Achieved 2.Attainment level need to be improved in 14.5% of the courses
Action Taken 1. Conducted workshop handled by industry experts. 2. Conducted awareness program among students and faculty members based on Research/innovation			
PSOs	Target level	Attainment level	Observations
<b>PSO 1 : An ability to solve real world problems in the areas related to Analog and Digital Electronics, Communication, Signal processing ,VLSI and Embedded systems.</b>			
PSO1	75%	80%	1. Target Achieved 2. Attainment level need to be improved in 16.5% of the courses
Action Taken 1. Teaching Learning tools – Lecture Capture System, Black board, etc. 2. Students are motivated to do mini – projects on recent technologies. 3. Set- up embedded laboratory for experimentation models. 4. Students are given technical training for improving their skills			
PSOs	Target level	Attainment level	Observations
<b>PSO 2:Expertise in using modern tools (both software and hardware) for the analysis of electronics engineering system.</b>			
PSO2	75%	77%	1. Target Achieved 2. Attainment level need to be improved in 12.5% of the courses
Action Taken 1. Teaching Learning tools – Lecture Capture System, Black board, Moodle, etc. 2. Students are motivated to do mini – projects on recent technologies. 3. Set- up embedded laboratory for experimentation models. 4. Students are given technical training for improving their skills			

**Table B.8.5.2**

Write similar action statements for relevant PSOs

## **CRITERION 9**

### **Student Support Systems     50**

#### **9.1 Mentoring system to help at individual level (5)**

##### **The services of counsellors / mentors/ advisors for each class or group of students for academic, personal and psycho-social guidance**

##### **Proctor**

- Each class will have two or three proctors and each proctor is assigned with a group of 15 – 20 students.
- Proctor will act as a philosopher, guide and friend to the students of their ward.
- The proctors keep track of the academic performance of the students and send the progress report of the students to the parents for all internal assessments and also end semester assessment.
- The proctors also monitor the attendance of the students.
- If any student lags or show deviation in his/her academic and attendance, the students will be counselled and appropriate actions are initiated.
- Students who require any personal guidance may approach the staff advisor for their assistance to overcome their difficulties.
- Any academic and non-academic issues of the students will be reported to the proctor and he / she will take necessary analysis and actions.
- Students who have bulk of / consecutive academic back logs will be counselled by the proctor and if needed will be brought to the notice of the Head of the Department.
- Students who need any personal or psycho-socio assistance can approach the proctor to overcome their issues.

##### **Class committee Chair person**

Each class will have a class committee chair person who should not be the Proctor for the respective class. He / She are responsible for conducting periodical meetings (twice in a semester) among faculty members who are handling the course for a particular class and a selected group of students. The student group comprises of the students with low, medium and good academic performance and also with different learning streams in their higher secondary education. During the meeting the students can express any issues regarding the progress of the course, difficulty in understanding etc. The issues will be positively considered by the faculty in-charges and they will then refine their methodology of teaching based on the students' need and if required it will be escalated. During the meeting the internal test performance will also be discussed and if there are any issues they will be addressed.

##### **Counsellor**

Counsellors play a major role in shaping the students who have physiological, psychological and sociological issues. The institute has a separate Counselling and Guidance Cell with experienced faculty members from various departments and external counsellors.

Students with serious personal problems will be identified and counselled. Confidentiality is maintained about the details of the students who get counselled to ensure trust among the students. So far around 350 students were benefitted through counselling for the past 4years and after counselling the students exhibited predominant changes in their behaviour.

## **9.2. Feedback analysis and reward /corrective measures taken, if any (10)**

The University follows a systematic process in the design, development and implementation of the curriculum offered. The curriculum design and development which takes into consideration the trends of the society and the nation, in terms of technological changes, human resource needs, research requirements, industry demands, employability needs, societal needs, and the needs of all the other stakeholders. The University makes sure that the curriculum design process addresses the contemporary problems and responds appropriately to the current and future needs of the local community and of the society at large. The design and development of curriculum is a process wherein the learning outcomes derived from the performance requirement of industry are achieved through enabling objectives.

**Step 1:** Boards of Studies are constituted for various programmes, instituted under different Faculties of the University, as per the guidelines of the UGC, after making need based assessment and feedback obtained from different stack holders for the new courses. The Board of Study is comprised of the Head of the Department as Chairman, all Professors of the Department, Two Associate Professors and Two Assistant Professors of the Department by rotation of seniority, two Experts from the Industry and academia, Student representative and a representative from the Alumni.

**Step 2:** The members of the Boards of Studies (BOS) discuss the curriculum of the Programme and syllabi of the subject considering the feedback from faculty, academicians, industrial experts, current students and alumni and recommend the Programme structure and the course content for the approval of the Academic Council.

**Step 3:** On approval by the Academic Council programmes are submitted to the Board of Management for final concurrence for implementation. The complete revision of the curriculum and syllabi is made considered once in three years, taking into consideration the technological developments and societal needs. However, the syllabus of certain subjects is revised as and when it is needed to remain with the fast growth in technology in the areas of the subject concerned. Thus, all the courses have undergone major syllabus restructuring in the last three years.

### **Program Design**

In order to meet the current and future, national and global needs, a large, diverse, and ever-growing set of programs are in place – spanning across sciences, engineering, health sciences, arts, commerce and management. The programs are offered at foundational as well as specialization levels. Additionally, several common components such as Cultural education, Yoga, Meditation, Self-Awareness & Personal Growth, Media Laws and Ethics, Environmental studies, Corporate Social Responsibility, Political Science, Social Inequalities, and Sustainability & Green solutions are included in the curriculum design.

### 9.3. Feedback on facilities (5)

#### Need Assessment

The process of need assessment for designing and development of the curriculum is generally informal. The various steps adopted by the University in understanding the need assessment for the curriculum development includes -

- The suggestion of the Academic Bodies are given due consideration on the needs/requirements at local, regional, state, national and global level.
- The adoption of academic flexibility has ensured involvement of expertise, continuous up gradation and need based curriculum design.
- Feedback for new and existing courses is obtained from experts, learned alumni, scientists, industrial experts, professionals and students.

The information obtained through feedback from different sources is placed in the meetings of the Board of Studies. The feedback obtained from students, alumni, employers, community and industry is given due weightage in revising the curriculum. Based on the feedback given by students and stakeholders the syllabus content and reinforcements needed there-in have taken place in some of the courses during the past. Now, 100% of the courses in the Faculty of Engineering and Technology have undergone total revision for implementation from 2015-16 onwards.

The strategies adopted for the curricular revision takes into account the following factors:

- Feedback from alumni, students, parents, employers, industrial personnel & academia
- Guidelines from regulatory authorities such as UGC, AICTE etc.,
- Assessment of local, regional & global needs
- Societal & Industrial needs.

Curriculum and Syllabi are changed / updated every three years or as and when required. The members of Board of Studies are drawn from exceptional academic background from premier academic / research institutes and leading industries. BIHER continuously in touch with the industry to access the new needs and developments so that we can respond with appropriate academic programs. The syllabus is periodically updated to meet the needs of the industry and emerging areas of research interest.

#### **Formal mechanism to obtain feedback from students regarding the curriculum and how it is made use of**

The University possesses a mechanism to obtain feedback from students both on the course content and teaching methodology. The students at the end of each semester submit a proforma detailing the merits and demerits of each course. These comments are reviewed and considered while revising the syllabus by the Board of Studies. Software developed by ITES of BIHER is being used to get the feedback from students about the teaching learning process. Feedback is obtained from the Alumni during convocation day and Alumni meet of the passed out students once in a year.

## Feedback on the curriculum from national and international faculty

The University elicits feedback on the curriculum from national and international faculty.

- The University elicits informal feedback from national and international faculty through Internet, e-mails and during their visits to University.
- The Conferences/Workshops/Seminars organized by Departments wherein renowned scientists/academicians are invariably invited as resource persons. Their outlook/suggestions in formal/informal manner are incorporated while developing the syllabi of different subjects.
- Most of the faculty members of the University are invited for delivering keynote address, invited talks as well for participation in national and international conferences/workshops/seminars, the outcome of the discussions with other participants related to University's academic programmers and curricula are considered to upgrade the curricula.
- At the time of semester end examinations, external examiners from National Institutes/Universities are also invited. These examiners also contribute in redesigning the curricula by giving suggestions based on their expertise.
- The views of external members of Board of Studies of each subject as well as Academic Council are taken into consideration while restructuring the curriculum of the University.
- The faculty members of the University who are nominated as external experts on the Board of Studies, Research and Recognition Committees and Academic Audit Committees of other Universities share their experience and suggestions and are considered during restructuring the curricula.
- Suggestions of the faculty from reputed institutions such as IITs, NITs, Central Universities etc. and practicing engineers from Industries are incorporated during curricula and syllabi revision.
- The Boards of Studies of all Departments have experts like practicing engineers from Industries and senior academicians from reputed institutions
- The senior academicians from National and International universities and executives from reputed industries are nominated members in the Academic Council. Suggestions from them are taken for revision.
- University has entered in to MoU with International Universities. The feedback from the foreign universities is considered for revision.

### 9.4. Self-Learning (5)

#### Apart from classroom interaction the provisions available for academic mentoring

Specific programmes such as Industrial visit, Internship programmes, Educational tours, industrial tie-up programmes and MoUs with national and international institutions offer Sample scope for hands-on training. Besides, students are given personal counselling and remedial coaching is provided for students who require extra attention. Special coaching classes for competitive examinations are provided for advanced learning.

Various clubs/societies/associations/Student chapters at department and college levels invite eminent scholars and scientists for interactive sessions with students and faculty. Apart from classroom interactions, the following provisions are available for academic mentoring:

- Faculty members are available in the faculty rooms from 4.00 p.m. to 5.20 p.m. for academic mentoring. Students meet their subject teachers to get their doubts clarified.
- Students have internet access to get information on course syllabus, learning materials, co-curricular learning information, home work, Question Answer instructions, teaching calendar, exam schedule and teacher contact information which are uploaded by faculty members to the university website.
- Students are provided with BIHER mobile app to access their study materials and academic information, anywhere and anytime.
- The “Semester Abroad Programme” (SAP) provides opportunities to study one semester in any of our partner universities/ institutions abroad. Meritorious students are encouraged and guided through the process of enrolling to SAP, a unique programme that them exposure to international academic environs, different teaching pedagogies and friends across the globe.

## **9.5. Career Guidance, Training, Placement (10)**

### **Provision for personal enhancement and development schemes such as career counselling, soft skill development, career-path identification, and orientation to well-being for its students.**

Training and Placement Cell offers career counselling and guidance. As one step ahead, soft skill development has been introduced as part of the curriculum in the Faculties of Engineering and Technology. It is mandatory to acquire two four credits for soft skills for successful completion of Undergraduate programmes. In addition to that various programmes are conducted such as Resume Writing, Professional Portfolio Development, Dressing Sense, Business Etiquette, Mock Interviews and Interview Techniques. Eminent management personalities are invited to guide on Personality Development, Interpersonal and Communication Skills, Time management, Memory Management etc.

Group Discussions are also organized to promote skills of interaction in groups and enhance the leadership styles. Training programmes are conducted for entrepreneurship by the Entrepreneurship Development Cell and personality development by the department of Business Studies. The departmental societies invite renowned academicians and entrepreneurs including alumni to guide students in their career path. Special coaching classes are conducted for civil services aspirants in the BIST campus. Special training for socially backward students is also coordinated by the cell.

### **Guidance and coaching classes for students appearing for competitive examinations**

The university conducts coaching classes for civil services and other competitive examinations like GATE/GRE/TOEFL etc. The University has centralized coaching unit named “BHARATH IAS STUDY CENTER for civil service aspirants to train them to appear for the Civil Service Examinations. Every faculty takes adequate measures to prepare students by providing suitable reading materials through library. Many students have cleared GATE/GRE/TOEFL examinations in recent years. Several students have gained admission in universities in abroad. Our students have cleared the national and international level examinations like NET / SLET / GATE / GMAT / GRE / TOEFL etc.,

### **Mechanism for students’ placement**

BIHER has established a separate Department of Training and Placement (T&P) to take care of placement and training related activities of the students. This cell is headed by a Director and supported by the Training and Placement Coordinators of the various departments.

The Placement Cell imparts training to students to meet the challenges in the job market by organizing group discussions and lectures on how to face interviews and to develop entrepreneurship skills. Besides this, the departmental associations invite experienced faculty and corporate managers including alumni to prime students for a future career. Varied stakeholders such as NGOs, Companies, Industries, Banking sector, and other have recruited a large number of students over the years in campus interviews conducted through the Placement Cell. The job opportunities and call for the admission to PG and Ph.D. courses by various Universities /Institutions are displayed on the notice board for the benefit of final year UG and PG students.

The placement coordinators guide the students and respond to the students' queries about placement activities. The T&P co-ordinates with the departments and industries, for scheduling the placement related activities. It also provides guidance to the students for Personality Development, Career Counselling, and Soft Skill Development etc.

The following services are provided to the students to identify job opportunities and to prepare themselves for interviews:

- i. The T&P provides information on placement procedures and guides the students in the preparation of their resumes and application forms for the submission to various industries/ organizations.
- ii. The T&P generates the detailed database of various industries/organizations (i.e. postal and electronic correspondence address of Head Office, branches and locations, product and business profile, mobile and e-mail of contact persons, nature of jobs and remuneration packages etc.)Interested in recruitment.
- iii. The T&P in coordination with the EDC conducts the Entrepreneurship Awareness/Motivation Programmes, Project Identification and Planning and Financing of Projects with faculty support. The outcome of these programmes is that number of students has started their own business units. This encourages us and gives us a sense of satisfaction.
- iv. In addition to the above, the T&P also conducts overseas placement activities.
- v. Every institution has an active Alumni Association to provide information about job opportunities and self-entrepreneurship development programmes provided by past students.
- vi. The main focus of the placement cell is to sensitize the students about the campus interviews and employment opportunities.

On an average 90% to 93% of the students are placed annually.

In India, the lacuna of employability skills, among graduates remains as a challenge. The Department of Training and Placement of BIHER combated this challenge in the most constructive and decisive manner by offering various skill development programmes.

Learning & Development programmes were offered in the following modules:

- ❖ Cracking the Aptitude Test
- ❖ The art of Resume Building
- ❖ The nuances of Group Discussion
- ❖ Facing the Interview
- ❖ The imperative of Personality Development

The onus of placing eligible students is the primary objective of the placement cell. Round the year efforts to attract the corporate world met with a resounding success. **Over 100 companies** jumped the band-wagon to hire the students of our University.

The following is the *select list of companies* that visited the campus for the year 2014-15

- ❖ Tech Mahindra
- ❖ L&T InfoTech
- ❖ HCL ISD
- ❖ Hewlett Packard
- ❖ Motherson Group
- ❖ Simpson
- ❖ Yamaha
- ❖ Apollo Tyres
- ❖ Sanmar
- ❖ Data 64

**Counselling & Career Guidance:** The Placement Cell integrates the task of directing the students who aspire to pursue higher education in the international arena. For those students who aspire to become technocrats / entrepreneurs, the cell provides guidance to ensure that they become what they intend to become.

### **Skill Building and Placement: Department of Training and Placement Cell**

#### **Preamble:**

The University is committed not only to impart relevant quality higher education and produce conscious researchers, technologists, professionals and citizens, but also to guide and shape the career of the students. The University has modernized the Department of Training & Placement to realize the above objectives. It plays a vital role in career planning, career-path-identification, goal setting, grooming, mapping, counselling, training and holistic development of the students. The TPC caters to the placement needs of the students on the campus. It also acts as an interface between the students and the recruiting industries/organizations.

#### **The Context:**

Many students on the campus belong to the socially marginalized and economically deprived backgrounds and are mostly first generation degree learners. These students suffer from several inhibitions and lack confidence in comparison to the students of metropolitan areas.

In addition to subject knowledge and technical skills, it is imperative to groom the students for employability and future careers. The University provides the fundamental and domain knowledge of the concerned subject, problem analysis, design and development solutions, research aptitude but the need to develop self-confidence, ability to conduct investigations of complex/real life problems, usages of modern technology, soft-skills, ethics, the values of environment sustainability, is realized very strongly.

The University is already conducting training programmes and recruitment drives at the individual level. But a large number of students were left out or lagged behind in the process. This lacuna was rightly filled by establishing a separate Central Training and Placement Cell, with a structured functioning.

The Cell is headed by a Director and supported by office staff recruited specially by the University.

The TPC office is located in the main SA block and is provided with the necessary infrastructure as listed below:

- 1) Well-furnished computerized office.
- 2) An audio-visual hall to conduct pre-placement workshops, training programmes etc.
- 3) Round table facility for group discussions.
- 4) Teleconferencing facility to conduct online interviews
- 5) The office of University-Industry Interaction Cell is located in close proximity of TPC for extending major support in terms of liaisoning with industries.

### **Objectives of the Practice**

The objectives of TPC in practice are:

- To assist students to identify their academic and career interests, their short and long-term goals through individual counselling and group sessions.
- To support the students for placement in reputed industries/organizations through on and off campus placement programmes.
- To organize special lectures and workshops relating to soft skills, personality development and group discussions to promote leadership styles.
- To conduct various programmes such as – technical, aptitude and general knowledge tests, resume writing and mock interviews/interview techniques, special training for socially backward and under privileged students etc.

### **The Practice:**

#### **Arranging In-plant Training/Internship for the students:**

Internship is a milestone in the student's academic career. Combined with the information gathered in the classroom, this experience is a substantial way to prepare them for their future employment. The efforts are made for the students to undergo practical training for specific period in multinational/national/ private/ public sector undertakings/government departments, research laboratories/ institutes and academic institutes.

#### **Industrial/Professional Tours:**

In order to understand the working of corporate sector, the TPC plans and executes visits of students to different industries/organizations located in different regions of India to get right exposure and opportunity for training.

#### **Guidance for Higher Studies in India and Abroad:**

The TPC provides detailed guidance to the students who wish to make career in higher education based on up-to-date placement statistics and an envisioned view of future educational and industrial trends. The TPC invites experts to offer career guidance and organizes workshops for providing training in this respect.

#### **Campus Placement:**

Campus Recruitment Programme (CRP) is promoted for the young students aspiring for appropriate placement in government departments, private/public sector undertakings, industries and research/academic institute. The detailed database of organizations interested in recruitment is continuously updated through the use of Yellow Pages, Association Members/regional industrial directories, websites of companies etc. For placement, a large number of prospective employers are contacted and promoted at the beginning of academic year to visit the University for CRP annually.

In order to achieve excellent placement record, the TPC gives great deal of emphasis on close interactions with executives of various industrial/ commercial organizations, both at the national and international levels, for strengthening the University-Industry interaction. It provides all audiovisual facilities for Pre-Placement talk, written test, group discussion and interviews.

#### **University-Industry Interaction Cell:**

The University-Industry Interaction Cell was established to strengthen linkages with the industry, research organizations and help to identify the recruiting industries. The objectives of this cell are – to impart industrial training, undertake joint R&D projects, offer technical consultancy and to solve the issues/problems of industries. This Cell organizes a HR Summit wherein over 100 HR executives gather and this programme serves as a great networking platform.

#### **Capacity Building among Women-Students:**

The TPC is committed to ensure capacity building, skill development for women students by providing them advanced training and to make them aware of career openings. Career planning strategies is adopted for career growth of the girl students of the University. The Cell creates awareness to girl students regarding flexible working conditions, part time work; home based work and family friendly policies.

#### **Training on Emotional Intelligence:**

The Cell conducts technical, aptitude and general knowledge tests for enhancing analytical skills and general awareness of students. Group discussions are also organized to promote skills of interaction in group and leadership styles. Company executives are invited to share their expertise on various topics, workplace situations, current trends and future scenario. The eminent management experts are also invited from corporate to conduct workshops on personality development, interpersonal and communication skills, time management, memory management etc. TPC coordinates various activities/organize programmes such as career goal mapping, mock interviews, group discussions, case studies, job application preparation, resume writing and referral, professional portfolio development, business etiquette, technology management, special training for socially backward students etc. Many soft skills and personality development programmes have been organized during the last five years.

#### **Multi-Lingual Center:**

To capitalize on off-shore opportunities, the Department of Training and Placement has established a Multilingual Center to make the students proficient in foreign languages such as

- Japanese
- French
- German

The language training is imparted by native speakers of the respective languages mentioned above.

#### **Alumni Association:**

The TPC obtains information and seeks support from alumni in facilitating placement of present students. Alumni meets are organized every year to increase interactions between the past and present students. The TPC offers senior placement assistance to our alumni for maintaining strong bond of affection between University and its alumni.

**Entrepreneurship Education:**

The TPC conducts Entrepreneurship Awareness/Motivation Programmes, Project Identification and Planning and Financing of Projects with faculty support. Under this scheme, five Entrepreneurship Awareness Programmes have been conducted. The outcome of these programmes in terms of number of students who have started their own units is very much encouraging.

**National and International Linkages:**

The University has signed over 90 MoUs with various institutions of national/ international importance/other universities/industries/corporate houses.

The TPC has well documented career path identification procedure as outlined in the following chart, sound placement policy and campus recruitment process which has resulted into a resounding success.

BIHER has placed more than 90% of all PG students consistently for the past 5 years.

BIHER has established a separate Department of Training and Placement (T&P) to take care of placement and training related activities of students. This cell is headed by a Director and supported by the Training and Placement Coordinators of the departments.

The Placement Cell imparts training to students to meet challenges in the job market by organizing group discussions and lectures on how to face interviews and to develop entrepreneurship skills. Besides these, the departmental associations invite experienced faculty and corporate managers including alumni to prime students for a future career. Varied stakeholders such as NGOs, Companies, industries, Banking sector, and others have recruited a large number of students over the years in campus interviews conducted through the Placement Cell. The job opportunities and call for the admission to PG and Ph.D. courses by various Universities /Institutions are displayed on the notice board for the benefit of final year UG and PG students.

The placement coordinators guide students and respond to the students' queries about placement activities. The T&P co-ordinates with the departments and industries, for scheduling placement related activities. It also provides guidance to students for Personality Development, Career Counselling and Soft Skill Development etc.

The following services are provided to students to identify job opportunities and to prepare themselves for interviews:

- i. The T&P provides information on placement procedures and guides students in the preparation of their resumes and application forms for submission to various industries/ organizations.
- ii. The T&P generates the detailed data base of various industries/organizations (i.e. postal and electronic correspondence address of Head Office, branches and locations, product and business profile, mobile and e-mail of contact persons, nature of jobs and remuneration packages etc.)Interested in recruitment.
- iii. The T&P in coordination with the EDC conducts the Entrepreneurship Awareness/Motivation Programmes, Project Identification and Planning and Financing of Projects with faculty support. The outcome of these programmes is that many students have started their own

business units. This encourages us and gives us much satisfaction.

- iv. In addition to the above, the T&P also conducts overseas placement activities.
- v. Every institution has an active Alumni Association to provide information about job opportunities and self-entrepreneurship development programmes provided by student former.
- vi. The main focus of the placement cell is to sensitize students about campus interviews and employment opportunities supported by the Training and Placement Coordinators of the departments.

The Placement Cell imparts training to students to meet challenges in the job market by organizing group discussions and lectures on how to face interviews and to develop entrepreneurship skills. Besides these, the departmental associations invite experienced faculty and corporate managers including alumni to prime students for a future career. Varied stakeholders such as NGOs, Companies, industries, Banking sector, and others have recruited a large number of students over the years in campus interviews conducted through the Placement Cell. The job opportunities and call for the admission to PG and Ph.D.courses by various Universities /Institutions are displayed on the notice board for the benefit of final year UG and PG students.

The placement coordinators guide students and respond to the students' queries about placement activities. The T&P co-ordinates with the departments and industries, for scheduling placement related activities. It also provides guidance to students for Personality Development, Career Counselling and Soft Skill Development etc.

The following services are provided to students to identify job opportunities and to prepare themselves for interviews:

- vii. The T&P provides information on placement procedures and guides students in the preparation of their resumes and application forms for submission to various industries/ organizations.
- viii. The T&P generates the detailed database of various industries/organizations (i.e. postal and electronic correspondence address of Head Office, branches and locations, product and business profile, mobile and e-mail of contact persons, nature of jobs and remuneration packages etc.) Interested in recruitment.
- ix. The T&P in coordination with the EDC conducts the Entrepreneurship Awareness/Motivation Programmes, Project Identification and Planning and Financing of Projects with faculty support. The outcome of these programmes is that many students have started their own business units. This encourages us and gives us much satisfaction.
- x. In addition to the above, the T&P also conducts overseas placement activities.
- xi. Every institution has an active Alumni Association to provide information about job opportunities and self-entrepreneurship development programmes provided by student former.
- xii. The main focus of the placement cell is to sensitize students about campus interviews and employment opportunities.

## **9.6. Entrepreneurship Cell (5)**

### **Entrepreneurship Development Cell**

In the engineering college of the university, a unique method of encouraging students to seek self-employment has been introduced. An Entrepreneur Club and a Training Centre for SMEs have been started. These forums harness ideas, instill the benefits of self-employment and encourage the students towards the concept. Similarly, medical students and students of life sciences are encouraged to start their own practices.

## **9.7. Co-curricular and Extra-curricular Activities (10)**

BIHER understands that active engagement in sports activities during the academic experience can provide multiple physical, psychological and social advantages to students. The University always encourages the students to participate in various sports/extra-curricular activities. The policies of the University for enhancing student participation in sports and extracurricular activities are given below:

### **(a) Additional academic support and academic flexibility in examinations:**

The students who are participating in sports and extracurricular activities are given special attention by the faculty. The laboratory works of such students are adjusted in repetition batches and internal tests, if missed due to sports and extracurricular activities are adjusted under Academic Flexibility of Schools/Institute.

- Students with good record in sports are admitted under sports quota without charging tuition fee and with free hostel accommodation
- Extra classes are conducted for students participating in sports and related activities
- Students participating in sports competitions during assessment test and semester end examinations are permitted to take substitute examination

### **(b) Special dietary requirements, sports uniform and materials:**

- i. The University offers sports uniforms, sport kits and other materials for team members. It also provides TA/DA and coaching support to sports persons during competitions/tournaments.
- ii. The Department of Sports organizes sports training/conditioning camps of various sporting events at University Sports Complex. The special diet like - a high energy breakfast (i.e. milk, eggs and banana), special dietary lunch and dinner are provided in the camps in addition to the daily allowance.
- iii. The University also arranges psychological clinics for the motivation and better performance of athletes.
- iv. Physical fitness camps are also conducted for the sport person with the help of University Health Center.
- v. The University in its annual budget allocates funds for recurring and non recurring expenditure of the Physical Education department
- vi. The department of Physical Education takes care of the special requirements of the sports persons.

University Sports persons are provided with track suits and blazers.

### Sports, cultural and extracurricular activities available to students

The following sports, cultural and extracurricular activities are available to students:

#### Sports Activities:

- Inter-collegiate sports Tournaments.
- Inter-group Tournaments.
- Inter-University sports Tournaments.

BIHER has adequate sports facilities, administered by a Sports Advisory Committee at the University level, headed by the Director of Physical education and supported by Physical Directors in the respective campuses of the University. Constructive ideas are always welcome for the furtherance of sports activities at the University and institution levels.

Well-equipped departments of physical education of various campuses cater to the requirement of training and facilitating sports activities of students as well as the staff, both teaching as well as non-teaching.

The Department of Physical Medicine & Rehabilitation, Faculty of Medicine, headed by Prof. Dr Karthikeyan, supports the Sports Department of the University in extensive trainings and rehabilitation of University sportsmen and athletes.

BIHER conducts annual,

1. Sports and Athletic Meet- National Level : **1 meet/ Year**
2. Sports and Athletic Meet- State Level : **2 meets/Year**
3. Sports and Athletic Meet- Intra University : **3 meets /Year**

Well maintained grounds and stadium are being used for the said purpose. Many of our students have represented the University at various sports activities bringing laurels to the University and to the institutions they represent.

S.No	Games	Facility
1.	Cricket	3 grounds
2.	Foot Ball	4 grounds
3.	Volley Ball	5 courts
4.	Throw Ball	4 courts
5.	Basket Ball	4 courts
6.	Kho Kho	2 courts
7.	Swimming	3 pools
8.	Tennis	2 courts
9.	Tennikoit	2 courts
10.	Badminton	6 courts

#### Track & Field

1. 400 meter : Track x 2
2. High Jump :2 pitches
3. Long Jump :2 pitches
4. Throws tracks :2 numbers

<b>S.No.</b>	<b>Indoor games</b>	<b>Quantity</b>
<b>1.</b>	Gymnasiums	5
<b>2.</b>	Table tennis	8 tables
<b>3.</b>	Badminton	8 courts
<b>4.</b>	Carrom & Chess rooms	12
<b>5.</b>	Snooker	5
<b>6.</b>	Squash	1

### **Cultural and Extracurricular Activities**

The associations in various Constituent colleges are active and encourage the students to participate in literary, sports and cultural events conducted every year. The students actively participate in various intra departmental and intramural competitions as well as in regional and state level competitions. The cultural committees, in all the colleges headed by the adviser and assisted by a team of staff members; conduct the literary and cultural events like debate, quiz, essay writing, song and dance events, instrumental music, skits, etc., for the students, every year.

NSS - Bharath University has altogether has 9 units with 100 students in each unit. There is a Program officer to plan and organize various activities for each unit. There are four units with BIST. The activities cover a wide range of social outreach programs in the nearby villages with one special camp of seven days in an adapted village.

## **CRITERION 10**

### **Governance, Institutional Support and Financial Resources 120**

#### **10.1. Organization, Governance and Transparency (55)**

##### **10.1.1. State the Vision and Mission of the Institute (5)**

###### **Vision of the Institution**

“Bharath Institute of Higher Education & Research (BIHER) envisions and constantly strives to provide an excellent academic and research ambience for students and members of the faculties to inherit professional competence along with human dignity and transformation of community to keep pace with the global challenges so as to achieve holistic development.”

###### **Missions of the Institution**

- ❖ To develop as a Premier University for Teaching, Learning, Research and Innovation on par with leading global universities.
- ❖ To impart education and training to students for creating a better society with ethics and morals.
- ❖ To foster an interdisciplinary approach in education, research and innovation by supporting lifelong professional development, enriching knowledge banks through scientific research, promoting best practices and innovation, industry driven and institute oriented cooperation, globalization and international initiatives.
- ❖ To develop as a multi-dimensional institution contributing immensely to the cause of societal advancement through spread of literacy, an ambience that provides the best of international exposures, provide health care, enrich rural development and most importantly impart value based education.
- ❖ To establish benchmark standards in professional practice in the fields of innovative and emerging areas in engineering, management, medicine, dentistry, nursing, physiotherapy and allied sciences.
- ❖ To imbibe human dignity and values through personality development and social service activities.

#### **Goal of BIHER**

##### **Goal 1: Increase student learning:**

BIHER will ensure through high-quality programs that graduates are well prepared for successful careers, meaningful work in a global society, and engaged citizenship.

##### **Goal 2: Develop an engaged, diverse, high-quality student population:**

BIHER will attract, retain, and graduate an engaged and success-oriented student population.

### **10.1.2. Availability of the Institutional Strategic Plan and its Effective Implementation and Monitoring (25)**

#### **Perspective Plan and Deployment Strategy**

- Bottom-up approach involving all stakeholders
- Five year Strategic plan
- In harmony with the vision and mission of the university
- Modern Teaching Learning Methodology with cafeteria approach to education
- Research and development oriented curriculum in sync with latest cutting edge technology
- Industry relevant and Industry specific curriculum orientation
- Holistic development of personality with social and cultural values

#### **The process of creating a university perspective plan is as follows:**

Each department is instructed to prepare their five-year plan (including budgetary details & projections) to meet common and collective requirements such as those of infrastructure and facilities, policy changes, increase in human resources, etc. The university level perspective plan is then created based on the inputs from the departments.

#### **Vision and mission:**

The perspective plan for development and its every aspect is broadly guided by progressive and forward-looking spirit of University's Vision and Mission statements. A plan that caters to immediate and future goals of the University is meticulously devised and the policies and strategies therein are worked upon.

#### **Teaching and learning:**

As outlined by the UGC and other respective monitoring bodies like MCI, DCI and NCI, the perspective plan of the university is to put in place reforms in teaching, learning, and evaluation. These include a cafeteria approach to education, introduction of lateral exit for 5-year integrated programmes, dual degrees, improved technology-assisted participatory teaching-learning processes, modular teaching, and greater emphasis on student feedback. Several examination reforms have been planned including scope for revaluation of answer scripts, preparation of question banks, and online examination and evaluation.

#### **Research and Development:**

The university created extensive research facilities with modern cutting-edge technology to provide international quality infrastructure and resource support to researchers in all the disciplines. Interdisciplinary Research to a greater extent, enter into MoUs for joint R&D works with industries and Research institutions, filing of patents, and publication in high impact factor and Scopus indexed journals are some of the highlights of Research in the Faculties of Engineering & Technology, Medicine & Health Sciences , Management and Science & Humanities.

- The research cell of the university continues to do valuable work in research & Development.
- The university encourages the culture of research among teachers and students.
- Students and faculty members are sponsored and given on duty leaves for presentations in conferences hosted by other institutions both national and international

### **Community Engagement:**

- Initiate academic programs for the local community such as computer literacy, technological advancements, and perspectives on health and economic issues.
- Organization of local communities into producer / consumer forums based on their skill, resource and needs.

### **Human resource planning and development:**

Built through a deep sense of care and awareness of the vital importance of human resource development, the University has a plan that caters to its various aspects. Doing so is considered an imperative in University's perspective plan for development. The plan includes ways to attract and retain best talent. Training and professional development is imparted to human resource to upgrade their knowledge base and deal effectively with new challenges at workplace by acquiring new and necessary competencies from time to time.

### **Industry interaction:**

It is planned to establish more Industrial Cells in addition to the existing one in the Faculty of Engineering & Technology to augment the collaborations with Industries/ Institutions, to foster inter-institutional collaboration at regional, national and international levels for research, training and development in select areas.

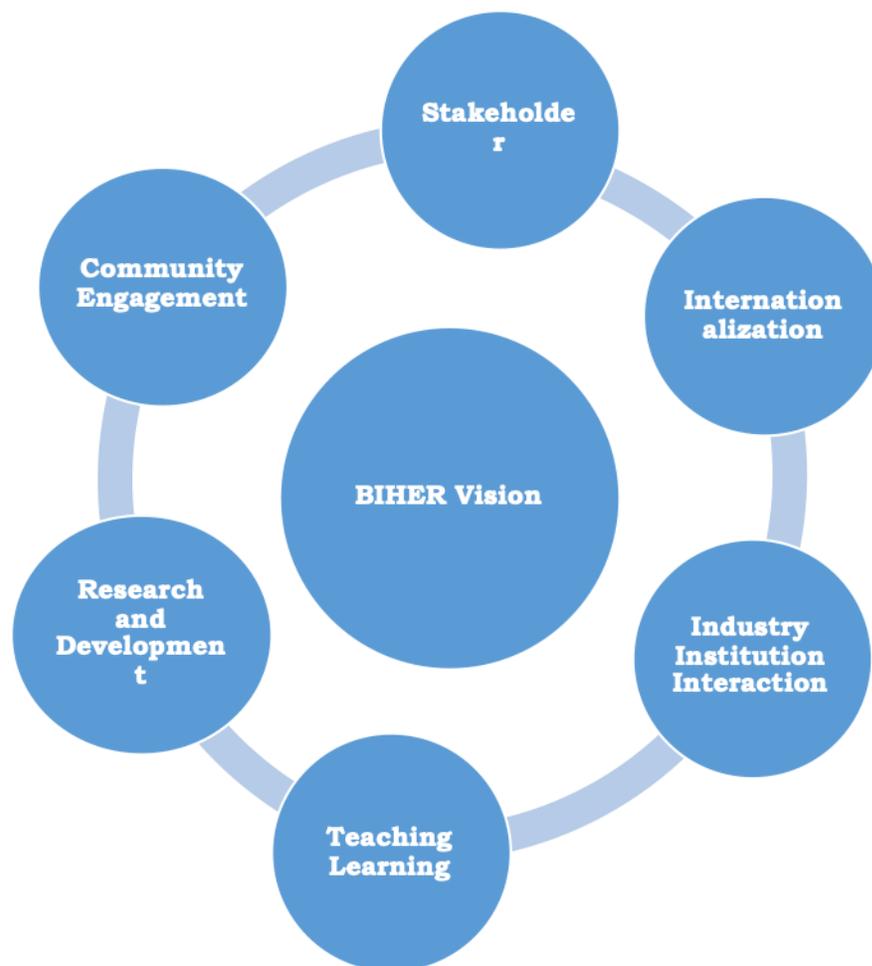
### **Internationalisation:**

- Facilitating Semester Abroad Programmes (SAP)
- Entering into MoUs with leading Universities in India and Abroad for teaching-learning, research and bilateral exchange programs

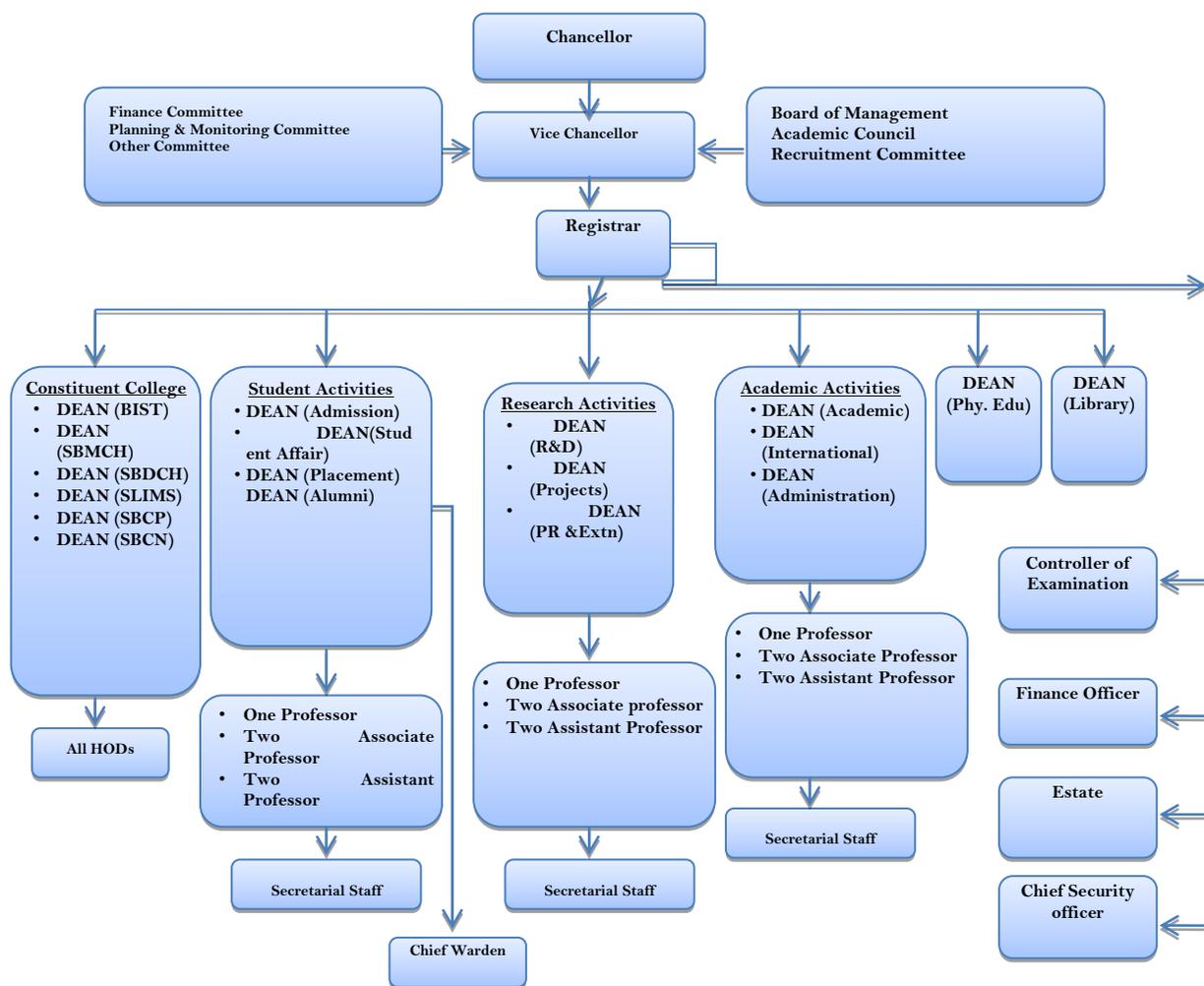
The future directions will be as follows:

- i) Greater functional autonomy
- ii) Learner centric academic practices
- iii) Academic continuum from degree to doctoral level
- iv) Flexible place of learning
- v) Trans border learning
- vi) Introduction of new courses in emerging areas
- vii) Introduction of specialized courses comprising cross disciplinary learning
- viii) Bidirectional transition between science and engineering
- ix) Increasing gross enrolment ratio at UG and PG levels
- x) Strengthening of Directorate of Research
- xi) Talent identification and determination
- xii) Promotion of 'earn while you learn scheme'
- xiii) Tech-savvy learning environment
- xiv) Promotion of holistic learning.
- xv) Promotion of value education
- xvi) Greater emphasis on proficiency and skill development
- xvii) Promotion of placement services
- xviii) Special training for competitive examinations
- xix) Rejuvenating Education at UG and PG Levels

- xx) Interactive and social networking
- xxi) Reaching out to the masses in the backward areas
- xxii) Twinning programmes with other institutions and Universities Collaboration with institutions of specialized studies
- xxiii) Community participation
- xxiv) Strengthening University- industry collaboration to the research level through Public - Private Partnership model



BIHER adopts a judicious mix of top down and bottom up approaches in decision making. On policy matters, decisions are taken at the top level with due consultations and are communicated throughout the organization. On issues regarding development and problem solving, a thorough discussion is organized at the appropriate level and thereafter decisions are arrived at.



### Quality improvement strategies (Teaching & Learning)

Quality Policy – design, deployment, and review This is mainly addressed through the IQAC, but in specific cases (for e.g. in Medical School), other methodologies are taken up, such as, ISO certification and audits. The university has an established tradition of the IQAC’s involvement at the department, school, campus, and university levels, and this enables gap analysis, creation of corrective action plan, implementation of corrective actions, and follow up with re-assessment to monitor the efficacy of the corrective actions.

- Encouraging to attend FDP, FEP, QIP
- Students are encouraged to give assignments in PPT to improve Interactive Learning
- EDUSAT provided to classrooms for delivering education materials
- Digital resources are used to enhance the quality of Teaching-Learning Class room teaching is complemented with regular field visits, industrial visit, industry- academic interaction, seminar workshops and project.

This is mainly addressed through the IQAC, but in specific cases other methodologies are taken up, such as, ISO certification and audits. The university has an established tradition of the IQAC’s involvement at the department, campus, and university levels, and this enables gap analysis, creation

of corrective action plan, implementation of corrective actions, and follow up with re-assessment to monitor the efficacy of the corrective actions.

The University has a proper policy to ensure quality in teaching, learning, evaluation and administration through the following:

- i. The University has established Internal Quality Assurance Cell (IQAC) since the first cycle of accreditation of the University as per the guidelines of UGC, New Delhi. The Cell conducts regular meetings to maintain quality of education in the University system. Deficiencies and the weaknesses pointed out by the Peer Team are promptly attended to by the IQAC.
- ii. The Vice-Chancellor along with Registrar and Director conducts periodic meetings with Administrative Officers and Heads of various units to assess and monitor the progress towards the fast-track implementation of the approved decisions taken by various statutory and non-statutory bodies and various schemes of State/Central Government sanctioned to the University.

At all levels, highest level of transparency is being practiced.

***Entire activities of the University can be grouped into three categories: admissions, examinations and employment.***

**Admissions:** Students are admitted to each course through a common entrance test conducted by the University. An up to date IT based system is in place for evaluation of the tests. Complete information is uploaded on the website.

**Examinations:** Examinations are conducted on time and the results are declared within a period of two weeks. More than 50% of the examiners are appointed from outside the University. The performance of the students is reviewed by the Standing Committee of the Deans under the chairmanship of the Vice Chancellor.

**Employment:** Vacant posts are duly advertised through national dailies, vernacular newspapers, Employment News, website and notice boards. All positions are filled through expert committees constituted by the competent authorities of the University.

University encourages academic departments to function independently and autonomously. Such practice, it has been observed, bestows upon academic departments the much needed academic freedom.

Accountability is ascertained through periodic departmental academic audits by the Audit Cell and by the Internal Quality Assurance Cell (IQAC) at the University. Departments are empowered to devise policies that best suit the interests of respective stakeholders and that are in accordance with the University's Vision and Mission.

Complete academic freedom exists for curriculum design to formulate new and innovative programmes of study, to include appropriate experts from leading Institutions and Industries in the Boards of Studies and Examinations, evolve and follow innovative teaching and evaluation methodologies, to undertake research projects and consultancies, and to conduct conferences and workshops. The self-appraisal of the individual faculty through Academic Performance Indicators (APIs) and the assessment report by the respective heads and peer review at the institute level ensure accountability in academics.

**10.1.3. Governing body, administrative setup, functions of various bodies, service rules, procedures, recruitment and promotional policies (10)**

**ACADEMIC COUNCIL**

<b>S.NO</b>	<b>PROFESSION</b>	<b>NAME</b>
<b>1</b>	Chairman	Vice-Chancellor
<b>2</b>	Secretary	Registrar
<b>3</b>	Member	Pro Vice-Chancellor
<b>4</b>	Member	Director

**DEANS**

<b>S.NO</b>	<b>DESIGNATION</b>	<b>MEMBERSHIP</b>
<b>1</b>	Dean (Engineering), Bharath Institute Of Science And Technology	Member
<b>2</b>	Dean, Sree Balaji Dental College And Hospital	Member
<b>3</b>	Principal, Sree Balaji College Of Nursing	Member
<b>4</b>	Principal, Sree Balaji College Of Physiotherapy	Member
<b>5</b>	Dean, Sree Balaji Medical College And Hospital	Member
<b>6</b>	Dean, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>7</b>	Dean (R & D)	Member

**HODS (ENGINEERING, MANAGEMENT, MEDICINE, DENTISTRY, NURSING AND PHYSIOTHERAPY)**

<b>S.N O</b>	<b>DEPARTMENT</b>	<b>MEMBERSHIP</b>
<b>1</b>	Director (Architecture), Bharath Institute Of Science And Technology	Member
<b>2</b>	Dept Of Civil, Bharath Institute Of Science And Technology	Member
<b>3</b>	Dept Of Mechanical , Bharath Institute Of Science And Technology	Member
<b>4</b>	Dept Of Aeronautical Engg, Bharath Institute Of Science And Technology	Member
<b>5</b>	Dept Of Automobile Engg, Bharath Institute Of Science And Technology	Member
<b>6</b>	Dept Of Mechatronics, Bharath Institute Of Science And Technology	Member
<b>7</b>	Dept Of CSE, Bharath Institute Of Science And Technology	Member
<b>8</b>	Dept Of IT, Bharath Institute Of Science And Technology	Member
<b>9</b>	Dept Of MCA, Bharath Institute Of Science And Technology	Member
<b>10</b>	Dept Of EEE, Bharath Institute Of Science And Technology	Member
<b>11</b>	Dept Of ETC, Bharath Institute Of Science And Technology	Member
<b>12</b>	Dept Of EIE, Bharath Institute Of Science And Technology	Member
<b>13</b>	Dept Of BioInformatics, Bharath Institute Of Science And Technology	Member
<b>14</b>	Dept Of Industrial Bio Technology, Bharath Institute Of Science And Technology	Member
<b>15</b>	Dept Of Bio Medical Engineering , Bharath Institute Of Science And Technology	Member
<b>16</b>	Dept Of English, Bharath Institute Of Science And Technology	Member
<b>17</b>	Dept Of Mathematics, Bharath Institute Of Science And Technology	Member
<b>18</b>	Dept Of Physics, Bharath Institute Of Science And Technology	Member

<b>19</b>	Dept Of Chemistry, Bharath Institute Of Science And Technology	Member
<b>20</b>	Dept Of MBA, Bharath Institute Of Science And Technology	Member
<b>21</b>	HOD, Dept Of Tourism & Hotel Management, Bharath Institute Of Science And Technology	Member
<b>22</b>	Dept Of Prosthodontics, Sree Balaji Dental College And Hospital	Member
<b>23</b>	Dept Of General Medicine, Sree Balaji Medical College And Hospital	Member
<b>24</b>	Dept Of Paediatrics, Sree Balaji Medical College And Hospital	Member
<b>25</b>	Dept Of General Surgery, Sree Balaji Medical College And Hospital	Member
<b>26</b>	Dept Of Orthopaedics, Sree Balaji Medical College And Hospital	Member
<b>27</b>	Dept Of ENT, Sree Balaji Medical College And Hospital	Member
<b>28</b>	Dept Of OBG, Sree Balaji Medical College And Hospital	Member
<b>29</b>	Dept Of Anatomy, Sree Balaji Medical College And Hospital	Member
<b>30</b>	Dept Of Physiology, Sree Balaji Medical College And Hospital	Member
<b>31</b>	Dept Of Biochemistry, Sree Balaji Medical College And Hospital	Member
<b>32</b>	Dept Of Pharmacology, Sree Balaji Medical College And Hospital	Member
<b>33</b>	Sree Lakshmi Narayana Institute Of Medical Science, Pondicherry	Member
<b>34</b>	Dept Of Microbiology, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>35</b>	Dept Of Pathology, Sree Balaji Medical College And Hospital	Member
<b>36</b>	Dept Of Community Medicine, Sree Balaji Medical College And Hospital	Member
<b>37</b>	Dept Of Forensic Medicine, Sree Balaji Medical College And Hospital	Member
<b>38</b>	Dept Of Nursing, Sree Balaji College Of Nursing	Member
<b>39</b>	Senior Professor Of Medicine, Sree Balaji Medical College And Hospital	Member
<b>40</b>	Dept Of General Medicine, Sree Balaji Medical College And Hospital	Member
<b>41</b>	Dept Of General Surgery, Sree Balaji Medical College And Hospital	Member
<b>42</b>	Dept Of ENT, Sree Balaji Medical College And Hospital	Member
<b>43</b>	Dept Of General Medicine, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>44</b>	Dept Of Paediatrics, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>45</b>	Dept Of Radiology, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>46</b>	Dept Of Anaesthesia Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>47</b>	Dept Of OBG, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>48</b>	Dept Of Microbiology, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>49</b>	Dept Of Community Medicine, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>50</b>	Dept Of Biochemistry, Sree Lakshmi Narayana Institute Of Medical Science	Member

**PROFESSORS (ENGINEERING, MEDICINE, DENTISTRY, NURSING AND PHYSIOTHERAPY)**

<b>S.N O</b>	<b>DEPARTMENT</b>	<b>MEMBERSHIP</b>
<b>1</b>	Aeronautical Engg, Bharath Institute Of Science And Technology	Member
<b>2</b>	Dept Of Prosthodontics, SreeBalaji Dental College And Hospital	Member
<b>3</b>	Dept Of Oral And Maxillofacial Surgery, Sree Balaji Dental College And Hospital	Member
<b>4</b>	Dept Of Nursing, Sree Balaji College Of Nursing	Member
<b>5</b>	Dept Of Physiology, Sree Balaji Dental College And Hospital	Member
<b>6</b>	Dept Of Orthopaedics, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>7</b>	Dept Of Nursing, Sree Balaji Medical College And Hospital	Member
<b>8</b>	Professor, Orthodontist, General Surgery	Member

**ASSOCIATE PROFESSORS (ENGINEERING, MEDICINE, DENTISTRY)**

<b>S.NO</b>	<b>DEPARTMENT</b>	<b>MEMBERSHIP</b>
<b>1</b>	Dept Of Conservative, Dentistry And Endodontics	Member
<b>2</b>	Department Of Civil, Bharath Institute Of Science And Technology	Member

**EDUCATIONISTS - NOMINATED BY THE PRESIDENT**

<b>S.NO</b>	<b>DEPARTMENT</b>	<b>MEMBERSHIP</b>
<b>1</b>	Dean, School Of Bio Engg, SRM University	Member
<b>2</b>	Former VC, University Of Madras	Member
<b>3</b>	Educationist, Mahalakshmi Nagar, Selaiyur, Chennai	Member
<b>4</b>	Educationist / Former Principal, Cummins College Of Engineering For Women	Member

**SPECIAL INVITEES**

<b>S.N O</b>	<b>DEPARTMENT</b>	<b>MEMBERSHIP</b>
<b>1</b>	Controller Of Examinations Engineering	Member
<b>2</b>	Controller Of Examinations Medical Sciences, Sree Balaji Dental College And Hospital	Member
<b>3</b>	Additional Controller PG, Sree Balaji Dental College And Hospital	Member
<b>4</b>	Academic Officer, Sree Balaji Dental College And Hospital	Member
<b>5</b>	Prof & HOD - Anatomy, Sree Lakshmi Narayana Institute Of Medical Science	Member
<b>6</b>	Associate Professor, Dept Of Orthopedics	Member
<b>7</b>	Professor Of Microbiology	Member
<b>8</b>	Director, Research, Bharath Institute Of Science And Technology	Member

#### 10.1.4. Decentralization in working and grievance redressal mechanism (5)

List the names of the faculty members who have been delegated powers for taking administrative decisions. Mention details in respect of decentralization in working. Specify the mechanism and composition of grievance redressal cell including Anti Ragging Committee & Sexual Harassment Committee.

##### Central Committees

S.No	Details	Professor in-charge	Email address
<b>Student Welfare Committee</b>			
1	NRI Students	Dr. A. Kumaravel, BIST	Kumaravel.cse@bharathuniv.ac.in
2	NSS Cell	Dr. R. Karthikeyan, BIST	Karthikeyan.cse@bharathuniv.ac.in
3	Railway Passes	Dr.V. Manimozhi, BIST	Manimozhi.eng@bharathuniv.ac.in
4	Transport	R.Rajasekar, BIST	transport@bharathuniv.ac.in
5	Boys Hostel	Dr. K. P. Kaliyamurthie, BIST	Kaliyamurthie.it@bharathuniv.ac.in
6	Girls Hostel	Dr. R. Vasuki, BIST	Vasuki.bma@bharathuniv.ac.in
7	Discipline	Dr.W.M.S.Johnson, SBMCH	Johnson.wms@bharathuniv.ac.in
8	Anti-Ragging	Dr.P.Sasikumar, BIST	sasikumar.p@bharathuniv.ac.in
9	Canteen and Cafeteria	Dr.N.B.Pradeep Kumar, BIST	Pradeep kumar th@bharathuniv.ac.in
10	Girls Hostel Advisory	Dr.K. Saraswathy, SBMCH	Saraswathi.k@bharathuniv.ac.in
11	Boys Hostel Advisory	Dr.R.Chidambaram, SLIMS	Chidambaram.r@slims.bharathuniv.ac.in
12	Students' Grievance Redressal	Dr. Padma, SBMCH	Padma.v@bharathuniv.ac.in
13	IEEE Chapter	Dr.S.P. Vijayaragavan, BIST	Vijayaragavan.eee@bharathuniv.ac.in
14	SAE Chapter	Dr.P. Naveen Chandran, BIST	Naveen .auto @ bharathuniv.ac .in
<b>Faculty Welfare Committee</b>			
15	Women's Forum	Dr.L.Jeyanthi Rebecca, BIST	Jeyanthi.bt@bharathuniv.ac.in
16	Employees' Grievance Redressal Committee	Dr.KathirViswalingam, BIST	KathirViswalingam@bharathuniv.ac.in
17	Against Sexual Harassment	Dr.V.Manimozhi, BIST	Manimozhi.eng@bharathuniv.ac.in
<b>University Welfare Committee</b>			
18	Power Supply	Dr. S. Prakash, BIST	prakash.eee@bharathuniv.ac.in
19	Gardening	Dr.S.Ravindhar, BIST	Ravindhar.arch@bharathuniv.ac.in
20	Alumnus Cell	Dr.P. Dayakar, BIST	Dayakar.civil@bharathuniv.ac.in
21	Sports Department	Dr.BalajiSubramaniyan, SLIMS	Blaji.pd@slims.bharathuniv.ac.in
22	Central Stores	Dr.S.Naakeeran, BIST	Naakeeran.mech@bharathuniv.ac.in
23	Purchases	Dr. T. Saravanan, BIST	Saravanan.etc@bharathuniv.ac.in
24	Information Technology	Dr.A.Muthukumaravel, BIST	Muthukumaravel.mca@bharathuniv.ac.in
25	Hardware & Computer Network	Mr. A.StephenAntoJegan,	stephen.a@bharathuniv.ac.in

		BIST	
26	Construction	Dr.P. Sachithanandam, BIST	Sachidanandam.civil@bharathuniv.ac.in
27	Safety Committee	Dr. Kishore, SBDCH	kishorekumars.odo@sbdch.bharathuniv.ac.in
28	Maintenance Aspects	Dr.Bhuminathan	Bhuminathan@bharathuniv.ac.in
29	Web Committee	Dr.S.Neduncheliyan	ites@bharathuniv.ac.in
30	Library Advisory Committee	Dr. V. Khanaa, BIST	Drvkannan 62@bharathuniv.ac.in
31	University ERP	Dr.S. PraveenKumar, BIST	Praveenkumar.mba@bharathuniv.ac.in
32	Energy Audit and Control	Dr. M. Sundarajan, BIST	hodaero@bharathuniv.ac.in
33	BU Newsletter Editorial Board	Dr. A. Vaithialingam, SLIMS	Vaithilingam.a@slims.bharathuniv.ac.in
34	BU Ombudsman	Dr.Masthan, SBDCH	drmasthan@sbdch.bharathuniv.ac.in
<b>In-Charges</b>			
35	IQAC	Dr.Sudalaimuthu, BIST	drsudalaimuthu@bharathuniv.ac.in
36	International Relations	Dr.T. Krishnakumar, BIST	drkk@bharathuniv.ac.in
37	Centre for Extension Activities	Dr. R. Udayakumar, BIST	Udayakumar.it@bharathuniv.ac.in

#### 10.1.5. Delegation of financial powers (5)

Institution should explicitly mention financial powers delegated to the Principal, Heads of Departments and relevant in-charges. Demonstrate the utilization of financial powers for each of the assessment years.

<b>FINANCE COMMITTEE</b>		
<b>S.NO</b>	<b>PROFESSION</b>	<b>NAME</b>
<b>1</b>	Chairman	Vice-Chancellor
<b>2</b>	Member	Pro Vice-Chancellor
<b>3</b>	Secretary	Registrar
<b>4</b>	Member	Educationalist
<b>5</b>	Member	Dean
<b>6</b>	Member	Administrative Officer
<b>7</b>	Member	Auditor
<b>8</b>	Member	Finance Manager

Institution should explicitly mention financial powers delegated to the Principal, Heads of Departments

SNO	Designation	Amount	Remarks
1	Dean	10000/ Month	
2	Head of the department	5000/Month	

**10.1.6. Transparency and availability of correct/unambiguous information in public domain (5)**

<https://www.bharathuniv.ac.in/about/>

<https://www.bharathuniv.ac.in/colleges1/auto.php>

**10.2. Budget Allocation, Utilization, and Public Accounting at Institute level (15)**

Summary of current financial year's budget and actual expenditure incurred (for the institution exclusively) in the three previous financial years.

**Total Income at Institute level: For CFY, CFYm1, CFYm2 & CFYm3**

**CFY: Current Financial Year – CFYm1 (Current Financial Year minus 1), CFYm2 (Current Financial Year minus 2), CFYm3 (Current Financial Year minus 3)**

**For CFY (2019-20)**

Total Income in CFY:2019-2020				Actual expenditure in 2019-20			Total No. of students in CFY:7424
Fee	Govt .	Grant(s )	Other Source	Recurring including Salaries	Non-recurring	Special Projects/Any other, specify	Expenditure per student
90,15,38,843	-	-	-	87,06,36,564	39,505,662	-	1,22,595

**Table B.10.2a**

**Note: Similar tables are to be prepared for CFYm1, CFYm2 & CFYm3.**

Items	Budget ed in 2019-20	Actual expense s in 2019-20	Budgete d in 2018-19	Actual Expense s in 2018-19	Budgete d in 2017-18	Actual Expense s in 2017-18	Budgete d in 2016-17	Actual Expense s in 2016-17
Infrastructure Built-Up	5,16,45,382	4,96,36,287	3,45,35,682	3,35,24,568	1,25,80,500	1,06,95,285	95,00,250	89,72,546
Library	1,12,36,875	98,65,386	91,23,545	81,62,535	74,52,108	45,26,812	40,78,765	39,38,206
Laboratory equipment	6,15,85,365	5,68,72,850	4,85,24,650	3,55,75,604	3,39,40,050	3,24,56,544	2,22,35,420	2,08,34,522
Laboratory consumables	8,86,358	6,15,878	7,23,252	2,32,021	4,00,400	2,65,042	5,39,525	2,93,456
Teaching and non-teaching staff salary	86,54,35,412	79,53,45,518	69,24,52,451	67,26,47,112	54,95,25,000	48,13,06,751	36,25,80,650	34,88,06,751
Maintenance and spares	13,50,528	11,48,358	11,23,050	9,63,040	12,55,005	8,50,045	2,50,420	1,80,250
R&D	10,89,52,412	9,45,85,612	8,63,78,350	7,43,25,648	6,25,00,440	5,56,93,229	4,52,02,502	4,02,20,515
Training and Travel	4,26,565	2,98,316	3,13,580	1,53,650	3,55,250	1,15,812	75,000	65,069
Miscellaneous expenses	7,05,854	5,86,173	5,59,000	2,55,000	3,05,000	2,85,000	80,000	57,525
Others, specify	1,00,000	8432	50000	1,352	5,000	50,000	0	5,000
Total	1,10,23,24,751	1,00,89,62,810	87,37,83,560	82,58,40,530	66,83,18,753	58,62,44,520	44,45,42,532	42,33,73,840

**Table B.10.2b**

### 10.2.1. Adequacy of budget allocation (5)

Before the commencement of every academic year a meeting of all the Heads of departments is convened and budgetary requirement is taken for the categories of expenditure. The categories considered are procurement of new equipment, maintenance/servicing of existing equipment, consumables required, building space and also books required for the library for each department based in the curricular reforms suggested in the respective Board of Studies.

For buildings (new construction as well as maintenance of existing building) detailed plans and estimates are prepared and approval is taken for the same in the Governing Council meetings. A detailed report of all the development works undertaken and their current status is presented in the Governing Council meeting.

The budgetary requirements are met through the admission fees collected from the students and the revenue generated from the consultancy services. The budget allocated at the beginning of the financial year is adequate for managing the expenditure during that year. In case of any additional funds required, the management provides the requisite support.

**10.2.2. Utilization of allocated funds (5)**

During each financial year out of the total budget allocated nearly 85% to 95% of the budget is utilized under the respective category of expenditure proposed. For the financial year 2016-17 the outlay of the budget was Rs. 39, 21, 50, 000 and the total expenditure being Rs. 36, 14, 57, 360, thus 92.17% of the total budget has been utilized during 2016-17. The major component of expenditure is towards the salary of faculty and staff, with nearly 81.45% of the total budget being allocated. The budget utilized under other categories is 18.55%. In addition to the expenditure incurred through the regular revenue from student fees (44.12%) and the Government grant (35%) towards salary component of faculty and staff in aided departments the college has also utilized nearly 3.79 crores during 2016-17 from TEQIP-II grants. The management contributes 15% and 100% of the salary component for faculty and staff of Aided and Unaided departments respectively. In total, the budget allocated during each financial year is effectively utilized and the institute is self-sustaining to a large extent. In case of any shortfall in finances required for developmental activities the management provides the requisite support

**10.2.3. Availability of the audited statements on the institute’s website (5)**

**YES**

**10.3. Program Specific Budget Allocation, Utilization (30)**

**Total Budget at program level: For CFY, CFYm1, CFYm2& CFYm3**

**CFY: Current Financial Year – CFYm1 (Current Financial Year minus 1) CFYm2 (Current Financial Year minus 2) CFYm3 (Current Financial Year minus 3)**

**For CFY (2019-20)**

Total Budget in 2019-20		Actual expenditure in 2019-20		Total No. of students in CFY:146
Non recurring	Recurring	Non Recurring	Recurring	Expenditure per student
1,72,40,412	45,53,057	1,68,94,204	14,05,199	1,25,338

*Table B.10.3a*

**Note: Similar tables are to be prepared for CFYm1, CFYm2 & CFYm3.**

Items	Budget ed in 2019-20	Actual expense s in 2019-20	Budgete d in 2018-19	Actual Expense s in 2018-19	Budgete d in 2017-18	Actual Expense s in 2017-18	Budgete d in 2016-17	Actual Expense s in 2016-17
Infrastructure Built-Up	24,84,219	22,36,418	8,98,548	8,12,578	2,95,618	2,76,219	2,76,856	2,63,878
Library	4,15,878	3,98,514	2,64,546	2,36,354	1,46,800	1,24,514	1,15,886	1,02,616
Laboratory equipment	4,18,428	3,18,526	1,12,457	95,998	9,98,318	9,05,218	6,12,896	5,96,118
Laboratory consumables	13,516	11,568	7316	6,518	9,614	8,566	14,300	8,118
Maintenance and spares	48,758	43,186	29,514	27,314	34,518	29,105	8,596	6,126
R&D	49,54,528	44,86,118	22,79,846	21,18,415	18,95,618	16,47,055	12,24,562	11,12,357
Training and Travel	11,550	9818	6,165	5,146	4,218	3,715	4,200	3,212
Miscellaneous expenses	19,546	17,818	10,756	9,578	8,918	7,818	12,640	3,516
Total	83,66,423	75,21,966	36,09,148	33,11,901	33,93,622	30,02,210	22,69,936	20,95,941

**Table B.10.3b**

**\* Items to be mentioned.**

### **10.3.1. Adequacy of budget allocation (10)**

Before the commencement of every academic year a meeting of all the Heads of departments is convened and budgetary requirement is taken for the categories of expenditure. The categories considered are procurement of new equipment, maintenance/servicing of existing equipment, consumables required, building space and also books required for the library for each department based in the curricular reforms suggested in the respective Board of Studies. For buildings (new construction as well as maintenance of existing building) detailed plans and estimates are prepared and approval is taken for the same in the Governing Council meetings. A detailed report of all the development works undertaken and their current status is presented in the Governing Council meeting. The budgetary requirements are met through the admission fees collected from the students and the revenue generated from the consultancy services. The budget allocated at the beginning of the financial year is adequate for managing the expenditure during that year. In case of any additional funds required, the management provides the requisite support)

### **10.3.2. Utilization of allocated funds (20)**

During each financial year out of the total budget allocated nearly 85% to 95% of the budget is utilized under the respective category of expenditure proposed. For the financial year 2016-17 the outlay of the budget was Rs. 39, 21, 50, 000 and the total expenditure being Rs. 36, 14, 57, 360, thus 92.17% of the total budget has been utilized during 2016-17. The major component of expenditure is towards the salary of faculty and staff, with nearly 81.45% of the total

budget being allocated. The budget utilized under other categories is 18.55%. In addition to the expenditure incurred through the regular revenue from student fees (44.12%) and the Government grant (35%) towards salary component of faculty and staff in aided departments the college has also utilized nearly 3.79 crores during 2016-17 from TEQIP-II grants. The management contributes 15% and 100% of the salary component for faculty and staff of Aided and Unaided departments respectively. In total, the budget allocated during each financial year is effectively utilized and the institute is self-sustaining to a large extent. In case of any shortfall in finances required for developmental activities the management provides the requisite support

#### **10.4. Library and Internet (20)**

(Indicate whether zero deficiency report was received by the Institution for all the assessment years. Effective availability/purchase records and utilization of facilities/equipment etc. to be documented and demonstrated)

##### **10.4.1. Quality of learning resources (hard/soft) (10)**

- Relevance of available learning resources including e-resources
- Accessibility to students
- Support to students for self-learning activities

##### **10.4.2. Internet (10)**

- Name of the Internet provider: 1.BSNL 2.LIMRAS EIRO NET 3.TIC FIBER
- Available bandwidth:1. 1Gbps 2. 100Mbps 3.20Mbps
- Wi Fi availability: YES
- Internet access in labs, classrooms, library and offices of all Departments: YES
- Security arrangements YES

## **PART-C**

### **Declaration**

The head of the institution needs to make a declaration as per the format given below:

I undertake that, the institution is well aware about the provisions in the NBA's accreditation manual concerned for this application, rules, regulations, notifications and NBA expert visit guidelines in force as on date and the institute shall fully abide by them.

It is submitted that information provided in this Self-Assessment Report is factually correct. I understand and agree that an appropriate disciplinary action against the Institute will be initiated by the NBA in case any false statement/information is observed during pre-visit, visit, post visit and subsequent to grant of accreditation.

**Date:24/12/2020**



**Signature & Name**

**Place:Chennai**

**Head of the Institution with seal**

## Annexure – I

### PROGRAMME OUTCOMES

PO1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and aeronautical engineering to solve the complex problems in the field of aeronautical engineering.

PO2. **Problem analysis:** Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using fundamentals of mathematics, physics, and engineering sciences.

PO3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems:** Use research-based knowledge 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 software tools including simulation and modelling 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 teams, and in multidisciplinary settings.

PO10. **Communication:** Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports. Make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects 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.

## **PROGRAM SPECIFIC OUTCOMES (PSO's)**

PSO 1: **Strong Subject Knowledge:** Upon the Completion of program, Graduate will have adequate knowledge in Aerodynamics, Aircraft Structures, Propulsion and Avionics System to develop new ideas on product design and development in the field of aeronautical engineering.

PSO 2: **Professional Skills:** Graduate will able to lead a successful team, serve the society through research, entrepreneurship being ethical and environmental conscious.