



SELF ASSESSMENT REPORT
B. Tech. AEROSPACE ENGINEERING
(TIER-I)
FIRST TIME ACCREDITATION

Department of Aerospace Engineering
Schools of Engineering
Amrita Vishwa Vidyapeetham
Amritanagar P.O. Ettimadai
Coimbatore, Tamilnadu-641 112-India

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PART A: Institutional Information

1. **Name and Address of the Institution** : Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Amritanagar PO, Ettimadai, Coimbatore – 641112, Tamilnadu.
2. **Name and Address of the Affiliating University** : Amrita Vishwa Vidyapeetham, Amritanagar PO, Ettimadai, Coimbatore – 641112, Tamilnadu.
3. **Year of establishment of the Institution** : 1994

4. Type of the Institution:

Institute of National Importance

University

Deemed University

Year: 2003

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 12th 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:

Sponsoring trust of the institute is **MATA AMRITANANDAMAYI MATH**.
Amrita School of Engineering is under the ambit of **AMRITA VISHWA VIDYAPEETHAM (DEEMED UNIVERSITY)**.

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

Other Academic Institutions of the Trust/Society/Company etc., if any:			
Name of the Institution(s)	Year of Establishment	Programs of Study	Location
Coimbatore Campus			
Amrita School of Business, Coimbatore	1996	MBA	Coimbatore, Tamil Nadu
Amritapuri Campus			
Amrita School of Engineering, Amritapuri, Kollam, Kerala	2002	B.Tech - Computer Science and Engg.	Amritapuri, Kollam, Kerala
		B.Tech - Electronics and Communication Engg.	
		B.Tech - Electrical and Electronics Engg.	
		B.Tech - Mechanical Engg.	
		M.Tech - Computer Science and Engineering	
		M.Tech - Cyber Security	
		M.Tech - Power and Energy Engineering	
		M.Tech - Robotics & Automation	
		M.Tech - Thermal and Fluid Engineering	
		M.Tech - VLSI Design	
		M.Tech - Wireless Networks and Applications	
		MCA	
		Ph.D	
Amrita School of Arts and Sciences, Amritapuri, Kollam, Kerala	2003	B.Com - Bachelor of Commerce	Amritapuri, Kollam, Kerala
		BCA - Bachelor of Computer Applications	
		BBA - Bachelor of Business Administration	
		M.Com - Master of Commerce	
		M.Sc. Chemistry	
		M.Sc. Physics	

		M.Sc Mathematics	
		MSW - Master of Social Work	
		MA English (2 Year)	
		MA Philosophy	
		M.Sc. Physics & Maths - Integrated 5 Yr. Course	
		M.Sc Chemistry - Integrated 5 Yr. Course	
		M.Sc Mathematics - Integrated 5 Yr. Course	
		M.A English - Integrated 5 Yr. Course	
		Ph.D	
Amrita School of Biotechnology, Amritapuri, Kollam, Kerala	2005	B.Sc. Biotechnology	Amritapuri, Kollam, Kerala
		B.Sc. Microbiology	
		M.Sc. Biotechnology	
		M.Sc. Bioinformatics	
		M.Sc. Microbiology	
		Ph.D	
Amrita School of Ayurveda, Amritapuri, Kollam, Kerala	2004	BAMS	Amritapuri, Kollam, Kerala
		MD - Ayurveda Samhita	
		MD - Dravyaguna Vigyana	
		MD - Kayachikitsa	
		MD - Panchakarma	
		MD - Rasashastra & Bhaishajya Kalpana	
		MD - Swasthavritta	
		MS - Prasuti Tantra & Streeroga	
		MS - Shalakya Tantra (Netra Roga Vigyana)	
		MS - Shalya Tantra (Samanya)	

		Ph.D	
Bangalore Campus			
Amrita School of Engineering, Bangalore, Karnataka	2002	B.Tech - Computer Science and Engg.	Bangalore, Karnataka
		B.Tech - Electronics and Communication Engg.	
		B.Tech - Electrical and Electronics Engg.	
		B.Tech - Electronics and Instrumentation Engg.	
		B.Tech - Mechanical Engg.	
		M.Tech - Communication Engg. & Signal Processing	
		M.Tech - Computer Science and Engineering	
		M.Tech - Embedded Systems	
		M.Tech - Power Electronics	
		M.Tech - Thermal Sciences & Energy Systems	
		M.Tech - VLSI Design	
		M.Tech - Computer Science and Engineering Data Science (Part Time)	
		Ph.D	
Kochi Campus			
Amrita School of Medicine, Kochi, Kerala	2002	MBBS	Kochi, Kerala
		B.Sc. - Anaesthesia Technology	
		B.Sc. - Cardiac Perfusion Technology	
		B.Sc. - Cardio Vascular Technology	
		B.Sc. - Diabetes Sciences	
		B.Sc. - Dialysis Therapy	
		B.Sc. - Echocardiography Technology	
		B.Sc. - Emergency Medical Technology	
		B.Sc. - Medical Laboratory Technology	

B.Sc. - Medical Radiologic Technology
B.Sc. - Neuro Electro Physiology
B.Sc. - Optometry (Regular)
B.Sc. - Optometry (Lateral Entry)
B.Sc. - Physician Assistant
B.Sc. - Respiratory Therapy
BASLP - Bachelor of Audiology and Speech Language Pathology
M.Sc. - Clinical Nutrition Foods & Sciences
M.Sc. - Medical Laboratory Technology (Biochemistry)
M.Sc. - Medical Laboratory Technology (Microbiology)
M.Sc. - Medical Laboratory Technology (Pathology)
M.Sc. - Biostatistics
M.Sc.- Deglutology & Swallowing Therapy (DSD)
M.Sc. - Neuro Electro Physiology
MPH - Master of Public Health
MHA - Hospital Administration
M.Sc - Cardio Vascular Technology
M.Sc. - Diabetes Sciences
M.Sc. - Dialysis Therapy
M.Sc. - Physician Assistant in Medical Oncology
M.Sc. - Trauma & Critical Care
M.Sc. - Respiratory Therapy (RPT)
MD Anesthesiology
MD Biochemistry
MD Community Medicine

	MD Dermatology, Venerology and Leprosy
	MD Emergency Medicine
	MD Forensic Medicine
	MD General Medicine
	MD Geriatrics
	MD Microbiology
	MD Nuclear Medicine
	MD Paediatrics
	MD Pathology
	MD Physical Medicine & Rehabilitation
	MD Psychiatry (PSYCHOLOGICAL MEDICINE)
	MD Radio Diagnosis
	MD Radio-Therapy
	MD Respiratory Medicine
	MD Tuberculosis and Respiratory Diseases
	MS General Surgery
	MS Obstetrics and Gynecology
	MS Ophthalmology
	MS Orthopedics
	MS Otorhinolaryngology
	DM Cardiac Anaesthesia
	DM Cardiology
	DM Endocrinology
	DM Medical Gastroenterology
	DM Medical Oncology

	DM Nephrology
	DM Neurology
	DM Paediatric Cardiology
	DM Rheumatology
	DM Pulmonary Medicine
	MCh. Cardio Vascular & Thorasic Surgery
	MCh. Head and Nech Surgery
	MCh. Neuro Surgery
	MCh. Pediatric Surgery
	MCh. Plastic & Reconstructuve Surgery
	MCh. Gynaecological Oncology
	MCh. Reproductive Medicine
	MCh. G I Surgery (Surgical Gastroenterlogy)
	MCh. Urology
	PG Diploma in Child Health (D.CH)
	PG Diploma in Gynecology & Obstetrics (D.GO)
	PG Diploma in Dermatology, Venerology and Leprosy (D.D.V.L.)
	PG Diploma in Medical Radio Diagnosis (D.MRD)
	PG Diploma in Ophthalmology (D.O.)
	PG Diploma in Psychological Medicine (D.PM)
	PG Diploma in Otorhinolaryngology(D. L. O)
	PG Diploma in Medical Radio-Therapy (DMRT)
	PG Diploma in Medical Radiological Sciences
	M.Phil Clinical Psychology
	M.Phil Hospital Administration

Amrita College of Nursing, Kochi, Kerala	2002	B.Sc. Nursing	Kochi, Kerala
		M Sc Nursing - Medical Surgical Nursing	
		M Sc Nursing -OBG Nursing	
Amrita School of Pharmacy, Kochi, Kerala	1997 / 2004	B.Pharm	Kochi, Kerala
		Pharm.D(Regular) 6 Year Course	
		M.Pharm - Pharmacy Practice	
		M.Pharm - Pharmaceutical Chemistry	
		M.Pharm - Pharmaceutics	
		M.Pharm - Pharmacology	
		Pharm.D(P.B) 3 Year Course	
		Ph.D	
Amrita School of Dentistry, Kochi, Kerala	2003	BDS	Kochi, Kerala
		MDS - Conservative Dentistry & Endodontics	
		MDS - Oral & Maxillofacial Surgery	
		MDS - Oral Medicine & Radiology	
		MDS - Oral Pathology & Microbiology	
		MDS - Orthodontics & Dentofacial Orthopedics	
		MDS - Pedodontics and Preventive Dentistry	
		MDS - Periodontology	
		MDS - Prosthodontics and Crown & Bridge	
		MDS - Public Health Dentistry	
		Diploma in Dental Mechanics	
		Ph.D	
Amrita School of Arts and Sciences, Kochi, Kerala	2003	B.Com - (Taxation & Finance)	Kochi, Kerala
		B.Com - Finance & IT - Computer Applications)	

B.Sc. Visual Media
BBA - Logistics Management
BBA - Bachelor of Business Administration
B.F.A - Photography
MCA
MFA - (ACM) Animation and Content Management
MFA - (AAA) Applied Art and Advertising
MFA - (DFM) Digital Film Making
M.Com (Finance and Systems)
MJMC - Master of Journalism and Mass Communication
M.Sc Mathematics
M.A (VM&C) - Visual Media & Communication
M.A (CC & A) - Corporate Communication & Advertising
M.A - English Language and Literature
M.A. - Journalism and Mass Communication
M.A English and Languages (Integrated 5 Yr.)
MCA Integrated 5 Yr. Course
M.Sc.Maths Integrated 5 Yr. Course
M.Phil (Commerce & Management)
M.Phil (English Language & Literature)
M.Phil (Computer Science & IT)
M.Phil (Computer Science & IT) (Part Time)
M.Phil (Mathematics)
M.Phil (Visual Media & Communication)
M.Phil (Visual Media & Communication) - Part Time

		Ph.D	
Amrita Centre for Nanosciences, Kochi, Kerala	2007	M.Tech - Moleculer Medicine	Kochi, Kerala
		M.Tech - Nanomedical Sciences	
		M.Tech - Nanotechnology & Renewable Energy	
		M.Sc - Moleculer Medicine	
		M.Sc - Nanomedical Sciences	
		M.Sc Nanoscience and Nanotechnology	
		Ph.D	
Mysore Campus			
Amrita School of Arts and Sciences, Mysore, Karnataka	2003	BBM - Bachelor of Business Management	Mysore, Karnataka
		BCA - Bachelor of Computer Applications	
		B.Com Regular - Bachelor of Commerce	
		B.Com Taxation - Bachelor of Commerce	
		B.Sc. Visual Media	
		BBA - Bachelor of Business Administration	
		B.Sc. - PCM	
		MCA	
		M.Com - Master of Commerce	
		M.Sc Visual Communication	
		B.Ed - Bachelor of Education	
		M.Sc Visual Communication - DFM	
		MCA - Integrated 5 Year	
		M Sc Visual Communication - Integrated 5 Year	
		B.Sc., B.Ed - PCM (Integrated)	
Ph.D			

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. - AEROSPACE ENGINEERING	AEROSPACE ENGINEERING	2007	60	Nil	Nil	F.No. Southern/1-707695364/2012/EOA Dated 10.05.2012 F.No. Southern/1-3516200899/2018/EOA Dated 04-Apr-2018	Eligible but not applied
2	B.Tech. - CIVIL ENGINEERING	CIVIL ENGINEERING	2008	60	Nil	Nil	F.No. Southern/1-414170221/2011/ EOA Dated 01.09.2011 F.No. Southern/1-3516200899/2018/EOA Dated 04-Apr-2018	Eligible but not applied
3	M.Tech. - STRUCTURAL AND CONSTRUCTION ENGINEERING	CIVIL ENGINEERING	2014	25	Nil	Nil		Eligible but not applied
4	B.Tech. - CHEMICAL ENGINEERING	CHEMICAL ENGINEERING	2007	60	Nil	Nil	F.No. Southern/1-707695364/2012/ EOA Dated 10.05.2012 F.No. Southern/1-3516200899/2018/EOA Dated 04-Apr-2018	Eligible but not applied

5	M.Tech. - MATERIALS SCIENCE & ENGINEERING	CHEMICAL ENGINEERING	2015	18	Nil	Nil		Eligible but not applied
6	B.Tech. - ELECTRICAL & ELECTRONICS ENGINEERING	ELECTRICAL & ELECTRONICS ENGINEERING	1994	40	Increase Intake - 20 + 60	1996**, 2014.	No. F 732-50- 9/RC/94 Dated 12.08.1994, ** Approval letter for Increase intake not available F.No. Southern/1- 2016442706/2014/ EOA Dated 04.06.2014 F.No. Southern/1- 3516200899/2018/ EOA Dated 04-Apr- 2018	Eligible but not applied
7	M.Tech - POWER ELECTRONICS	ELECTRICAL & ELECTRONICS ENGINEERING	2003	18	Increase Intake - 7 + 5	2005, 2018.	F.No.PG/TN/M.TEC H./2004/ECE-0078- 0057 Dated 25.06.2004, F.No.730-52- 203(E)/ET/97 Dated 19.09.2005, F.No. Southern/1- 3516200899/2018/ EOA Dated 04-Apr- 2018	Eligible but not applied
8	M.Tech - EMBEDDED SYSTEMS	ELECTRICAL & ELECTRONICS ENGINEERING	2008	24	Increase Intake - 6	2018	F.No. Southern/1- 707695364/20 12/EOA Dated 10.05.2012 F.No. Southern/1- 3516200899/2 018/EOA Dated 04-Apr-2018	Eligible but not applied
9	M.Tech - CONTROL & INSTRUMENTATI ON ENGINEERING	ELECTRICAL & ELECTRONICS ENGINEERING	2016	18	-	-	-	Eligible but not applied
10	M.Tech - RENEWABLE ENERGY TECHNOLOGIES	ELECTRICAL & ELECTRONICS ENGINEERING	2014	18	-	-	-	Eligible but not applied

Table A.7

*** Write applicable one:**

Applying first time

- Granted provisional accreditation for two/three years for the period(specify period)
- Granted accreditation for 5/6 years for the period (specify period)
- Not accredited (specify visit dates, year)
- Withdrawn (specify visit dates, year)
- Not eligible for accreditation
- **Eligible but not applied**

Note: Add rows as needed.

8. Programs to be considered for Accreditation vide this application

S. No.	Program Name
1	B.Tech. - AEROSPACE ENGINEERING
2	B.Tech. - CIVIL ENGINEERING
3	B.Tech. - CHEMICAL ENGINEERING
4	B.Tech. - ELECTRICAL & ELECTRONICS ENGINEERING

Table A.8

9. Total number of employees:

A. Regular Employees (Faculty and Staff):

Items		CAY 2018-19		CAYm1 2017-18		CAYm2 2016-17	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M	165		172		182	
	F	94		101		115	
Faculty in Maths, Science & Humanities teaching in engineering Programs	M	57		57		37	
	F	40		39		30	
Non-teaching staff	M	290		289		274	
	F	73		75		80	

Table A.9a

Note: Minimum 75% should be Regular/Full Time faculty and the remaining shall be Contractual Faculty as per AICTE norms and standards.

The contractual faculty (doing away with the terminology of visiting/adjunct faculty, whatsoever) who have taught for 2 consecutive semesters in the corresponding academic year on full time basis shall be considered for the purpose of calculation in the Student Faculty Ratio.

CAY – Current Academic Year

CAYm1- Current Academic Year minus1= Current Assessment Year

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

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

Items		CAY 2018-19		CAYm1 2017-18		CAYm2 2016-17	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M	7		8		7	
	F	1		0		1	
Faculty in Maths, Science & Humanities teaching in engineering Programs	M	2		4		2	
	F	1		6		0	
Non-teaching staff	M	16		12		5	
	F	2		3		2	

Table A.9b

10. Total number of Engineering Students:

Item	CAY 2018-19			CAYm1 2017-18			CAYm2 2016-17		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
B.Tech – I Year	850	224	1074	988	256	1244	877	257	1134
B.Tech – II Year	982	254	1236	863	251	1114	798	219	1017
B.Tech – III Year	855	249	1104	793	218	1011	758	233	991
B.Tech – IV Year	776	218	994	753	233	986	834	314	1148
Total	3463	945	4408	3397	958	4355	3267	1023	4290
M.Tech – I Year	141	84	225	267	127	394	214	156	370
M.Tech – II Year	256	124	380	203	149	352	218	165	383
M.Tech – III Year	0	0	0	23	0	23	2	0	2
Total	397	208	605	493	276	769	434	321	755

Table A10

(Instruction: The data may be categorized in tabular form separately for undergraduate, postgraduate engineering, other program, if applicable)

Note: *In case the institution is running programs other than engineering programs, a separate table giving similar details is to be included.*

11. Vision of the Institution: To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.

12. Mission of the Institution:

- To provide best-in-class infrastructure and resources to achieve excellence in technical education,
- To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally,
- To design and maintain the highest quality education through active engagement with all stakeholders – students, faculty, industry, alumni and reputed academic institutions,
- To contribute to the quality enhancement of the local and global education ecosystem,
- To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish, and
- To practice and promote high standards of professional ethics, transparency, and accountability

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

Name : **Dr. SASANGAN RAMANATHAN**
Designation : DEAN
Mobile No : 7598155285
Email id : sasangan@amrita.edu

ii. **NBA coordinator, if designated**

Name : Dr S Mahadevan
Designation : Deputy Dean
Mobile No : 9944312309
Email id : dydean@cb.amrita.edu

PART B
PROGRAM LEVEL CRITERIA

CRITERION 1

VISION, MISSION AND PROGRAM EDUCATIONAL OBJECTIVES

CRITERION 1	Vision, Mission and Program Educational Objective	50
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1.1. State the Vision and Mission of the Department and Institute (5)

Institute Vision: To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.

Institute Mission:

- To provide best-in-class infrastructure and resources to achieve excellence in technical education,
- To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally,
- To design and maintain the highest quality education through active engagement with all stakeholders – students, faculty, industry, alumni and reputed academic institutions,
- To contribute to the quality enhancement of the local and global education ecosystem,
- To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish, and
- To practice and promote high standards of professional ethics, transparency, and accountability

Department Vision: To be the best Department of Aerospace Engineering known for its teaching, research, applied engineering and service to society.

Department Mission: To achieve the stated vision, our mission is to ensure continuous improvement in each of the following:

M1-Teaching: Updating the curriculum and continuously improving the pedagogy to keep pace with advances in the field of Aerospace Engineering, reflecting the interdisciplinary nature of this technology domain.

M2-Research: Inculcating research interest in students by offering state of the art and multidisciplinary topics as final year projects.

M3-Applied Engineering: Including lab courses and design projects, both involving open-ended problems, which need innovative approach, as part of the curriculum.

M4-Service to Society: Imparting knowledge on environmental issues related to Aerospace Engineering and including value based programs to make the student appreciate societal needs.

1.2. State the Program Educational Objectives (PEOs) (5)

Aerospace Engineering graduates will be able to:

PEO1: Confidently pursue higher studies and research.

PEO2: Work in core aerospace industry, which covers diverse technology domains

PEO3: Become an entrepreneur confidently.

PEO4: Meet societal/national requirements.

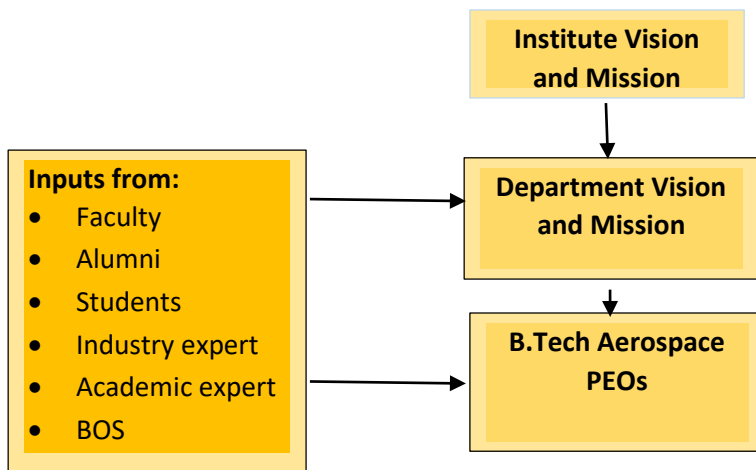
PEO5: Perform well in any field allied to the fundamentals of Aerospace engineering

1.3. Indicate where the Vision, Mission and PEOs are published and disseminated among Stakeholders (15)

- Department website: www.amrita.edu
- INPODS
- Display boards:-
 - Chairperson office
 - Faculty room
 - Aerospace laboratory
 - Hangar
- Induction program
- Progress report

1.4. State the process for defining the Vision and Mission of the Department, and PEOs of the Program (15)

Institute Vision and Mission is communicated to the department by the Dean Engineering. Based on it the Department Vision, Mission and PEOs are formulated. Inputs are taken from Faculty, Alumni, Industry and academic experts. The Department Vision, Mission and PEOs are finalized after taking the opinion of BOS members. The flow chart indicating the process is given below.



1.5. Establish consistency of PEOs with Mission of the Department (10)

The correlation between PEOs and Department Mission was deliberated within the Department and subsequently with BOS members. Table 1.1 given below indicates the correlation of PEOs with the Aerospace Department Mission.

PEO\M	M1	M2	M3	M4
PEO1	3	3	2	1
PEO2	3	3	3	1
PEO3	1	3	3	2
PEO4	1	1	2	3
PEO5	3	3	3	1

Table1.1: Correlation between Mission and PEOs

Correlation: 1 -low; 2-Medium; 3-high; “-“no correlation

B. Consistency/justification of co-relation parameters of the above matrix

PEO1 is strongly mapped with the M1 and M2 because they assist students to confidently pursue higher studies and research.

PEO2 is strongly mapped to M1, M2 and M3 as they enable the students to work in core aerospace industry, which involves diverse technology domains.

PEO3 is strongly mapped with M2 and M3 because of its emphasis on research and applied engineering, which helps the students to become successful entrepreneurs.

PEO4 is strongly mapped to M4 as it emphasizes on environmental and value based programs which will enable the students to them to appreciate societal/national requirements.

PEO5 is strongly mapped to M1, M2 and M3 as they will enable the students to perform well in any field allied to the fundamentals of Aerospace engineering.

CRITERION 2

PROGRAM CURRICULUM AND TEACHING LEARNING PROCESSES

CRITERION 2	PROGRAM CURRICULUM AND TEACHING LEARNING PROCESSES	100
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2.1. Program Curriculum (30)

2.1.1. State the process for designing the program curriculum (10)

- Revision at the Institute level every 4 years
- Deliberations within the department.
- Inputs from Industry and Alumni.
- Advice from BOS
- Approval by academic council.
 - Last major revision in 2015
 - Revision of 2019 curriculum is in progress

Process for designing the program curriculum and syllabi, followed by the Aerospace Department is as shown in Figure 2.1 below.

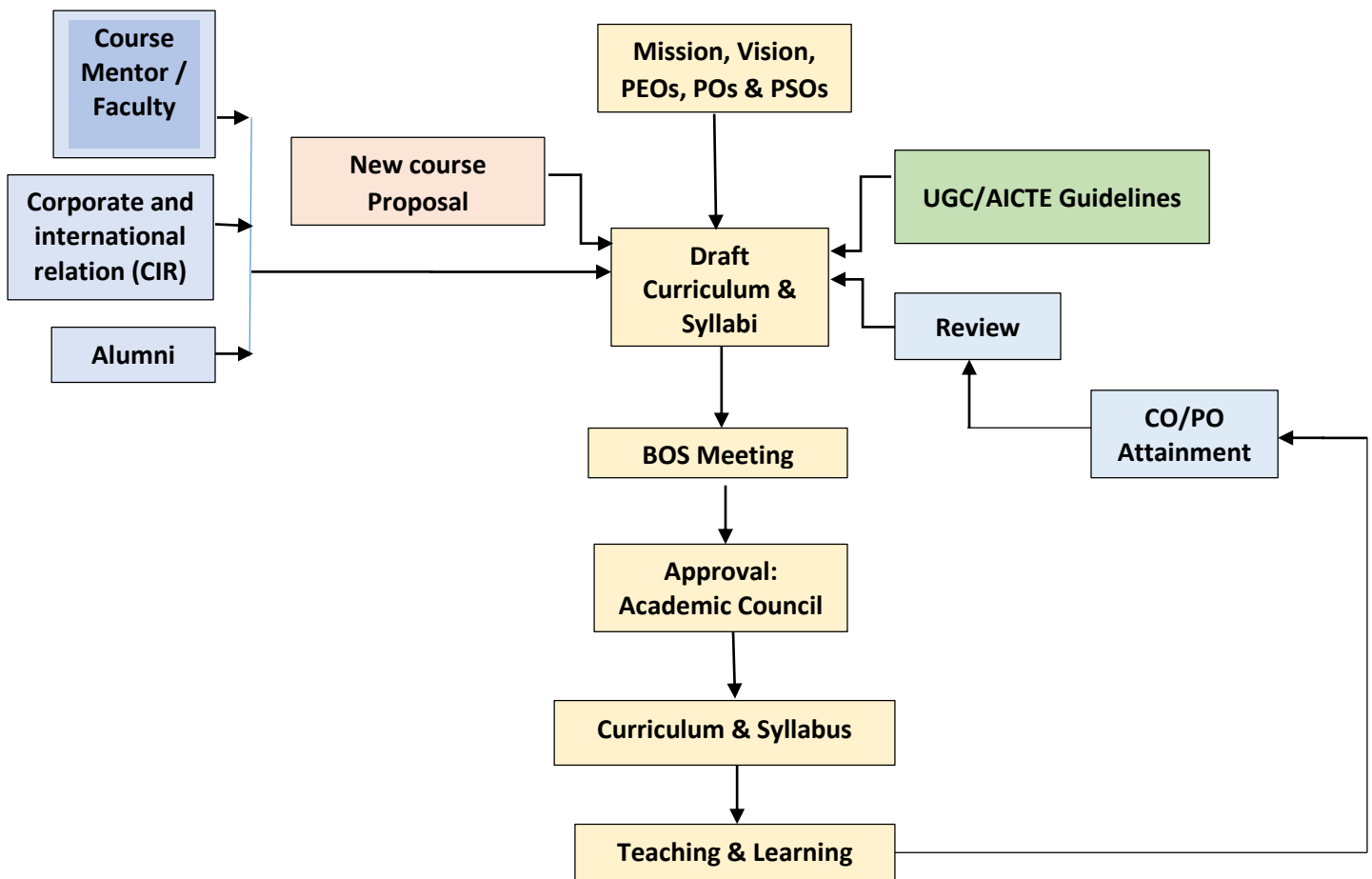


Figure 2.1: Program curriculum and syllabus design process

2.1.2. Structure of the Curriculum (5)

2010 Curriculum

Course Code	Course Title	Total No of contact hours				Cr
		L	T	p	Total Hrs.	
ENG111	Communicative English	2	0	2	45	3
PHY100/C HY100	Physics / Chemistry	3	0	0	45	3
MAT111	Calculus, Matrix Algebra and Ordinary Differential Equation	3	1	0	60	4
EEE100	Electrical Engineering	3	0	0	45	3
MEC100/ CSE100	Engineering Mechanics / Computer Engineering	3 3	1 0	0 0	60 45	4 3
MEC181	Engineering Drawing	1	0	3	60	2
PHY181/ CHY181	Physics Lab / Chemistry Lab.	0	0	3	45	1
MEC180/ EEE180	Workshop A / Workshop B	1	0	2	45	2
CSE180	Computer programming lab	0	0	3	45	1
CUL101	Cultural Education I	2	0	0	30	2
ENG112	Technical Communication	2	0	2	45	3
CHY100 PHY100	Chemistry / Physics	3	0	0	45	3
MAT112	Vector Calculus, Fourier series and partial differential equations	3	1	0	60	4
ECE100	Electronics Engineering	3	0	0	45	3
CSE100 / MEC100	Computer Engineering / Engineering Mechanics	3 3	0 1	0 0	45 60	3 4
MEC182	Computer Aided Drawing	1	0	3	60	2
CHY181/ PHY181	Chemistry Lab / Physics Lab	0	0	3	45	1
EEE180/ MEC180	Workshop B / Workshop A	1	0	2	45	2
CSE180	Computer Programming Lab.	0	0	3	45	1
CUL102	Cultural Education II	2	0	0	30	2
MAT211	Integral Transforms and Complex Analysis	3	1	0	60	4
MEC220	Engineering Thermodynamics	3	1	0	60	4
	Humanities Elective I	1	0	2	45	3
AES211	Introduction to Aerospace Technology	3	0	0	45	3
AES221	Mechanics of Fluids	3	1	0	60	4
AES241	Mechanics of Materials	3	1	0	60	4
AES291	Materials Testing Lab.	0	0	3	45	1
MEC290	Machine Drawing	1	1	3	75	3
MAT212	Mathematical Statistics and Numerical Methods	3	1	0	60	4
AES222	Fundamentals of Aerodynamics	3	1	0	60	4
AES232	Introduction to Control	3	0	0	45	3

AES242	Aerospace Structures	3	1	0	60	4
	Science Elective I	3	0	0	45	3
	Humanities Elective II	1	0	2	45	2
AES292	Mechanics of Fluids Lab.	0	0	3	45	1
AES294	Instrumentation Lab.	0	0	3	45	1
SSK111	Soft Skills I	0	0	3	45	1
AES321	Compressible Fluid Flow	3	1	0	60	4
AES331	Introduction to Aerospace Propulsion	3	1	0	60	4
	Elective I	4	0	0	60	4
	Science Elective II	3	0	0	45	3
ENV200	Environmental Studies	3	1	0	60	4
AES391	Control Lab.	0	0	3	45	1
AES393	Aero-structures Lab.	0	0	3	45	1
SSK112	Soft Skills II	0	0	3	45	1
AES312	Flight Mechanics and Static Stability	3	1	0	60	4
AES322	Computational Aerodynamics	3	0	3	60	4
AES332	Introduction to Avionics	2	0	0	30	2
AES344	Finite Element Analysis	3	0	3	60	4
	Elective II	4	0	0	60	4
AES392	Propulsion Lab.	0	0	3	45	1
AES394	Low-speed Aerodynamics Lab.	0	0	3	45	1
AES397	Seminar	0	0	3	45	1
SSK113	Soft Skills III	0	0	3	45	1
AES411	Flight Dynamics	3	1	0	60	4
	Elective III	4	0	0	60	4
	Elective IV	2	0	0	30	2
MNG400	Principles of Management	3	0	0	45	3
AES491	Aero-Design Lab.	2	1	3	60	4
AES493	Flight Testing Lab.	0	0	3	45	1
AES491	Project Phase I				45	3
	Elective V	4	0	0	60	4
	Management Elective	3	0	0	45	3
AES499	Project Phase II				135	9
Elective I						
AES351	Boundary Layer Theory					
AES357	Heat Transfer					
AES361	Analysis of Aero-structures					
AES366	Vibration Analysis					
Elective II						
AES352	Turbulent Flows					
AES356	Rocket and Space Craft Propulsion					
AES362	Engineering Fracture Mechanics					
Elective III						
AES451	Hypersonic Flow Theory					
AES456	Air-breathing Engines					
AES461	Composite Mechanics and Materials					
AES466	Manufacturing Processes					

Elective IV	
AES452	Advanced Computational Fluid Dynamics
AES467	Advanced Avionics
AES468	Flight Control Systems
Elective V	
AES462	Aero-elasticity
AES463	Matrix Methods in Structural Analysis
AES469	Multidisciplinary Design Optimisation
AES470	Space Flight Mechanics
Management Elective	
MEC461	Quality control and Reliability Engineering
MEC460	Simulation modeling of Manufacturing Systems
MEC482	Project Management

2015 Curriculum

Course Code	Course Title	Total No of contact hours				Cr
		L	T	p	Total Hrs.	
15ENG111	Communicative English	2	0	2	60	3
15MAT111	Calculus and Matrix Algebra	2	1	0	45	3
15CSE100	Computational Thinking and Problem Solving	3	0	2	75	4
15PHY100/ 15CHY100	Physics / Chemistry	3	0	0	45	3
15PHY181/ 15CHY181	Physics Lab. / Chemistry Lab.	0	0	2	30	1
15MEC180/ 15EEE180	Workshop – A Workshop – B	0	0	2	30	1
15MEC100	Engineering Drawing - CAD	2	0	2	60	3
15CUL101	Cultural Education I	2	0	0	30	2
15MAT121	Vector Calculus and Ordinary Differential Equations	3	1	0	60	4
15CHY100/ 15PHY100	Chemistry/ Physics	3	0	0	45	3
15CSE102	Computer Programming	3	0	0	45	3
15MEC102	Engineering Mechanics	3	0	0	45	3
15AES111	Introduction to Aerospace Technology	3	0	0	45	3
15CHY181/ 15PHY181	Chemistry Lab./ Physics Lab.	0	0	2	30	1
15EEE180/ 15MEC180	Workshop – B / Workshop – A	0	0	2	30	1
15CSE180	Computer Programming Lab.	0	0	2	30	1
15CUL111	Cultural Education II	2	0	0	30	2
15AES201	Mechanics of Fluids	3	1	0	60	4
15AES202	Introduction to Thermodynamics	2	1	0	45	3
15AES203	Mechanics of Materials	2	1	0	45	3
15AES204	Materials for Aviation and Space	3	0	0	45	3

15MAT204	Transforms and Partial Differential Equation	2	1	0	45	3
	Science Elective I	2	1	0	45	3
	Humanities Elective I	1	0	2	45	2
15AES281	Measurement and Instrumentation Lab.®	0	0	2	30	1
15AVP201	Amrita Value Program I	1	0	0	15	1
15AES211	Aerodynamics I	3	0	0	45	3
15AES212	Compressible Fluid Flow	2	1	0	45	3
15AES213	Aerospace Structures I	3	0	0	45	3
15AES214	Introduction to Control Theory	2	1	0	45	3
15MAT211	Calculus of variations and Numerical Methods	2	1	0	45	3
	Humanities Elective II	1	0	2	45	2
15AES285	Mechanics of Fluids Lab.	0	0	2	30	1
15AES286	Materials Testing Lab.®	0	0	2	30	1
15SSK221	Soft Skills I	1	0	2	45	2
15AVP211	Amrita Value Program II	1	0	0	15	1
15AES301	Aerodynamics II	2	1	0	45	3
15AES302	Aerospace Propulsion	2	1	0	45	3
15AES303	Aerospace Structures II	3	0	0	45	3
15AES304	Avionics	3	0	0	45	3
15MAT202	Linear Algebra	2	1	0	45	3
	Elective I	3	0	0	45	3
15AES381	Aero-structures Lab.®	0	0	2	30	1
15AES382	Avionics Lab.®	0	0	2	30	1
15SSK321	Soft Skills II	1	0	2	45	2
15AES390	Live-in-lab					3
15AES311	Finite Element Methods for Aerospace	2	1	0	45	3
15AES312	Flight Mechanics	2	1	0	45	3
15ENV300	Environmental Science and Sustainability	3	0	0	45	3
	Elective II	3	0	0	45	3
	Science Elective II	3	0	0	45	3
15AES383	Propulsion Lab.®	0	0	2	30	1
15AES384	Low-speed Aerodynamics Lab.®	0	0	2	30	1
15AES385	Innovations Lab.	0	0	2	30	1
15SSK331	Soft Skills III	1	0	2	45	2
15AES401	Computational Fluid Dynamics for Aerospace	2	1	0	45	3
15AES402	Aero Design	2	2	2	90	5
15AES403	Flight Dynamics and Control	3	0	0	45	3
	Elective III	3	0	0	45	3
	Elective IV	3	0	0	45	3
15AES481	UAV Lab.®	0	0	2	30	1
15AES495	Project Phase I				30	2
15AES490	Live-in-lab					3
	Elective V	3	0	0	45	3
	Elective VI	3	0	0	45	3
15AES499	Project Phase II				150	10
Elective I						

15AES332	Fundamentals of Heat Transfer
15AES352	Vibration Analysis
15AES372	Manufacturing Processes
Elective II	
15AES342	Experimental Aerodynamics
15AES353	Composite Materials and Mechanics
15AES373	Advanced Avionics
Elective III	
15AES432	Air Breathing Engines
15AES452	Engineering Fracture Mechanics
15AES462	Helicopter Theory
Elective IV	
15AES430	Rocket and Spacecraft Propulsion (O)
15AES442	Hypersonic Flow Theory
15AES453	Aero-Elasticity
15AES454	Advanced Composite Structures
15AES470	State Space Techniques (O)
Elective V	
15AES440	Turbulent Flows (O)
15AES460	Space Flight Mechanics (O)
15AES471	Multidisciplinary Design Optimization (O)
Elective VI	
15AES441	Advanced Computational Fluid Dynamics (O)
15AES450	Surface Engineering, Coating and Joining Technologies (O)
15AES461	Principles of Airport Management (O)

2.1.3. State the components of the curriculum (5)

2010 Curriculum

Course Component	Curriculum Content (% of total number of credits of the program)	Total number of contact hours	Total number of Credits
Basic Sciences	19.10	570	34
Engineering Sciences	16.85	615	29
Humanities and Social Sciences	12.92	480	23
Program Core	34.27	1230	61
Program Electives	10.11	300	18
Open Electives	0.00	0	0
Project(s)	6.74	180	12
Total number of Credits : 177			

2015 Curriculum

Course Component	Curriculum Content (% of total number of credits of the program)	Total number of contact hours	Total number of credits
Basic Sciences	18.29	450	30
Engineering Sciences	10.36	345	17
Humanities and Social Sciences	13.45	300	22
Program Core	39.63	1320	65
Program Electives	7.31	180	12
Open Electives	3.65	90	6
Project(s)	7.31	180	12
Total number of Credits : 164			

Table B.2.1.3

2.1.4. State the process used to identify extent of compliance of the curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I(10)

Inputs for compliance of curriculum is given by the respective course mentor and the same is verified and approved by the Chairperson. The PO and PSO compliance matrix for different courses is as given below.

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE100	Computer Programming	Y	Y	Y										Y	Y	
CSE180	Computer Programming Lab	Y	Y	Y		Y								Y	Y	
CUL101	Cultural Education – 1						Y	Y	Y	Y	Y	Y	Y	Y	Y	
CUL102	Cultural Education – 2						Y	Y	Y	Y	Y	Y	Y	Y	Y	
ECE100	Electronics Engineering	Y	Y	Y									Y	Y		
EEE100	Electrical Engineering	Y	Y										-			
EEE180	Workshop B	Y	Y	Y						Y	Y	Y	Y			
ENG111	Communicative English								Y	Y	Y		Y			
ENG112	Technical Communication								Y	Y	Y		Y			
MAT111	Calculus, Matrix Algebra	Y	Y													
MAT112	Vector Calculus and ordinary Differential equation	Y	Y	Y									Y			
MEC181	Engineering Drawing	Y	Y	Y	Y		Y				Y		Y	Y	Y	Y
MEC182	CAD	Y	Y	Y		Y					Y		Y	Y	Y	
MEC100	Engineering mechanics	Y	Y	Y	Y								Y			

MEC180	Workshop A	Y	Y	Y		Y				Y	Y		Y	Y	Y	
CHY100	Chemistry	Y	Y	Y	Y											
CHY181	Chemistry Lab	Y	Y	Y												
PHY100	Physics	Y	Y										Y			
PHY181	Physics Lab	Y	Y	Y	Y	Y	Y							Y	Y	
MAT211	Integral Transforms and Complex Analysis	Y	Y	Y										Y		
AES211	Introduction to Aerospace Technology	Y	Y							Y			Y	Y	Y	Y
AES221	Mechanics of Fluids	Y	Y		Y								Y	Y	Y	Y
AES241	Mechanics of Materials	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MEC220	Introduction to Thermodynamics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
AES291	Materials Testing Lab	Y	Y	Y	Y	Y		Y	Y	Y			Y	Y	Y	Y
MEC290	Machine Drawing	Y				Y				Y	Y		Y	Y		Y
MAT212	Mathematical Statistic and NM	Y	Y	Y												
AES222	Fundamental of Aerodynamics	Y	Y							Y			Y	Y	Y	
AES232	Introduction to Control Theory	Y	Y	Y	Y								Y	Y	Y	Y
AES242	Aerospace Structures	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PHY263	Concepts of Nanophysics and Nanotech.	Y	Y		Y	Y		Y								
AES292	Mechanics of Fluid Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
AES294	Instrumentation Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
SSK111	Soft Skills I		Y		Y				Y	Y	Y		Y			
AES321	Compressible Fluid Flow	Y	Y	Y	Y	Y				Y			Y	Y	Y	Y
AES331	Introduction Aerospace propulsion	Y	Y					Y						Y		Y
AES363	Vibration Analysis	Y	Y	Y	Y								Y	Y	Y	
AES476	Manufacturing Processes	Y											Y	Y	Y	Y
PHY274	Astrophysics	Y	Y										Y			
ENV200	Environmental Studies															
AES391	Control Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
AES393	Aero-structures Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
SSK112	Soft Skills II		Y		Y					Y	Y	Y	Y			
AES312	Flight Mechanics and Static Stability	Y	Y		Y					Y			Y	Y	Y	Y
AES322	Computational Aerodynamics	Y	Y	Y	Y	Y							Y	Y	Y	Y
AES332	Introduction To Avionics	Y	Y	Y									Y	Y	Y	Y
AES344	Finite Element Analysis	Y	Y	Y	Y								Y	Y	Y	Y
AES356	Heat Transfer	Y	Y	Y	Y								Y	Y	Y	Y
AES357	Rocket and Spacecraft Propulsion	Y	Y	Y	Y	Y		Y					Y	Y	Y	Y
AES392	Propulsion Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
AES394	Low- speed Aerodynamics Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
AES397	Seminar	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y
SSK113	Soft Skills III		Y		Y				Y	Y	Y		Y			
AES411	Flight Dynamics	Y	Y	Y		Y							Y	Y	Y	Y
AES453	Advanced CFD	Y	Y		Y								Y	Y	Y	Y
AES456	Air-breathing Engines	Y	Y	Y	Y			Y						Y	Y	Y
AES461	Composite Mechanics and Materials	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

AES471	Advanced Avionics	Y	Y										Y	Y		Y
AES362	Engineering Fracture Mechanics	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y
AES472	Space Flight Mechanics	Y	Y							Y			Y	Y	Y	Y
MNG400	Principles of Management															
AES491	Aero-Design Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
AES493	Flight Testing Lab	Y	Y	Y	Y	Y			Y	Y	Y		Y	Y	Y	Y
AES498	Project Phase I	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
AES451	Hypersonic Flow Theory	Y	Y	Y	Y	Y				Y				Y	Y	Y
AES464	Advanced Composite Structures	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
AES477	Multidisciplinary Design Optimization	Y	Y										Y		Y	Y
AES413	Introduction to Airport Management		Y		Y		Y	Y	Y			Y	Y			Y
AES499	Project Phase II	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

2.2. Teaching-Learning Processes (70)

2.2.1. Describe Processes followed to improve quality of Teaching & Learning (15)

Efforts are continuously made to improve the quality of course delivery. Performance of weak students is monitored and opportunities are given to them for improving their academic performance. Strong students are encouraged to appear for competitive exams. Details are as given below.

Academic Process

Department academic processes are aligned with the institution academic calendar with three terms in each semester. Activities involved in the academic process are given in Figure 2.1 below.

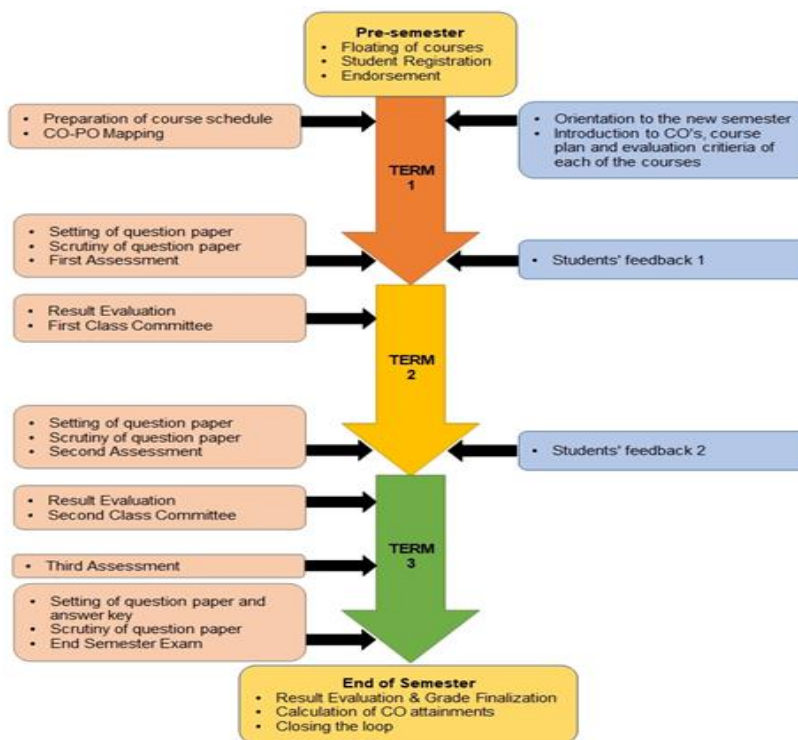


Figure 2.1: Academic process

Delivery:

- Adherence to academic calendar.
- Course plan: Course plan approved by the Chairperson ensures Unit/CO wise coverage of syllabus.
- Varied teaching methods (lecture, tutorial, demonstrations, presentations, project based learning and student presentations).
- Smart classrooms: OHP and online tests.
- Presentations available in AUMS for reference by students.
- Maintenance of Faculty Record Book (syllabus, attendance, CA).

Weak students: They are given adequate opportunities like staggered credits, runtime- redo courses, reappearance in supplementary exams.

Strong students: They are given additional training for competitive exams and publication of papers.

Impact analysis:

Weak students: Results of run-time redo exams are as given below:-

	2016	2017	2018
Appeared	08	10	35
Passed	07	07	28

Strong students: GATE performance in for last four years is given below.

SI No	Roll No	Name	GATE AIR	Higher studies
1	CB.EN.U4AEE14045	Sethupathy P	14	M.Tech Aerospace Engineering, IISC, Bangalore
2	CB.EN.U4AEE13020	Gollapalli Abhishek	Not available	M.Tech in UAV, Defence Institute of Advanced Technology, Pune
3	CB.EN.U4AEE13046	Refiya Hussain	Not available	M.Tech , Defence Institute of Advanced Technology, Pune
4	CB.EN.U4AEE13038	Nithin	Not available	M.Tech in Aerospace Engineering, Propulsion, IISc, Bangalore
5	CB.EN.U4AEE13039	Nivedha A	Not available	ME in Avionics, Madras Institute of Technology
6	CB.EN.U4AEE12011	Bodla Ashish Kumar	49	M. Tech. IIT, Kanpur
7	CB.EN.U4AEE12020	G. Harish Subramanian	06	M. Tech, IISc
8	CB.EN.U4AEE12033	Peddakotla Sai Abhishek	62	M. Tech. IIT, Kanpur
9	CB.EN.U4AEE12036	Premika t. S.	20	M. Tech, IISc, Bangalore
10	CB.EN.U4AEE12045	Sanjeev s. S	75	M. Tech, IIT, Kanpur
11	CB.EN.U4AEE12058	Yerraballi Sree lakshmi	93	M.S. (Structures) IIT, Madras

12	CB.EN.U4AEE12060	Ch. V. S. Nagarjun	53	M. Tech. IIT, Kanpur
13	CB.EN.U4AEE11027	Komma siddhartha koushik	75	M. Tech, IIT Kanpur
14	CB.EN.U4AEE11030	Lakshmi Ganesh Shankar	06	M. Tech, IISC Bangalore
15	CB.EN.U4AEE11033	Mallangi Prashanth Reddy	06	M. Tech, IISC Bangalore
16	CB.EN.U4AEE11047	Sai Tharun b	136	M. Tech, IIT Kanpur
17	CB.EN.U4AEE11066	Vigneshwaran k	18	M. Tech, IIT Kanpur
18	CB.EN.U4AEE11501	N. Nandhita	18	M. Tech, IISC Bangalore

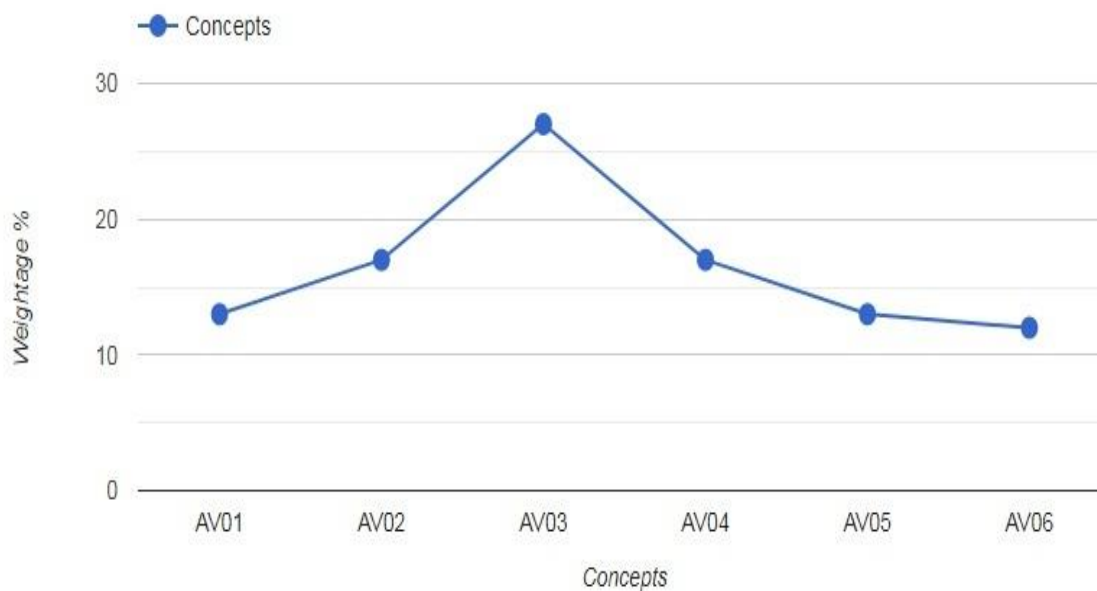
2.2.2 Quality of end semester examination, internal semester question papers, assignment and evaluation (15)

Following information is entered by the Faculty in Inpods software.

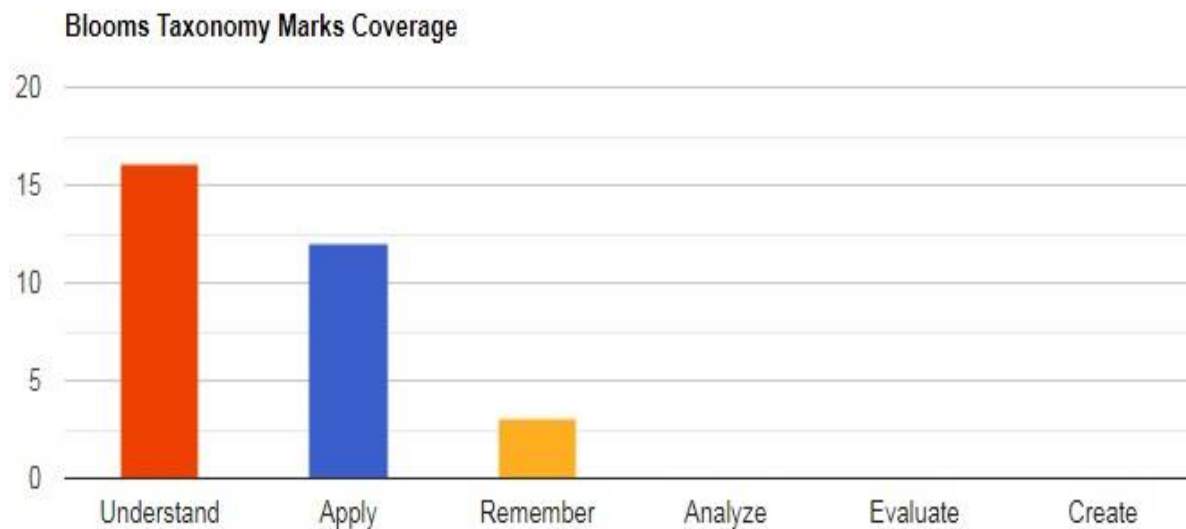
- CO coverage for each question.
- Bloom's Taxonomy Level (BTL).
- Marks obtained by the student for each question.

Inpods provides consolidated information on the quality of question papers. Sample data for 15AES304 course is given below.

1. CO coverage:



2. BTL of the question paper – Quality of the question paper.



3. CO attainment:

CO	Exam	CO_Attainment(%)	Average(%)
AV01	P1	77	81.29
	End Sem	67	
	CA	100	
AV02	P1	40	69.01
	End Sem	67	
	CA	100	
AV03	P1	79	71.49
	P2	49	
	End Sem	58	
	CA	100	
AV04	P2	53	69.44
	End Sem	55	
	CA	100	
AV05	End Sem	63	81.58
	CA	100	
AV06	End Sem	63	81.58
	CA	100	

4. **Indirect CO attainment:** It is obtained (CAY even semester onwards) from the students through a questionnaire and data is available in CMS (Campus Management Software).

2.2.3. Quality of student projects (20)

- **Project Identification Process**

Project coordinator invites proposed topics from faculty members. This is done in the first week of the 7th semester. List of project is placed in “Annexure B2. a”.

- **Allotment**

Students are divided into teams of 3/4 per team. The identified topics are listed for the students to choose from. In case there are more groups opting for the same topic, allotment is based on drawing lots.

- **Monitoring method**

The respective guides continuously monitor the progress. Typically they meet the teams at least once in a week. Review meetings with the entire department faculty is organised twice in a semester where the teams present the progress and address questions posed by the faculty. Suggestions/corrections/directions for improvement are provided during these review sessions.

- **Project Evaluation**

- Marks for presentation and content by faculty.
- Guides provide marks to each student based on their involvement and contribution.
- A final viva is conducted at the end of 4th year where external experts review the projects and give their marks for each team after final presentation and viva voce. Details of various components are as given below.

Phase I

Internal	Guide’s Marks	60
Sub total		60
External	Review 1	20
	Review 2	20
Total		100

Phase II

Internal	Review 1	30
	Review 2	30
Sub total		60
External	Internal examiner	10
	External examiner	30
Total		100

Course outcomes for the final year project have been defined. To ensure adequate coverage of POs and PSOs, they are mapped with the course outcomes. This serves as a guideline for the project mentors while defining the problem statement for different projects. Details are as given below.

PO / CO	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Ability to identify a problem, formulate a methodology,	3	3	3	3	2	-	-	-	-	-		3	3	2	2

	analyze, investigate the results, using acquired theoretical knowledge															
CO2	Work as an effective team member	-	-	-	-	-	-	-	-	3	2	-	-	-	-	3
CO3	Manage the cost and time of the project	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2
CO4	Ethically communicate the results both orally and as written reports	-	-	-	-	-	-	-	3	-	3	-	-	-	-	2
CO5	Assess the societal and environment effects of the project	-	-	-	-	-	3	3	-	-	-	-	-	-	-	2

2.2.4. Initiatives related to industry interaction (10)

Lectures are conducted for the students by experts from the industry. These lectures result in lively discussions and help in imparting 'state of the art' knowledge to the students and faculty members. Prof. Raju Anand a registered Professional Mechanical Engineer, from California has been visiting this department regularly. Details of major courses taken by him are as given below. His rich work experience for the last four decades is placed as "Annexure B2. b". Further three Faculty in the department worked in the industry, before joining Amrita School of Engineering.

S.no	Name	Time	Day	Subject title	Date	Total hour
1	Prof. Raju Anant	0945-1045	Mon	Heat Transfer	Even Semester 2015-16	60
		1100-1200	Wed			
		1100-1200	Thu			
		0945-1045	Fri			
2	Prof. Raju Anant	0945-1045	Mon	Heat Transfer	Even Semester 2016-17	60
		1200-0100	Tue			
		0945-1045	Thu			
		1100-1200	Fri			
3	Prof. Raju Anant	0845-0945	Mon	Fundamentals of heat transfer	Even Semester 2018-19	45
		0945-1045	Thu			
		1200-0100	Fri			

2.2.5. Initiatives related to industry internship/summer training (10)

Internship:

Students are allowed to undergo internship at Research Organizations / Public sector units / reputed academic institutions / industries with the approval of the department. Details of students who underwent internship in aerospace related industries are given below. The internships were subsequently converted to regular placements.

Sl. No	Name	Roll Number	Period	Company
1	Ashwin Ashok	CB.EN.U4AEE11014	2014-15	Honey Well
2	Jisha. N	CB.EN.U4AEE11022	2014-15	Honey Well
3	Gokula Krishnan S	CB.EN.U4AEE14019	2017-18	Tredence Analytics Solutions Pvt. Ltd
4	D R Shanthosh Kumar	CB.EN.U4AEE14046	2017-18	Asteria Aerospace Pvt. Ltd.

Summer training:

During summer vacation, students are permitted to undergo training in reputed industries/companies like **HAL Bengaluru, ICF Chennai, ECIL Hyderabad, FCRI Palakad, DRDO etc.** to get practical exposure to latest technologies. It helps the students to relate theory and its application to real world engineering problems. Details are as given below

Sl. No	Year	Number of Students
1	2015	51
2	2016	49
3	2017	21
4	2018	21

Impact Analysis:

Feedback from students was collected on the usefulness of their in plant training/internship with respect to PSOs of the department. The consolidated feedback report was analysed to evaluate contribution of the industrial exposure. On a scale of 1-3 (low-high) the average score was found to be 2.4, 2 and 2 for PSO1, PSO2 and PSO 3 respectively. Internship in public sector organizations (like HAL) was found to be more useful than that in private companies. This observation will be used in guiding the students in future when they apply for internship/training.

PSO		Average Score
PSO1	Understanding governing principles and applying them in Aerospace Engineering	2.4
PSO2	Using methodology and tools pertaining to fundamental design of aircraft	2
PSO3	Ability to function in multidisciplinary teams in the Aerospace Engineering domain.	2

CRITERION 3

COURSE OUTCOMES AND PROGRAM OUTCOMES

CRITERION 3	Course Outcomes and Program Outcomes	175
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3.1. Establish the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes (25)

NBA defined Program Outcomes as mentioned in Annexure I and Program Specific Outcomes as defined by the Program.

Program Articulation Matrix (2010)

SI No	COURSE CODE	TITLE	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	PSO 2	PSO 3
1	AES211	Introduction to Aerospace Technology	3	3	-	-	-	-	-	-	-	2	-	3	3	3	2
2	AES222	Fundamental of Aerodynamics	3	3	3	2	-	-	-	-	-	3	-	2	3	3	-
3	AES321	Compressible Fluid Flow	3	3	3	2	2	-	-	-	-	3	-	2	3	3	-
4	AES331	Introduction Aerospace propulsion	2	2	-	-	-	-	2	-	-	-	-	-	2	-	2
5	AES312	Flight Mechanics and Static Stability	3	3	-	3	-	-	-	-	-	3	-	3	3	2	3
6	AES322	Computational Aerodynamics	3	3	3	3	3	-	-	-	-	-	-	3	3	2	2
7	AES344	Finite Element Analysis	3	3	2	2	-	-	-	-	3	-	-	3	3	2	2
8	AES411	Flight Dynamics	3	2	2	-	2	-	-	-	-	-	-	3	3	2	2

Table B.3.1a

Course Articulation Matrix (2010)

Course Code	Course Outcome Statements	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	PSO 2	PSO 3
AES211.1	Recall historic attempts at flight and flying machines. Categorize various types of flying machines. Recognize major components and their functions. Apply Newton's laws of motion to flight through the atmosphere. Understand airfoils and wings and the behavior of lift and drag. Know the various types of high lift devices	3	-	-	-	-	-	-	-	-	2	-	3	3	2	2
AES211.2	Understand moments acting on an aircraft, aerodynamic center and role of control surfaces. Study aircraft and rocket engines and their operation. Know about load factor, V-n diagrams and methods of wing and fuselage construction	3	3	-	-	-	-	-	-	-	2	-	3	3	3	2
AES211.3	Know the solar system and its laws, apply the laws to rockets and satellites, classify satellite orbits and know about interplanetary transfer	3	3	-	-	-	-	-	-	-	2	-	3	3	3	2
AES211 - Introduction to Aerospace Technology		3	3	-	-	-	-	-	-	-	2	-	3	3	3	2
AES222.1	Know about aerodynamic forces, moments and governing equations	3	3	-	-	-	-	-	-	-	3	-	2	2	2	-
AES222.2	Understand Conformal mapping and basics of plane potential flow	3	3	2	2	-	-	-	-	-	3	-	3	3	3	-
AES222.3	Able to understand elementary potential flows and superimpose them to get meaningful flows. Know panel methods.	3	3	3	2	-	-	-	-	-	3	-	2	3	3	-
AES222.4	Appreciate airfoil nomenclature and understand thin airfoil theory	3	3	3	2	-	-	-	-	-	3	-	-	3	3	-
AES222 - Fundamentals of Aerodynamics		3	3	3	2	-	-	-	-	-	3	-	2	3	3	-

AES321.1	Understand the concept of continuum and basic governing equations of compressible fluid flow. Appreciate finite waves	3	3	2	-	-	-	-	-	-	2	-	-	3	3	-
AES321.2	Understand isentropic flow and apply to problems of practical interest	3	3	2	-	2	-	-	-	-	3	-	2	3	3	-
AES321.3	Understand the formation of and flow through shock waves and expansion waves. Apply these to practical problems. Understand measurement of pressure and temperature. Appreciate optical techniques	3	3	3	2	2	-	-	-	-	3	-	2	3	3	-
AES321.4	Evaluate the effects of heat and friction in 1d flow, represent shock waves in T-S diagram. Know similarity rules and method of characteristics	3	3	3	2	2	-	-	-	-	3	-	2	3	3	-
AES321 - Compressible Fluid Flow		3	3	3	2	2	-	-	-	-	3	-	2	3	3	-
AES331.1	Analyse the fundamental process of production of propulsive thrust in various types of aircraft engines, along with the related parameter	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
AES331.2	Apply thermodynamic analysis to the components of aircraft engines	3	2	-	-	-	-	-	-	-	-	-	-	2	-	2
AES331.3	Analyse combustion as applicable to aircraft engines	2	-	-	-	-	-	2	-	-	-	-	-	-	-	2
AES331.4	Learn how rocket propulsion systems are classified	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2
AES331.5	Analyse the thermodynamics of thrust production in rockets	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2
AES331 - Introduction to Aerospace propulsion		2	2	-	-	-	-	2	-	-	-	-	-	2	-	2
AES312.1	Understand and apply equations of motion for an aircraft. Understand aerodynamic characteristics of the wing. Understand propulsion system and their characteristics	3	3	-	-	-	-	-	-	-	3	-	-	3	2	2

AES312.2	Able to evaluate the performance of propeller and jet aircrafts	3	3	-	3	-	-	-	-	-	3	-	3	3	2	3
AES312.3	Understand and evaluate static stability and control of airplanes	3	3	-	3	-	-	-	-	-	3	-	3	3	2	3
AES312.4	Understand the performance evaluation of helicopters. Understand the basics of dynamic stability	3	3	-	3	-	-	-	-	-	3	-	3	3	2	3
AES312 - Flight Mechanics and Static Stability		3	3	-	3	-	-	-	-	-	3	-	3	3	2	3
AES322.1	Model the performance of the finite and infinite wings using potential vortex theory	3	3	2	3	3	-	-	-	-	-	-	2	3	3	2
AES322.2	Recall the governing equation of fluid dynamics in conservation and non-conservation form.	3	3	-	3	-	-	-	-	-	-	-	3	3	2	2
AES322.3	Utilize finite difference method for the discretization of the fluid flow problems.	3	3	-	2	3	-	-	-	-	-	-	-	3	2	2
AES322.4	Make use of suitable numerical methods for solving the governing equations in the discretized domain by understanding stability and convergence.	3	3	-	-	3	-	-	-	-	-	-	-	3	2	2
AES322.5	Choose proper structured / unstructured 2D grids specific to particular fluid flow problems.	3	3	-	-	3	-	-	-	-	-	-	2	3	2	2
AES322.6	Experiment numerically the theoretical understanding of Computational Aerodynamics using commercial packages such as Fluent and Matlab.	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
AES322 - Computational Aerodynamics		3	3	3	3	3	-	-	-	-	-	-	3	3	2	2
AES344.1	Understand various energy principles and variational methods	3	-	-	-	-	-	-	-	-	-	-	3	3	-	-

AES344.2	Understand step by step procedure to develop finite element formulation for 1D problem	3	3	-	-	-	-	-	-	3	-	-	3	3	2	-
AES344.3	Understand applications of FEM for various engineering problems	3	3	2	2	-	-	-	-	3	-	-	3	3	2	2
AES344.4	Understand step by step procedure to develop finite element formulation for 2D/3D problems	3	3	-	-	-	-	-	-	3	-	-	3	3	2	-
AES344 - Finite Element Method		3	3	2	2	-	-	-	-	3	-	-	3	3	2	2
AES411.1	Understand different Aircraft Axis	3	2	-	-	-	-	-	-	-	-	-		3		
AES411.2	Derive Aircraft equation of motion	3	2	-	-	-	-	-	-	-	-	-	2	3		
AES411.3	Derive Aircraft equation of motion and stability	3	2	-	-	-	-	-	-	-	-	-		3		
AES411.4	Understand Flight dynamics modes	3	2	2	-	2	-	-	-	-	-	-	3	3	2	2
AES411.5	Understand rocket motion and performance	3	2	-	-	-	-	-	-	-	-	-	3	3		2
AES411 - Flight Dynamics		3	2	2	-	2	-	-	-	-	-	-	3	3	2	2

Table B.3.1bNote:

Correlation levels 1, 2 or 3 as defined: 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

3.2. Attainment of Course Outcomes (75)

3.2.1. Describe the assessment tool and process used to gather the data upon which the evaluation of course Outcome is based (10)

Procedure given below is used for calculating the CO attainment using Inpods Software.

Step 1:	Faculty sets the assessment question paper with CO mapping, BTL mapping and Marks for each question.
Step 2:	Faculty enters the step 1 data in Inpods software and the bundle number is generated. Bundle Number is a unique number (Spread sheet) for an exam for a particular course and class.
Step 3:	The answer paper is evaluated by the faculty and is shared with the students for verification.
Step 4:	The front sheet of the answer paper which contains the question wise mark is removed by the faculty.
Step 5:	The front sheet along with bundle number generated in step 2 is forwarded to the data entry team
Step 6:	Data entry team then enters the marks of each student, question wise, in the Inpods software with the help of bundle number (spread sheet).
Step 7:	Continuous Assessment (CA) is entered by the faculty for assignments and quizzes.
Step 8:	Step 1 to Step 6 will be followed for Periodicals 1, Periodicals 2 and End Semester.
Step 9:	The Course Attainment-Direct is computed by the Inpods software.

The process followed at Amrita School of Engineering, Coimbatore for CO computation in a theory course is given in Figure 3.2.1. In the CO attainment calculation for a course, 80% is contributed through direct and 20% through Indirect assessments. As per the University regulation, 50% of the direct is contributed by Cumulative Internal Examination (CIE) and 50% from Semester End Examinations (SEE) for theory courses. In the CIE, Periodical 1, Periodical 2 and Continuous Assessment contribute 15, 15 and 20 percentages respectively. For Lab courses, 80% and 20% is contributed by continuous assessment and end semester examinations respectively to the direct attainment.

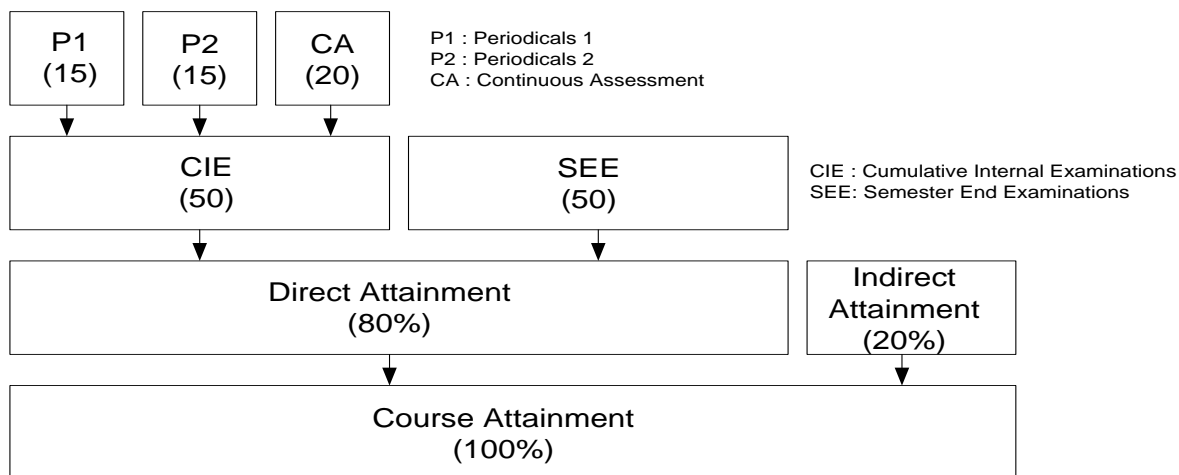
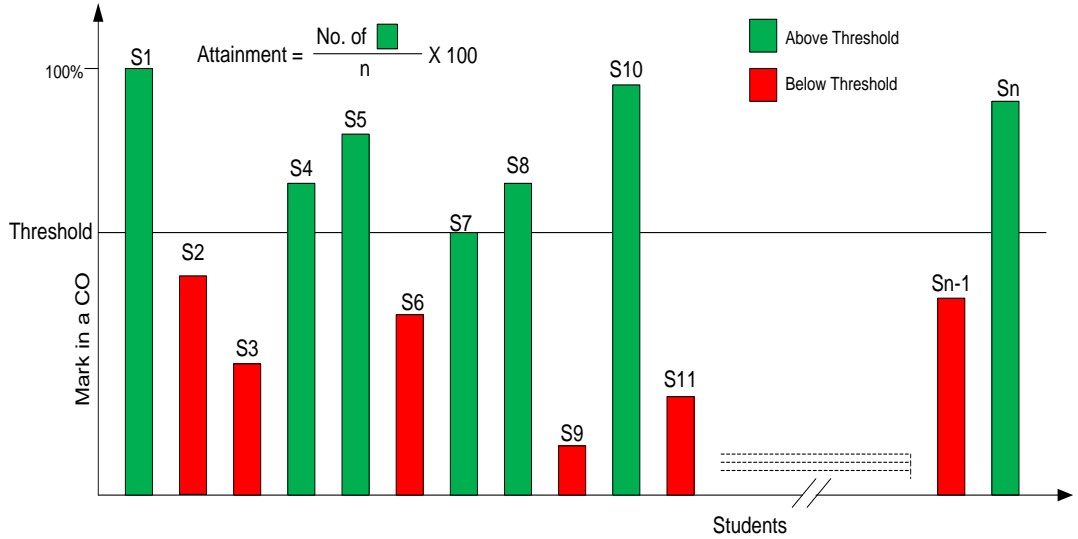


Figure 3.2.1 CO attainment for theory courses

Procedure to calculate CO attainment is as given below.

<p>Direct</p>	<p>The direct part of the CO attainment is computed through exams.</p> <p>The percentage of students in the class who scored more than threshold percentage of marks in the respective CO is the attainment.</p> 
<p>Indirect</p> <p>#</p>	<p>Based on Survey</p> $Attainment = \frac{\sum_{i=1}^5 i * no. of students gave i option}{5 * no. of responses}$

Indirect CO attainment for 2014 batch is based on faculty feedback given by the students. For 2015, 2016 and 2017 batches it is based on individual student opinion on COs and is available in CMS software.

Final CO attainment for each course is calculated based on the contribution of direct (80%) and indirect assessments (20%). Percentages are converted to levels as given in the Table below.

Percentage	Level
Less than 40	1
40-60	2
More than 60%	3

CO attainment for few courses (2014 batch) indicating the procedure being followed in the Department is given below. Data for 2015 curriculum courses are available in Inpods.

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target (%)	Attainment Yes/No
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment	Level	Attainment	Level	Attainment	Level		
AES 211	CO1	85.71	3	62.5	3	75.00	3	86	3	77.20	3	50	Yes
	CO2	48.21	2	62.5	3	57.14	2.5	86	3	62.91	2.6	50	Yes
	CO3	39.29	1	62.5	3	53.57	2	86	3	60.06	2.2	50	Yes
AES 222	CO1	96.43	3	64.29	3	94.64	3	79	3	91.51	3	50	Yes
	CO2	92.86	3	64.29	3	83.93	3	79	3	82.94	3	50	Yes
	CO3	83.93	3	64.29	3	80.36	3	79	3	80.09	3	50	Yes
	CO4	100	3	64.29	3	75.00	3	79	3	75.80	3	50	Yes
AES 321	CO1	76.79	3	75	3	75	3	83	3	76.6	3	50	Yes
	CO2	76.79	3	75	3	75	3	83	3	76.6	3	50	Yes
	CO3	87.50	3	75	3	85.71	3	83	3	85.17	3	50	Yes
	CO4	100	3	75	3	87.5	3	83	3	86.6	3	50	Yes
AES 331	CO1	57.14	2	78.57	3	60.71	2.5	90.65	3	66.70	2.6	50	Yes
	CO2	94.64	3	78.57	3	89.29	3	90.65	3	89.56	3	50	Yes
	CO3	100	3	78.57	3	87.50	3	90.65	3	88.13	3	50	Yes
	CO4	100	3	78.57	3	98.21	3	90.65	3	96.70	3	50	Yes
	CO5	100	3	78.57	3	98.21	3	90.65	3	96.70	3	50	Yes
AES 411	CO1	69.64	3	48.21	2	55.36	2.5	93	3	62.89	2.6	50	Yes
	CO2	69.64	3	125.00	3	69.64	3	93	3	74.31	3	50	Yes
	CO3	69.64	3	48.21	2	62.50	2.5	93	3	68.60	2.6	50	Yes
	CO4	69.64	3	48.21	2	57.14	2.5	93	3	64.31	2.6	50	Yes
	CO5	100	3	48.21	2	51.79	2.5	93	3	60.03	2.6	50	Yes

3.2.2. Record the attainment of Course Outcomes of all courses with respect to set attainment levels (65)

CO ATTAINMENT FOR THE STUDENTS OF 2014-18 BATCH

Course Code	Name of the subject	COs	Direct Value	Indirect Value	Total	Attainment level
CSE100	Computer Programming	CO1	70.69	55.00	67.55	2.8
		CO2	70.69	64.00	69.35	3
		CO3	72.41	62.00	70.33	3
		CO4	68.97	55.00	66.17	2.8
CSE180	Computer Programming Lab	CO1	50.00	55.00	51.00	2
		CO2	50.00	64.00	52.80	2.2
		CO3	50.00	62.00	52.40	2.2
		CO4	51.92	55.00	52.54	2
CUL101	Cultural Education-1	CO1	92.86	0.00	92.86	3
		CO2	96.43	0.00	96.43	3
		CO3	98.21	0.00	98.21	3
		CO4	98.21	0.00	98.21	3
		CO5	98.21	0.00	98.21	3
CUL102	Cultural Education-2	CO1	98.28	0.00	98.28	3
		CO2	98.28	0.00	98.28	3
		CO3	100.00	0.00	100.00	3
		CO4	100.00	0.00	100.00	3
		CO5	100.00	0.00	100.00	3
ECE100	Electronics Engineering	CO1	58.62	0.00	58.62	2.5
		CO2	56.90	0.00	56.90	2.5
		CO3	60.34	0.00	60.34	3
		CO4	68.97	0.00	68.97	3
EEE100	Electrical Engineering	CO1	77.59	0.00	62.07	1.8
		CO2	93.10	0.00	74.48	1.8
		CO3	100.00	0.00	80.00	1.8
		CO4	100.00	0.00	80.00	1.8
		CO5	100.00	0.00	80.00	1.8
EEE180	Workshop B	CO1	10.34	85.43	25.36	1.4
		CO2	3.45	85.43	19.84	1.4
		CO3	6.90	85.43	22.60	1.4
		CO4	6.90	85.43	22.60	1.4
ENG111	Communicative English	CO1	84.48	77.00	82.99	3
		CO2	77.59	77.00	77.47	3
		CO3	75.86	77.00	76.09	3
		CO4	82.76	77.00	81.61	3

		CO5	82.76	77.00	81.61	3
ENG112	Technical Communication	CO1	88.46	94.74	89.72	3
		CO2	96.15	94.74	95.87	3
		CO3	96.15	94.74	95.87	3
		CO4	80.77	94.74	83.56	3
		CO5	80.77	94.74	83.56	3
MAT111	Calculus, Matrix Algebra	CO1	67.24	0.00	67.24	2.2
		CO2	62.07	0.00	62.07	2.2
		CO3	74.14	0.00	74.14	2.2
		CO4	86.21	0.00	86.21	2.2
		CO5	67.24	0.00	67.24	2.2
		CO6	51.72	0.00	51.72	2.2
MAT112	Vector Calculus and Ordinary Differential Equations	CO1	56.90	80.00	61.52	2.2
		CO2	48.28	80.00	54.62	2.2
		CO3	48.28	80.00	54.62	2.2
		CO4	44.83	80.00	51.86	2.2
		CO5	46.55	80.00	53.24	2.2
		CO6	46.55	80.00	53.24	2.2
MEC181	Engineering Drawing	CO1	94.83	0.00	75.86	2.6
		CO2	96.55	0.00	77.24	2.6
		CO3	94.83	0.00	75.86	2.6
		CO4	96.55	0.00	77.24	2.6
		CO5	94.83	0.00	75.86	2.6
		CO6	94.83	0.00	75.86	2.6
MEC182	CAD	CO1	53.45	0.00	42.76	1.8
		CO2	53.45	0.00	42.76	1.8
		CO3	53.45	0.00	42.76	1.8
		CO4	53.45	0.00	42.76	1.8
MEC100	Engineering Mechanics	CO1	89.66	0.00	71.72	1.8
		CO2	91.38	0.00	73.10	1.8
		CO3	62.07	0.00	49.66	1.8
		CO4	91.38	0.00	73.10	1.8
		CO5	55.17	0.00	44.14	1.8
MEC180	Workshop A	CO1	100.00	0.00	80.00	2.6
		CO2	100.00	0.00	80.00	2.6
		CO3	100.00	0.00	80.00	2.6
		CO4	100.00	0.00	80.00	2.6
CHY100	Chemistry	CO1	39.66	75.60	46.84	2.2
		CO2	44.83	75.60	50.98	2.2
		CO3	41.38	75.60	48.22	2.2
CHY181	Chemistry Lab.	CO1	98.28	78.00	94.22	3
		CO2	98.28	78.00	94.22	3
		CO3	98.28	78.00	94.22	3

		CO4	98.28	78.00	94.22	3
		CO5	98.28	78.00	94.22	3
PHY100	Physics	CO1	48.28	58.00	50.22	2.4
		CO2	50.00	58.00	51.60	2.4
		CO3	60.34	58.00	59.88	2.4
PHY181	Physics Lab	CO1	100.00	58.00	91.60	2.8
		CO2	100.00	58.00	91.60	2.8
		CO3	100.00	58.00	91.60	2.8
MAT211	Integral Transforms and Complex Analysis	CO1	60.71	73.15	63.20	2.2
		CO2	55.36	73.15	58.92	2.2
		CO3	58.93	73.15	61.77	2.2
		CO4	55.36	73.15	58.92	2.2
		CO5	53.57	73.15	57.49	2.2
		CO6	55.36	73.15	58.92	2.2
AES211	Introduction to Aerospace Technology	CO1	75.00	86.00	77.20	3
		CO2	57.14	86.00	62.91	2.6
		CO3	53.57	86.00	60.06	2.2
AES221	Mechanics of Fluids	CO1	12.50	91.84	28.37	1.4
		CO2	14.29	91.84	29.80	1.4
		CO3	16.07	91.84	31.23	1.4
		CO4	30.36	91.84	42.65	1.4
		CO5	30.36	91.84	42.65	1.4
AES241	Mechanics of Materials	CO1	60.71	87.00	65.97	3
		CO2	51.79	87.00	58.83	1.8
		CO3	48.21	87.00	55.97	1.8
		CO4	37.50	87.00	47.40	1.8
		CO5	39.29	87.00	48.83	2.2
		CO6	55.36	87.00	61.69	2.2
MEC220	Introduction to Thermodynamics	CO1	100.00	55.00	91.00	2.8
		CO2	46.43	64.00	49.94	2.2
		CO3	48.21	62.00	50.97	2.2
		CO4	100.00	55.00	91.00	2
		CO5	44.64	35.00	42.71	1.8
		CO6	46.43	45.00	46.14	2
HUM250	Indian classic for the Twenty first century	CO1	92.00	0.00	73.60	2.6
		CO2	92.00	0.00	73.60	2.6
		CO3	96.00	0.00	76.80	2.6
		CO4	96.00	0.00	76.80	2.6
		CO5	96.00	0.00	76.80	2.6
		CO6	96.00	0.00	76.80	2.6
HUM256	Psychology for engineers	CO1	100.00	0.00	100.00	2.6
		CO2	100.00	0.00	100.00	2.6
		CO3	100.00	0.00	100.00	2.6

		CO4	100.00	0.00	100.00	2.6
HUM258	Health and Life Style	CO1	66.67	90.61	71.46	3
		CO2	66.67	90.61	71.46	2.6
		CO3	50.00	90.61	58.12	2.6
		CO4	66.67	90.61	71.46	2.6
AES291	Materials Testing Lab	CO1	32.14	88.00	43.31	1.8
		CO2	32.14	88.00	43.31	1.8
		CO3	32.14	88.00	43.31	1.8
		CO4	32.14	88.00	43.31	1.8
MEC290	Machine Drawing	CO1	55.36	80.00	60.29	2.6
		CO2	55.36	80.00	60.29	2.6
		CO3	55.36	80.00	60.29	2.6
		CO4	55.36	80.00	60.29	2.6
MAT212	Mathematical Statistic and NM	CO1	61.61	80.00	65.29	3
		CO2	61.61	80.00	65.29	3
		CO3	61.61	80.00	65.29	3
		CO4	60.71	80.00	64.57	3
		CO5	57.14	80.00	61.71	3
		CO6	61.61	80.00	65.29	3
AES222	Fundamental of Aerodynamics	CO1	94.64	79.00	91.51	3
		CO2	83.93	79.00	82.94	3
		CO3	80.36	79.00	80.09	3
		CO4	75.00	79.00	75.80	3
AES232	Introduction to Control Theory	CO1	50.00	90.00	58.00	2.6
		CO2	69.64	90.00	73.71	3
		CO3	53.57	90.00	60.86	2.2
		CO4	46.43	90.00	55.14	2.2
		CO5	57.14	90.00	63.71	2.2
AES242	Aerospace Structures	CO1	51.79	73.00	56.03	2.2
		CO2	39.29	73.00	46.03	1.8
		CO3	32.14	73.00	40.31	1.4
		CO4	33.93	73.00	41.74	1.8
		CO5	37.50	73.00	44.60	2.2
		CO6	41.07	73.00	47.46	2.2
PHY263	Concepts of Nanophysics and Nanotech.	CO1	69.64	74.00	70.51	3
		CO2	57.14	74.00	60.51	2.2
		CO3	46.43	74.00	51.94	2.2
		CO4	35.71	74.00	43.37	1.8
		CO5	26.79	74.00	36.23	1.8
		CO6	23.21	74.00	33.37	1.8
ENG252	Indian thought in English	CO1	56.25	85.00	62.00	2.36
		CO2	62.50	85.00	67.00	2.36
		CO3	56.25	85.00	62.00	2.36

		CO4	56.25	85.00	62.00	2.36
		CO5	56.25	85.00	62.00	2.36
HUM252	Glimpses of eternal India	CO1	100.00	0.00	80.00	2.6
		CO2	100.00	0.00	80.00	2.6
		CO3	100.00	0.00	80.00	2.6
		CO4	100.00	0.00	80.00	2.6
		CO5	100.00	0.00	80.00	2.6
		CO6	100.00	0.00	80.00	2.6
HUM257	Psychology for effective living	CO1	100.00	0.00	100.00	2.6
		CO2	100.00	0.00	100.00	2.6
		CO3	100.00	0.00	100.00	2.6
		CO4	100.00	0.00	100.00	2.6
		CO5	100.00	0.00	100.00	2.6
HUM259	Understanding Science of Food and Nutrition	CO1	100.00	90.21	98.04	3
		CO2	100.00	90.21	98.04	3
		CO3	91.67	90.21	91.38	3
		CO4	91.67	90.21	91.38	3
		CO5	91.67	90.21	91.38	3
AES292	Mechanics of Fluid Lab	CO1	94.64	80.00	91.71	3
		CO2	94.64	80.00	91.71	3
		CO3	94.64	80.00	91.71	3
		CO4	94.64	80.00	91.71	3
AES294	Instrumentation Lab	CO1	62.50	90.00	68.00	2.2
		CO2	62.50	90.00	68.00	2.2
		CO3	62.50	90.00	68.00	2.2
		CO4	62.50	90.00	68.00	2.2
SSK111	Soft Skills I	CO1	100.00	77.60	95.52	3
		CO2	100.00	78.20	95.64	3
		CO3	85.71	73.80	83.33	3
		CO4	78.57	72.80	77.42	3
		CO5	85.71	78.20	84.21	3
		CO6	94.64	78.80	91.47	3
AES321	Compressible Fluid Flow	CO1	75.00	83.00	76.60	3
		CO2	75.00	83.00	76.60	3
		CO3	85.71	83.00	85.17	3
		CO4	87.50	83.00	86.60	3
AES331	Introduction Aerospace propulsion	CO1	60.71	90.65	66.70	2.6
		CO2	89.29	90.65	89.56	3
		CO3	87.50	90.65	88.13	3
		CO4	98.21	90.65	96.70	3
		CO5	98.21	90.65	96.70	3
AES363	Vibration Analysis	CO1	54.29	91.64	61.76	2.2
		CO2	54.29	91.64	61.76	2.2

		CO3	62.86	91.64	68.61	2.6
		CO4	60.00	91.64	66.33	2.6
		CO5	65.71	91.64	70.90	2.6
AES476	Manufacturing Processes	CO1	52.38	91.00	60.10	2.2
		CO2	66.67	91.00	71.53	3
		CO3	90.48	91.00	90.58	3
		CO4	100.00	91.00	98.20	3
		CO5	95.24	91.00	94.39	3
PHY274	Astrophysics	CO1	50.00	67.00	53.40	2.2
		CO2	73.21	67.00	71.97	2.2
		CO3	71.43	67.00	70.54	2.2
ENV200	Environmental Studies	CO1	98.21	80	94.57	3
		CO2	98.21	80	94.57	3
		CO3	96.43	80	93.14	3
		CO4	96.43	80	93.14	3
AES391	Control Lab	CO1	25.00	84.00	36.80	1.8
		CO2	25.00	84.00	36.80	1.8
		CO3	25.00	84.00	36.80	1.8
		CO4	25.00	84.00	36.80	1.8
AES393	Aero-structures Lab	CO1	100.00	88.61	97.72	3
		CO2	100.00	88.61	97.72	3
		CO3	100.00	88.61	97.72	3
		CO4	100.00	88.61	97.72	3
SSK112	Soft Skills II	CO1	98.21	77.60	94.09	3
		CO2	98.21	78.20	94.21	3
		CO3	33.93	73.80	41.90	2.2
		CO4	26.79	72.80	35.99	2.2
		CO5	44.64	78.20	51.35	2.2
		CO6	39.29	78.80	47.19	2.2
AES312	Flight Mechanics and Static Stability	CO1	87.50	90.00	88.00	2.6
		CO2	89.29	90.00	89.43	2.6
		CO3	73.21	90.00	76.57	2.6
		CO4	96.43	90.00	95.14	2.6
AES322	Computational Aerodynamics	CO1	58.93	84.00	63.94	3
		CO2	60.71	84.00	65.37	2.6
		CO3	66.07	84.00	69.66	3
		CO4	67.86	84.00	71.09	3
		CO5	67.86	84.00	71.09	3
		CO6	87.50	84.00	86.80	3
AES332	Introduction To Avionics	CO1	67.86	90.00	72.29	2.6
		CO2	67.86	90.00	72.29	2.6
		CO3	46.43	90.00	55.14	2.2
		CO4	48.21	90.00	56.57	2.2

AES344	Finite Element Analysis	CO1	64.29	95.00	70.43	2.2
		CO2	64.29	95.00	70.43	2.2
		CO3	46.43	95.00	56.14	2.2
		CO4	53.57	95.00	61.86	2.2
AES356	Heat Transfer	CO1	18.18	93.92	33.33	1.8
		CO2	18.18	93.92	33.33	1.4
		CO3	18.18	93.92	33.33	1.4
		CO4	9.09	93.92	26.06	1.4
		CO5	9.09	93.92	26.06	1.4
		CO6	9.09	93.92	26.06	2.2
AES357	Rocket and Spacecraft Propulsion	CO1	93.48	78.00	90.38	3
		CO2	82.61	78.00	81.69	3
		CO3	84.78	78.00	83.43	3
		CO4	80.43	78.00	79.95	3
		CO5	91.30	78.00	88.64	3
AES392	Propulsion Lab	CO1	76.79	88.00	79.03	2.2
		CO2	76.79	88.00	79.03	2.2
		CO3	76.79	88.00	79.03	2.2
		CO4	76.79	88.00	79.03	2.2
AES394	Low- speed Aerodynamics Lab	CO1	10.71	91.00	26.77	1.4
		CO2	10.71	91.00	26.77	1.4
		CO3	10.71	91.00	26.77	1.4
		CO4	10.71	91.00	26.77	1.4
AES397	Seminar	CO1	44.29	93.99	54.23	2.2
		CO2	44.29	93.99	54.23	2.2
		CO3	44.29	93.99	54.23	2.2
		CO4	44.29	93.99	54.23	2.2
		CO5	44.29	93.99	54.23	2.2
		CO6	44.29	93.99	54.23	2.2
SSK113	Soft Skills III	CO1	62.50	77.60	65.52	3
		CO2	62.50	78.20	65.64	3
		CO3	57.14	73.80	60.47	2.6
		CO4	55.36	72.80	58.85	2.6
		CO5	55.36	78.20	59.93	2.6
		CO6	57.14	78.80	61.47	2.6
AES411	Flight Dynamics	CO1	55.36	93.00	62.89	2.6
		CO2	69.64	93.00	74.31	3
		CO3	62.50	93.00	68.60	2.6
		CO4	57.14	93.00	64.31	2.6
		CO5	51.79	93.00	60.03	2.6
AES453	Advanced CFD	CO1	96.77	91.00	95.62	3
		CO2	96.77	91.00	95.62	3
		CO3	100.00	91.00	98.20	3

		CO4	93.55	91.00	93.04	3
		CO5	96.77	91.00	95.62	3
		CO6	100.00	91.00	98.20	3
AES456	Air-breathing Engines	CO1	41.67	96.00	52.53	2.2
		CO2	83.33	96.00	85.87	2.6
		CO3	41.67	96.00	52.53	2.2
		CO4	75.00	96.00	79.20	2.2
AES461	Composite Mechanics and Materials	CO1	100.00	94.60	98.92	3
		CO2	96.67	94.60	96.25	3
AES471	Advanced Avionics	CO1	60.00	95.00	67.00	2.2
		CO2	48.00	95.00	57.40	2.2
		CO3	56.00	95.00	63.80	2.6
		CO4	56.00	95.00	63.80	2.6
AES362	Engineering Fracture Mechanics	CO1	60.00	92.00	66.40	2.6
		CO2	60.00	92.00	66.40	2.6
		CO3	60.00	92.00	66.40	2.6
		CO4	60.00	92.00	66.40	2.6
		CO5	60.00	92.00	66.40	2.6
		CO6	60.00	92.00	66.40	2.6
AES472	Space Flight Mechanics	CO1	75.00	93.00	78.60	3
		CO2	57.14	93.00	64.31	2.6
		CO3	53.57	93.00	61.46	2.2
MNG400	Principles of Management	CO1	94.64	80.30	91.77	3
		CO2	94.64	80.30	91.77	3
		CO3	92.86	80.30	90.35	3
		CO4	85.71	80.30	84.63	3
		CO5	73.21	80.30	74.63	3
AES491	Aero-Design Lab	CO1	48.21	84.00	55.37	2.2
		CO2	48.21	84.00	55.37	2.2
		CO3	48.21	84.00	55.37	2.2
		CO4	48.21	84.00	55.37	2.2
AES493	Flight Testing Lab	CO1	42.86	75.00	49.29	2.2
		CO2	42.86	75.00	49.29	2.2
		CO3	42.86	75.00	49.29	2.2
		CO4	42.86	75.00	49.29	2.2
AES498	Project Phase I	CO1	62.50	93.00	68.60	2.2
		CO2	62.50	93.00	68.60	2.2
		CO3	62.50	93.00	68.60	2.2
		CO4	62.50	93.00	68.60	2.2
		CO5	62.50	93.00	68.60	2.2
AES451	Hypersonic Flow Theory	CO1	100.00	68.00	93.60	3
		CO2	91.67	68.00	86.93	3
		CO3	91.67	68.00	86.93	3

		CO4	100.00	68.00	93.60	3
		CO5	91.67	68.00	86.93	3
AES464	Advanced Composite Structures	CO1	100.00	97.56	99.51	3
		CO2	100.00	97.56	99.51	3
		CO3	96.30	97.56	96.55	3
AES477	Multidisciplinary Design Optimization	CO1	82.35	88.00	83.48	3
		CO2	82.35	88.00	83.48	3
		CO3	76.47	88.00	78.78	3
		CO4	88.24	88.00	88.19	3
		CO5	94.12	88.00	92.89	3
		CO6	94.12	88.00	92.89	3
AES413	Introduction to Airport Management	CO1	100.00	74.00	94.80	3
		CO2	100.00	74.00	94.80	3
		CO3	100.00	74.00	94.80	3
		CO4	100.00	74.00	94.80	3
AES499	Project Phase II	CO1	67.86	90.00	72.29	2.6
		CO2	71.43	90.00	75.14	2.6
		CO3	69.64	90.00	73.71	2.6
		CO4	69.64	90.00	73.71	2.6
		CO5	67.86	90.00	72.29	2.6

3.3. Attainment of Program Outcomes and Program Specific Outcomes (75)

3.3.1. Describe the assessment tools and processes used for measuring the attainment of each Program Outcomes and Program Specific Outcomes (10)

PO/PSO attainment is computed through direct and indirect methods. Direct contribution is computed through the attainment of COs from all courses, using the Course Articulation Matrix (CAM). The indirect attainments of the POs are computed through feedback from students with the help of exit surveys. The process followed by the Department is as shown in Figure 3.3.1.

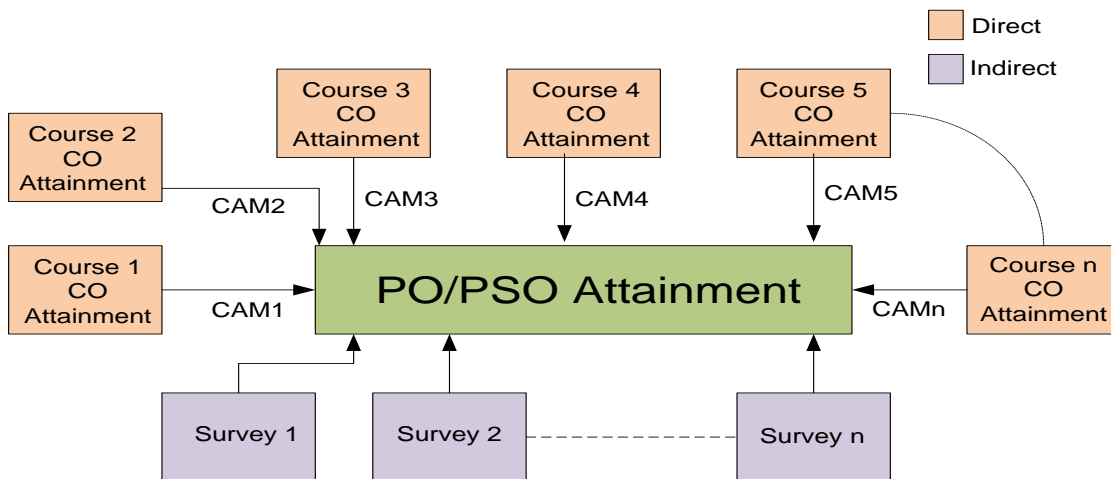


Figure 3.3.1. PO/PSO attainment

PO/PSO Attainment is Computed based on the following expressions

<p>Direct</p>	<p>Attainment of PO/PSO through a Course:</p> $PO_{ij} \text{ Attainment} = \frac{\sum_{k=1}^{CO_{max}} CA_k * CAM_{ik}}{\sum_{k=1}^{CO_{max}} CAM_{ik}}$ <p>Where, PO_{ij} is the Attainment of 'i' th PO through the course 'j'</p> <p>CO_{max} is the maximum number of COs in the course 'j'</p> <p>CA is Course Attainment</p> <p>CAM_{ik} is the Course Articulation matrix for the 'i' th PO for the course 'j' with 'k' COs</p> <p>Attainment of PO/PSO through all courses</p> <p>Poi Attainment = Average across all Courses Addressing that POs/PSOs</p>
<p>Indirect</p>	<p>Based on Exit Survey</p> $PO_i = \frac{\sum_{i=1}^5 i * \text{no. of students gave } i \text{ option}}{5 * \text{no. of responses}}$ <p>Where, PO_i is the attainment of the 'i' th PO</p>

3.3.2. Provide results of evaluation of each PO & PSO (65)

(The attainment levels by direct (student performance) and indirect (surveys) are to be presented through Program level Course PO&PSO matrices as indicated).

PO Attainment for 2014-18 Batch

Sl No	Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CSE100	Computer Programming	2.9	2.9	2.9										2.9	2.9	
2	CSE180	Computer Programming Lab	2.6	2.6	2.6		2.6								2.6	2.6	
3	CUL101	Cultural Education - 1						3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
4	CUL102	Cultural Education - 2						3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
5	ECE100	Electronics Engineering	2.7	2.7	2.8									2.8	2.8		
6	EEE100	Electrical Engineering	1.8	1.8										-			
7	EEE180	Workshop B	1.4	1.4	1.4						1.4			1.4			
8	ENG111	Communicative English								3.0	3.0	3.0		3.0			
9	ENG112	Technical Communication								3.0	3.0	3.0		3.0			
10	MAT111	Calculus, Matrix Algebra	2.2	2.2													
11	MAT112	Vector Calculus and ordinary Differential equation	2.5	2.6	2.6									2.4			
12	MEC181	Engineering Drawing	2.6	2.6	2.6	2.6		2.6				2.6		2.6	2.6	2.6	2.6
13	MEC182	CAD	1.8	1.8	1.8	1.8	1.8	1.8				1.8		1.8	1.8	1.8	1.8
14	MEC100	Engineering mechanics	1.8	1.8	1.8	1.8								1.8			
15	MEC180	Workshop A	2.6	2.6	2.6		2.6				2.6	2.6		2.6	2.6	2.6	
16	CHY100	Chemistry	2.2	2.2	2.2	2.2											
17	CHY181	Chemistry Lab	3.0	3.0	3.0												
18	PHY100	Physics	2.4	2.4										2.4			
19	PHY181	Physics Lab	2.8	2.8	2.8	2.8	2.8	2.8							2.8	2.8	
20	MAT211	Integral Transforms and Complex Analysis	2.2	2.2	2.2										2.2		
21	AES211	Introduction to Aerospace Technology	2.6	2.4								2.6		2.6	2.6	2.6	2.6

22	AES221	Mechanics of Fluids	1.4	1.4		1.4								1.4	1.4	1.4	1.4
23	AES241	Mechanics of Materials	2.2	2.1	1.9	1.9	2.0	2.2	2.6	2.4	1.9	1.9	2.0	2.1	2.1	1.9	2.1
24	MEC220	Introduction to Thermodynamics	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
25	HUM250	Indian classic for the Twenty first century						2.6		2.6	2.6	2.6	2.6	2.6			
26	HUM256	Psychology for engineers						2.6	2.6	2.6	2.6	2.6	2.6	2.6			
27	HUM258	Health and Life Style		2.7	2.7			2.7	2.7	2.7	2.7	2.7	2.7	2.7			
28	AES291	Materials Testing Lab	1.8	1.8	1.8	1.8	1.8			1.8	1.8	1.8		1.8	1.8	1.8	1.8
29	MEC290	Machine Drawing	2.6				2.6							2.6	2.6		2.6
30	MAT212	Mathematical Statistic and NM	3.0	3.0	3.0												
31	AES222	Fundamental of Aerodynamics	3.0	3.0								3.0		3.0	3.0	3.0	
32	AES232	Introduction to Control Theory	2.4	2.4	2.2	2.2								2.4	2.4	2.4	2.2
33	AES242	Aerospace Structures	1.9	1.9	2.0	1.9	2.1	2.1	2.0	1.4	2.2	2.2	1.8	1.9	1.9	1.8	2.2
34	PHY263	Concepts of Nanophysics and Nanotech.	2.5	3.0		1.8	1.8		1.8								
35	ENG252	Indian thought in english						2.4		2.4				2.4			
36	HUM252	Glimpses of eternal India						2.6		2.6	2.6	2.6	2.6	2.6			
37	HUM257	Psychology for effective living						2.6	2.6	2.6	2.6	2.6	2.6	2.6			
38	HUM259	Understanding Science of Food and Nutrition		3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0			
39	AES292	Mechanics of Fluid Lab	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	3.0
40	AES294	Instrumentation Lab	2.2	2.2	2.2	2.2	2.2			2.2	2.2	2.2		2.2	2.2	2.2	2.2
41	SSK111	Soft Skills I		3.0		3.0				3.0	3.0	3.0		3.0			
42	AES321	Compressible Fluid Flow	3.0	3.0	3.0	3.0	3.0					3.0		3.0	3.0	2.9	2.9
43	AES331	Introduction Aerospace propulsion	2.9	3.0					3.0							2.8	3.0
44	AES363	Vibration Analysis	2.4	2.4	2.4	2.4								2.4	2.4	2.4	
45	AES476	Manufacturing Processes	2.8											2.8	2.8	2.8	2.8
46	PHY274	Astrophysics	2.2	2.2										2.2			
47	ENV200	Environmental Studies	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
48	AES391	Control Lab	1.8	1.8	1.8	1.8	1.8			1.8	1.8	1.8		1.8	1.8	1.8	1.8
49	AES393	Aero-structures Lab	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	3.0
50	SSK112	Soft Skills II		2.2		2.2					2.6	2.5	3.0	2.5			
51	AES312	Flight Mechanics and Static Stability	2.6	2.6		2.6								2.6	2.6	2.6	2.6

52	AES322	Computational Aerodynamics	2.9	2.9	3.0	2.9	3.0							2.9	2.9	2.9	2.9
53	AES332	Introduction To Avionics	2.4	2.6	2.6									2.4	2.4	2.6	2.4
54	AES344	Finite Element Analysis	2.2	2.2	2.2	2.2								2.2	2.2	2.2	2.2
55	AES356	Heat Transfer	1.6	1.6	1.7	1.7								1.6	1.6	1.6	1.7
56	AES357	Rocket and Spacecraft Propulsion	3.0	3.0	3.0	3.0	3.0		3.0					3.0	3.0	3.0	3.0
57	AES392	Propulsion Lab	2.2	2.2	2.2	2.2	2.2			2.2	2.2	2.2	-	2.2	2.2	2.2	2.2
58	AES394	Low- speed Aerodynamics Lab	1.4	1.4	1.4	1.4	1.4			1.4	1.4	1.4	-	1.4	1.4	1.4	1.4
59	AES397	Seminar	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		2.2
60	SSK113	Soft Skills III		2.6		2.6				3.0	2.9	2.8		2.7			
61	AES411	Flight Dynamics	2.7	2.7	2.6		2.6							2.7	2.7	2.6	2.6
62	AES453	Advanced CFD	3.0	3.0		3.0								3.0	3.0	3.0	3.0
63	AES456	Air-breathing Engines	2.3	2.4	2.4	2.4			2.2						2.3	0.0	2.3
64	AES461	Composite Mechanics and Materials	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
65	AES471	Advanced Avionics	2.4	2.4										2.4	2.4		2.4
66	AES362	Engineering Fracture Mechanics	2.6	2.6	2.6	2.6	2.6	2.6			2.6	2.6	2.6	2.6	2.6	2.6	2.6
67	AES472	Space Flight Mechanics	2.6	2.4								2.6		2.6	2.6	2.6	2.6
68	MNG400	Principles of Management	3.0	3.0	3.0			3.0		3.0	3.0	3.0		3.0			
69	AES491	Aero-Design Lab	2.2	2.2	2.2	2.2	2.2			2.2	2.2	2.2		2.2	2.2	2.2	2.2
70	AES493	Flight Testing Lab	2.2	2.2	2.2	2.2	2.2			2.2	2.2	2.2		2.2	2.2	2.2	2.2
71	AES498	Project Phase I	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
72	AES451	Hypersonic Flow Theory	3.0	3.0	3.0	3.0	3.0				3.0				3.0	3.0	3.0
73	AES464	Advanced Composite Structures	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
74	AES477	Multidisciplinary Design Optimization	3.0	3.0										3.0		3.0	3.0
75	AES413	Introduction to Airport Management		3.0		3.0		3.0	3.0	3.0			3.0	3.0			3.0
76	AES499	Project Phase II	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6

Table B.3.3.2a

Survey	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Exit Survey	2.64	2.57	2.57	2.57	2.64	2.49	2.49	2.49	2.48	2.39	2.48	2.39	2.71	2.35	2.57

Table B.3.3.2b

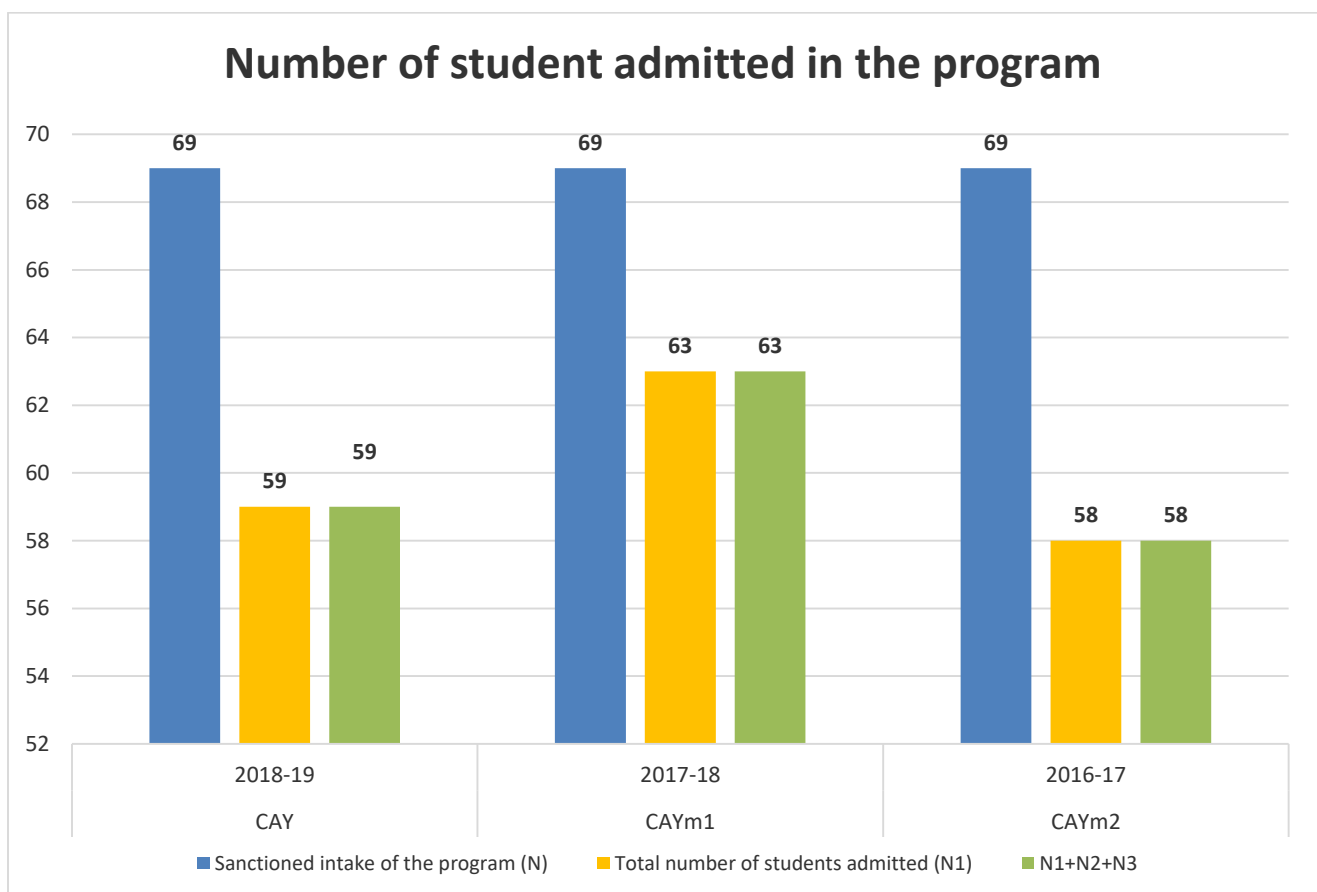
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Direct Assessment	2.5	2.5	2.5	2.4	2.4	2.6	2.6	2.6	2.5	2.6	2.6	2.5	2.5	2.4	2.5
80% of Direct assessment	2.0	2.0	2.0	1.9	1.9	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0
20% of Exit survey	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
PO Attainment	2.5	2.5	2.5	2.4	2.5	2.6	2.6	2.5	2.5	2.5	2.6	2.5	2.5	2.4	2.5

CRITERION 4
STUDENTS' PERFORMANCE

CRITERION 4	Students' Performance	100
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Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	CAY 2018-19	CAYm1 2017-18	CAYm2 2016-17
Sanctioned intake of the program (N)	69	69	69
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)	59	63	58
Number of students admitted in 2 nd year in the same batch via lateral entry (N2)	-	-	-
Separate division students, if applicable (N3)	-	-	-
Total number of students admitted in the program (N1+N2+N3)	59	63	58

Table B.4a



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

Year of entry	N1+N2+N3 (As defined above)	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)			
		1 Year	II Year	III Year	IV Year
CAY (18-19)	59				
CAY m1 (17-18)	63	42			
CAY m2 (16-17)	58	53	26		
CAY m3 (15-16)	48	40	38	41	
CAY m4 (LYG) (14-15)	56	42	44	54	55
CAY m5 (LYGm1) (13-14)	69	37	42	51	64
CAY m6 (LYGm2) (12-13)	58	41	37	54	56

Table B.4b

Year of entry	N1+N2+N3 (As defined above)	Number of students who have successfully graduated (Student with backlog in stipulated period of study)			
		1 Year	II Year	III Year	IV Year
CAY (18-19)	59				
CAY m1 (17-18)	63	14			
CAY m2 (16-17)	58	02	11		
CAY m3 (15-16)	48	5	5	02	
CAY m4 (LYG) (14-15)	56	14	11	02	01
CAY m5 (LYGm1) (13-14)	69	28	22	15	02
CAY m6 (LYGm2) (12-13)	58	17	19	01	-

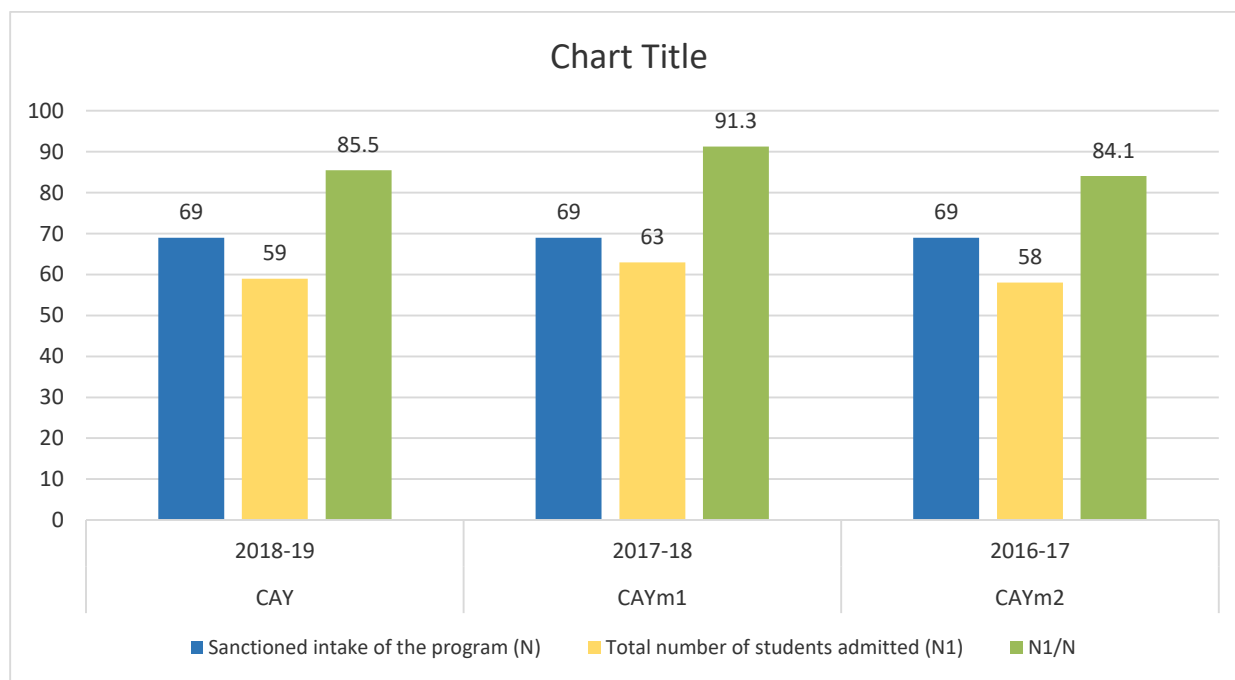
Table B.4c

4.1. Enrolment Ratio (20)

Enrolment Ratio= $N1/N$

	2018-2019	2017-2018	2016-2017
Sanctioned intake of the program (N)	69	69	69
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)	59	63	58
N1/N	85.5	91.3	84
Average	86.9		

Table B.4.1



Item (Students enrolled at the First Year Level on average basis during the last three 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 (20)

4.2.1 Success rate without backlogs in any semester/year of study (15)

SI= (Number of students who have graduated from the program without backlog)/(Number of students admitted in the first year of that batch and 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	Latest Year of Graduation, LYG 2018	Latest Year of Graduation, Minus1 LYGm1 2017	Latest Year of Graduation Minus 2 , LYGm2 2016
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	56	69	58
Number of students who have graduated without backlogs in the stipulated period	36	29	34
Success Index (SI)	0.64	0.42	0.59
Average SI			0.55
Success rate without backlogs in any semester/year of study = 15 × Average SI			8.25

Table B.4.2.1

4.2.2. Success rate with backlog in stipulated period of study (5)

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 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	Latest Year of Graduation, LYG 2017	Latest Year of Graduation, Minus1 LYGM1 2016	Latest Year of Graduation Minus 2 , LYGM2 2015
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	56	69	58
Number of students who have graduated with backlogs in the stipulated period	19	35	20
Success Index (SI)	0.34	0.51	0.34
Average SI			0.4
Success rate without backlogs in any semester/year of study = 5 × Average SI			2

Table B.4.2.2

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 (10)

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 (16-17)	CAYm2 (15-16)	CAYm3 (14-15)
Mean of CGPA or Mean Percentage of all successful students (X)	6.69	7.62	7.27
Total no. of successful students (Y)	58	48	56
Total no. of students appeared in the examination (Z)	58	48	56
API = X* (Y/Z)	6.69	7.62	7.27
Average API = (AP1 + AP2 + AP3)/3	7.2		

Table B.4.3

4.4. Placement, Higher Studies and Entrepreneurship (30)

Assessment Points = 30 × average placement

Item	CAY 2017-2018	CAYm1 2016-2017	CAYm2 2015-2016
Total No. of Final Year Students (N)	56	69	58
No. of students placed in companies or Government Sector (x)	18	30	26
No. of students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level Tests, GRE, GMAT etc.) (y)	14	14	20
No. of students turned entrepreneur in engineering/technology (z)	-	-	-
x + y + z =	32	44	46
Placement Index : (x + y + z)/N	0.57	0.64	0.79
Average placement= (P1 + P2 + P3)/3	0.67		
Assessment Points = 30 × average placement	20.1		

Table B.4.4

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

Programs Name and Assessment Year: B Tech Aerospace 2017-18				
S.no.	Name of the student placed	Enrollment no.	Name of the Employer	Appointment letter reference no. with date
1	AMIRTHA GADESWARI S	CB.EN.U4AEE14006	Accenture	6 Oct 2017
2	ASWATH RAJ D	CB.EN.U4AEE14010	BYJU's	23 Dec 2017
3	DEV NIKLESH B U	CB.EN.U4AEE14015	Infosys	HRD/3T/18-19
4	GABRIELLA BERNICE ZENOBIA P	CB.EN.U4AEE14016	Infosys	HRD/3T/18-19
5	V GANGADHAR ARASU	CB.EN.U4AEE14017	Accenture	6 Oct 2017
6	G GAUTHAMI	CB.EN.U4AEE14018	TCS	TCSL/ 6/10/2017
7	GOKULA KRISHNAN S	CB.EN.U4AEE14019	Tredence	11 Aug 2017
8	GOWTHAM PANDI B	CB.EN.U4AEE14021	TCS	TCSL/ 6/10/2017
9	KALIVELA VENKATA RAMANA	CB.EN.U4AEE14024	TCS/ BYJU's	23 Dec 2017
10	MEENAKSHI S	CB.EN.U4AEE14028	Infosys	HRD/3T/18-19
11	PARVATHY K S	CB.EN.U4AEE14035	Infosys	HRD/3T/18-19
12	SANJANA P	CB.EN.U4AEE14043	TCS	TCSL/ 6/10/2017
13	SANKURANTRIPATI VENKATA SHRIRAM	CB.EN.U4AEE14044	Infosys	HRD/3T/18-19
14	D R SHANTHOSH KUMAR	CB.EN.U4AEE14046	Accenture	6 Oct 2017
15	SWATHI V	CB.EN.U4AEE14050	Infosys	HRD/3T/18-19

16	VIJAY SOORYA S	CB.EN.U4AEE14054	TCS	TCSL/ 6/10/2017
17	YADLA SAI SIDDARTH	CB.EN.U4AEE14055	Accenture	6 Oct 2017
18	GOGINENI PRANAY CHOWDARY	CB.EN.U4AEE14056	Accenture	6 Oct 2017

Programs Name and Assessment Year: B Tech Aerospace 2016-2017				
S.no.	Name of the student placed	Enrollment no.	Name of the Employer	Appointment letter reference no. with date
1	ABINAYA M	CB.EN.U4AEE13003	CTS	8 Dec 2016
2	AKHSHAYA P	CB.EN.U4AEE13004	Infosys	HRD/3T/16-17
3	AKSHAY ANIL ERANEZHUTH	CB.EN.U4AEE13005	Infosys	HRD/3T/16-17
4	ALKA KARAN	CB.EN.U4AEE13007	CTS/FIITJEE nw	Maths/2017004165/28/Mar/2017
5	ANJANA L	CB.EN.U4AEE13008	Tech Mahindra	1488068/ELTP/2017 31 Jan 2017
6	BADRRI NARAYANAN S	CB.EN.U4AEE13013	TCS/Mphasis	10 Mar 2017
7	DIVYENDU KISHORE VALAPPIL	CB.EN.U4AEE13016	3dPLM Software	3dPLM Software 17/8/2016
8	GOKUL VASUDEVAN S	CB.EN.U4AEE13019	3dPLM Software	3dPLM Software 17/8/2016
9	HEMA SINEGA T	CB.EN.U4AEE13022	CTS	8 Dec 2016
10	JEGAN VISHNU R S	CB.EN.U4AEE13023	Tech Mahindra	1488068/ELTP/2017 31 Jan 2017
11	JOSHNEETA R	CB.EN.U4AEE13024	CTS	8 Dec 2016
12	KAMBHAMPATI VENKATA VIJAYA RAMA KRISHNA	CB.EN.U4AEE13025	TCI Tech	3 May 2017
13	KARTHIKEYAN C	CB.EN.U4AEE13029	CTS	8 Dec 2016
14	KRISHNA PRASAD G	CB.EN.U4AEE13030	CTS	8 Dec 2016
15	LAKSHMI ROOPANJALI GORAGAPOODI	CB.EN.U4AEE13031	CTS	8 Dec 2016
16	MOHANA PRASANTH S	CB.EN.U4AEE13035	Infosys	HRD/3T/16-17
17	NEELIMA VENUGOPALAN	CB.EN.U4AEE13036	Infosys	HRD/3T/16-17
18	S PRADEEP KUMAR	CB.EN.U4AEE13040	Tech Mahindra	1488068/ELTP/2017 31 Jan 2017
19	PRASANTH KOWSIK K	CB.EN.U4AEE13041	Infosys	HRD/3T/16-17
20	REFIYA HUSSAIN	CB.EN.U4AEE13046	CTS/ Mphasis	10 Mar 2017
21	SAIRAM KRISHNA R	CB.EN.U4AEE13048	Infosys	HRD/3T/16-17
22	SASTHA KUMAR P	CB.EN.U4AEE13051	Infosys	HRD/3T/16-17
23	SAVITHA D	CB.EN.U4AEE13052	Tech Mahindra	1488068/ELTP/2017 31 Jan 2017
24	SNEHA R	CB.EN.U4AEE13055	Tech Mahindra	1488068/ELTP/2017 31 Jan 2017
25	SRIRAAM J	CB.EN.U4AEE13056	CTS	8 Dec 2016
26	SRITHARAN T	CB.EN.U4AEE13057	Tech Mahindra	1488068/ELTP/2017 31 Jan 2017

27	SRUTHI RAMADURAI	CB.EN.U4AEE13058	CTS	8 Dec 2016
28	SUDHEENDRA K	CB.EN.U4AEE13060	Mu-Sigma	6 Aug 2016
29	VINITH M	CB.EN.U4AEE13064	Infosys/Mphasis	10 Mar 2017
30	VISHAL V	CB.EN.U4AEE13065	Infosys	HRD/3T/16-17

Programs Name and Assessment Year : B Tech Aerospace 2015-16				
S.no.	Name of the student placed	Enrollment no.	Name of the Employer	Appointment letter reference no. with date
1	ADARSH ASOK	CB.EN.U4AEE12002	Cognizant	6 Apr 2016
2	AINGARAN E	CB.EN.U4AEE12003	TCS	TCSL/CT/201517/23/9/15
3	AROCKIA STEPHNA M A	CB.EN.U4AEE12007	INFOSYS	HRD/3T/16-17
4	ARVIND BHARATH S.R	CB.EN.U4AEE12008	INFOSYS	HRD/3T/16-17
5	DAAMINI VISAALAKSHI	CB.EN.U4AEE12012	WIPRO / UTC Aerospace	15 Jul 16
6	K EASVARAN	CB.EN.U4AEE12014	Cognizant	6 Apr 16
7	T ELANGO VAN	CB.EN.U4AEE12015	INFOSYS	HRD/3T/16-17
8	GORTHI SAI KRISHNA PHANINDRA	CB.EN.U4AEE12018	Cognizant	6 Apr 16
9	GOURAV SHARAN	CB.EN.U4AEE12019	INFOSYS	HRD/3T/16-17
10	JITHIN P R	CB.EN.U4AEE12022	TCS	TCSL/CT/201517/23/9/15
11	KANNIYA G	CB.EN.U4AEE12023	INFOSYS	HRD/3T/16-17
12	KIRUBASHINI K A	CB.EN.U4AEE12025	TCS	TCSL/CT/201517/23/9/15
13	LAVENYA K	CB.EN.U4AEE12026	Cognizant	6 Apr 2016
14	MAHALAKSHMI G M	CB.EN.U4AEE12027	INFOSYS	HRD/3T/16-17
15	NAMRATHA KANAKADAS	CB.EN.U4AEE12028	Cognizant	6 Apr 2016
16	NIRMAL KUMAR C	CB.EN.U4AEE12030	INFOSYS	HRD/3T/16-17
17	NIRUPAMA N	CB.EN.U4AEE12031	INFOSYS	HRD/3T/16-17
18	NIVETHA S	CB.EN.U4AEE12032	TCS	TCSL/CT/201517/23/9/15
19	PRITHVI I	CB.EN.U4AEE12037	TCS-EIS	TCSL/CT/201517/23/9/15
20	PUJARI AKSHAY KUMAR	CB.EN.U4AEE12039	INFOSYS	HRD/3T/16-17
21	REVATHY U	CB.EN.U4AEE12042	Cognizant	6 Apr 2016
22	M SATISH KUMAR	CB.EN.U4AEE12047	Cognizant	6 Apr 2016
23	SUNNYTH KUMAR SAMUDRALA	CB.EN.U4AEE12048	Cognizant	6 Apr 2016
24	SURIYA PANDIYAN	CB.EN.U4AEE12050	Cognizant	6 Apr 2016
25	THARANGINI S	CB.EN.U4AEE12052	INFOSYS	HRD/3T/16-17
26	NAVANEETH KRISHNAN B	CB.EN.U4AEE12061	Cognizant	6 Apr 2016

Table B.4.4a

4.5. Professional Activities (20)

4.5.1. Professional societies/chapters and organizing engineering events (5)

YEAR	Professional Society/ Chapters/ Organization	DATE	EVENT & TITLE	RESOURCE PERSON
2018	Anokha	23 Feb	Matlab Tools	TRA Vinod Raj / Sundra Pandian R
2017	Anokha	2,3&4 Mar	Aeromodeling	Shriram/Vignesh
2017	Anokha	2,3&4 Mar	Drone way out	Krishna Prasad/ Harihara sudhan
2017	Anokha	2,3&4 Mar	May Day	Vineeth
2017	Anokha	2,3&4 Mar	Matlab and Simulink Connectivity	Kowshik Nittala/ Deepica
2017	Anokha	2,3&4 Mar	Ornithopter	Prasanth/ Vishal
2016	Anokha	20 Feb	Mayday	Prasanth/ Vinith
2016	Anokha	19 Feb	Para Landing	Tamilarasan
2016	Anokha	18&19 Feb	Horner Automation	Gokul Murali
2016	Anokha	18 Feb	CAD-le-Craft	Kirubashini
2016	Anokha	18&19 Feb	CAN Sat	Niranjan
2016	Anokha	18,19&20 Feb	RC Aircraft and Flight simulator	Viswesh SB/ Girish Nair
2016	Anokha	18 &19 Feb	Astro-Q-Del	Yashmitha/Divyendu

4.5.2. Publication of technical magazines, newsletters, etc. (5)

S.No	Roll no	Name	Name of the Journal	Title
1	CB.EN.U4AEE11026 CB.EN.U4AEE11059	Khooshboo P. Dania, Suddapally Srirama	Journal of Failure Analysis and Prevention(2016)	Prediction of Stress Intensity Factor on Pre-cracked Composite Wing Rib Made-up of Carbon-epoxy IM7-8552
2	CB.EN.U4AEE12057	Viswesh Sujjur Balaramraj	Indian Journal of Science and Technology,(2017)	Aerodynamics of Discrete Location Camber Morphing Airfoils in Low Reynolds Number Flows
3	CB.EN.U4AEE13038	Somasekharan	International Journal of Renewable Energy Research(2017)	Influence of solidity and wind shear on the performance of VAWT using a free vortex model
4	CB.EN.U4AEE12006 CB.EN.U4AEE12050	Arjhun A K Suriyapandiyan	Journal of Engineering Science and Technology (2017)	Numerical Investigation Of Two Element Camber Morphing Airfoil In Low Reynolds Number Flows

5	CB.EN.U4AEE12017 CB.EN.U4AEE12026 CB.EN.U4AEE12025	M. Gokul Ganesh K. Lavenya K. A. Kirubashini	Advances in Aircraft and Spacecraft Science (2017)	Electrically conductive nano adhesive bonding: Futuristic approach for satellites and electromagnetic interference shielding
6	CB.EN.U4AEE13002 CB.EN.U4AEE13020 CB.EN.U4AEE13048 CB.EN.U4AEE13049 CB.EN.U4AEE13061 CB.EN.U4AEE13068 CB.EN.U4AEE13071	Abhilash K Nair, Abhishek.G, Sairam Krishna, Radhesh S. , Sudipta Jena, V.Jagadeesh, V.Yaswanth	International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS) (2017)	Sweet-shop Management
7	CB.EN.U4AEE13060 CB.EN.U4AEE13051 CB.EN.U4AEE13069 CB.EN.U4AEE13040	K. Sudheendra, Sastha Kumar, Yadu Krishnan, Pradeep Kumar,	Surface Engineering (2017)	Effect of TiN-deposition on adhesion characteristics of aluminium
8	CB.EN.U4AEE14033 CB.EN.U4AEE14023 CB.EN.U4AEE14017	Pankaj Soorya R, G.Jerome Alex Revanth, Gangadhar V. Arasu	International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS) (2017)	Sustainable Methods used to reduce the Energy Consumption by Various Facilities in Airport Terminals
9	CB.EN.U4AEE14010 CB.EN.U4AEE14043 CB.EN.U4AEE14046 CB.EN.U4AEE14057 CB.EN.U4AEE14060	Aswath Raj D, Sanjana.P, Shanthosh Kumar.D. R, Kaza Gowtham Teja, B. Srilekha	--- "" ---	Online Grocery Market
10	CB.EN.U4AEE14019 CB.EN.U4AEE14025 CB.EN.U4AEE14030 CB.EN.U4AEE14058	Gokulakrishnan S, Kaushik Ramana S, Muralitharan R, Ch.V.S Kamal	--- "" ---	Application of Big Data Systems to Airline Management
11	CB.EN.U4AEE14004 CB.EN.U4AEE14018 CB.EN.U4AEE14028 CB.EN.U4AEE14031 CB.EN.U4AEE14055	S Ajay Vishnu, Gauthami Govindan, Meenakshi Sreekumar, Neeraj Srinivas, Y Sai Siddarth	--- "" ---	Business Analysis of a Fast Food Restaurant Chain
12	CB.EN.U4AEE14026 CB.EN.U4AEE14027 CB.EN.U4AEE14038 CB.EN.U4AEE14047 CB.EN.U4AEE14050	Kavi Kerusiha V, Sai Phanendra, Raji Sivani M, ShyamKashyab S, Swathi V	--- "" ---	Coffee Shop Management
13	CB.EN.U4AEE13054 CB.EN.U4AEE13005 CB.EN.U4AEE13025 CB.EN.U4AEE13026	A. Sivagnana Sundaram Akshay Anil Eranezhuth K. V. V. R. Krishna P. Karthic Kumar	Journal of Failure Analysis and Prevention(2017)	Ballistic Impact Performance Study on Thermoset and Thermoplastic Composites
14	CB.EN.U4AEE14011 CB.EN.U4AEE14022 CB.EN.U4AEE14032 CB.EN.U4AEE14037 CB.EN.U4AEE14042 CB.EN.U4AEE14048	Athmajan I, Harihara Sudhan R, Neha S, Pradeep R, Sai Sidharth S, Sowmya R	International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS)(2018)	Kids Daycare – Startup

15	CB.EN.U4AEE14008 CB.EN.U4AEE14012 CB.EN.U4AEE14015 CB.EN.U4AEE14016	Arun B, Ayswarya Venugopal, Dev Niklesh BU, Gabriella Bernice Zenobia P	--- "" ---	Eagle I – RC Plane Manufacturing
16	CB.EN.U4AEE14045 CB.EN.U4AEE14024 CB.EN.U4AEE14020 CB.EN.U4AEE14035 CB.EN.U4AEE14041	Sethupathy.P, K.Venkata Ramana, Govardhan.S, Parvathy.K.S, Sachin Saj .T.K	--- "" ---	Cross Cultural Workforce - Challenges and Strategies
17	CB.EN.U4AEE14025 CB.EN.U4AEE14058 CB.EN.U4AEE14032	Kaushik Ramana R, Ch.V.S.Kamal, Neha S	--- "" ---	Accidents in Airports and Prevention
18	CB.EN.U4AEE14005 CB.EN.U4AEE14009 CB.EN.U4AEE14040 CB.EN.U4AEE14052 CB.EN.U4AEE14002	Allan Thomas Ivan Ashvin V.S., Ranjith V., Vighnesh N, AbhishekVyas	--- "" ---	Travel Agency Management
19	CB.EN.U4AEE14034	Parthasarathi A	--- "" ---	Analysis of Airport Operations
20	CB.EN.U4AEE14026 CB.EN.U4AEE14038	Kavi Kerusiha V, Raji Sivani M	--- "" ---	Analysis of Fire Accidents in Airports and Its Mitigation Measures
21	CB.EN.U4AEE14053	Vignesh Selvam	--- "" ---	Airport Layout Plan for Efficient Airport Design
22	CB.EN.U4AEE14047 CB.EN.U4AEE14052	Shyam Kashyab S, Vighnesh N	--- "" ---	Next Generation Airports – A Realistic Perception
23	CB.EN.U4AEE14001 CB.EN.U4AEE14029	V.Abhinaya, Mounicka.T	--- "" ---	Airport Financial Management
24	CB.EN.U4AEE14027 CB.EN.U4AEE14057	M.G.V.S. Phanendra, Kaza Gowtham Teja	--- "" ---	Comparative Study of Landside Facilities in Airports
25	CB.EN.U4AEE14048 CB.EN.U4AEE14022	R .Sowmya, R.Harihara Sudhan	--- "" ---	Modern Techniques for Enhancing the Safety and Security in Airports
26	CB.EN.U4AEE14008	B.Arun	--- "" ---	Arrival Delay Comparison of Airline Services
27	CB.EN.U4AEE14003 CB.EN.U4AEE14007 CB.EN.U4AEE14014 CB.EN.U4AEE14034 CB.EN.U4AEE14051	Adarsh B, Arjun R, Deepak S, Parthasarathi A, Thayalan K	--- "" ---	Tourism Management
28	CB.EN.U4AEE14030 CB.EN.U4AEE14024	Muralitharan R, Venkatramana K	--- "" ---	Total Quality Management in Airline Industry
29	CB.EN.U4AEE14003 CB.EN.U4AEE14012	Adarsh Balakrishnan, Ayswarya Venugopal	--- "" ---	A Study on the Master Planning in Airports
30	CB.EN.U4AEE14050 CB.EN.U4AEE14051	Swathi V, Thayalan K	Indian Academy of Sciences	Meteorological Effects on Airports
31	CB.EN.U4AEE12020 CB.EN.U4AEE12060 CB.EN.U4AEE12024 CB.EN.U4AEE12011 CB.EN.U4AEE12056	G Harish Subramanian, CH V S Nagarjun, K V Satish Kumar, B Ashish Kumar, Vishal Srikanth	Aerospace Science and Technology	Mixing enhancement using chevron nozzle: studies on free jets and confined jets
32	CB.EN.U4AEE 16037	Narne Prudhvi	STM Journal	Cryogenic Engine and their Working Mechanism

4.5.3 Participation in inter-institute events by students of the program of study (10)

(The Department shall provide a table indicating those publications, which received awards in the events/conferences organized by other institutes)

S.No	Name	Title of event	Conference	Paper title
1	Akash Vineeth	IEEE TIAR 2018 Eshwari Engineering Collage	Conference	Importance of technology driven value addition of NTFP for sustainable limitations in rural villages.
2	Sounthara pandiyan	RIMCO 2017 Manipal Institute of Technology	Conference	Plasma modification on mechanical and thermal properties of PP / Nano composites
3	Adarsh			
4	Aditya			
5	Viswesh Sujjur Balaramraja, Eashwra Sankrityayan S, Suraj	2016 Intl. Conference on Advances in Computing, Communications and Informatics (ICACCI)	Conference	Modelling the Undulation Patterns of Flying Snakes
6	Saroj Hari Krishnan Gopi, Divyendu Kishore Valappil Viswesh Sujjur Balaramraja	IEEE Xplore International Conference on Advances in Computing, Communications and Informatics (ICACCI- 2017)	Conference	Modeling Non-equilibrium Glides in Flying Snakes
7	Prasanth Kowsik K, Thamizharasan K, Anjana L, Gokul Krishnan R,	44th National Conference on Fluid Mechanics and Fluid Power (FMFP-2017) December 2017, Amritapuri Campus, Kollam	Conference	Computational Study of Effects of Icing on Wind Turbine Airfoil Performance
8	Nikitha Narayanaprasad, Yashmitha Kumaran	International Conference on Innovative Design, development practices in aerospace and automotive engineering (I-DAD)	Conference	Numerical Analysis of Discrete Element Camber Morphing Airfoil in the Reynolds number of Conventional Flyers

CRITERION 5
FACULTY INFORMATION AND CONTRIBUTIONS

CRITERION 5	Faculty Information and Contributions	200
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2018-2019

Faculty Name	Qualification			Association with the Institution	Designation	Date of Joining the Institution	Department	Specialization	Academic Research			Project	
	Degree (highest degree)	University	Year of Graduation						Research Paper Publications	Ph.D. Guidance	Faculty Receiving PhD during the assessment year	Sponsored Research (Funded Research)	Consultancy and Product development
Dr. J. Chandrasekhar	PhD	IIT Bombay	1972	10 years	Professor	16.10.2008	Aerospace	Flight Dynamics, Simulators	35	11	-	-	
Dr. S. Bhowmik	PhD	IIT Roorkee	2002	5 years	Professor	09.01.2013	Aerospace	Aviation and Space Materials	136	6	-	22	2
Dr. V. Sivadas	Post Doc	IST-Lisbon, Portugal	1995	10 years	Associate Professor	2.1.2008	Aerospace	Fluid Mechanics	13	1	-	-	
Dr. V. Sivakumar	PhD	IIT, Madras	2006	12 years	Associate Professor	13.7.2006	Aerospace	Structural Mechanics	28	1	-	3	
Dr. A. R. Srikrishnan	PhD	IIT, Madras	1996	06 Years	Associate Professor	04.06.2012	Aerospace	High Speed Flows, Propulsions	25	3	-	2	
Mr. TVK Sushil Kumar	M.Tech	IIT, Bombay	2004	7 years	Distinguished Faculty	03.01.2011	Aerospace	Avionics and Navigational AIDS	03	-	-	-	
Dr. Balajee R	PhD	Nanyang Technological University, Singapore	1997	7 years	Assistant Professor	07.01.2011	Aerospace	Computational Fluid Dynamics	24	-	-	2	
Dr. V. Laxman	Post Doc	Seoul Nat. Univ., S. Korea	2008	7 years	Assistant Professor	03.06.2011	Aerospace	Structural Dynamics	31	-	-	-	
Dr. Kannan. R	PhD	IISc, Bangalore	2012	2 years	Assistant Professor	09.06.2016	Aerospace	Aerodynamics and propulsion	16	-	-	-	
Mr. T. Rajesh Senthil Kumar	M.Tech	M.Tech, Amrita	2009	9 years	Assistant Professor	01.07.2009	Aerospace	Engineering Design	15	-	-	-	
Dr. Nandu Gopan	PhD	PhD, NIT Calicut	2014	06 Month	Assistant Professor	06.09.2018	Aerospace	Fluid Mechanics	08	-	-	-	-

Table B.5

2017-2018

Faculty Name	Qualification			Association with the Institution	Designation	Date of Joining the Institution	Department	Specialization	Academic Research			Project	
	Degree (highest degree)	University	Year of Graduation						Research Paper Publications	Ph.D. Guidance	Faculty Receiving PhD during the assessment year	Sponsored Research (Funded Research)	Consultancy and Product development
Dr. J. Chandrasekhar	PhD	IIT Bombay	1972	10 years	Professor	16.10.2008	Aerospace	Flight Dynamics, Simulators	35	11	-	-	-
Dr. S. Bhowmik	PhD	IIT Roorkee	2002	5 years	Professor	09.01.2013	Aerospace	Aviation and Space Materials	136	6	-	22	-
Dr. V. Sivadas	Post Doc	IST-Lisbon, Portugal	1995	10 years	Associate Professor	2.1.2008	Aerospace	Fluid Mechanics	13	1	-	-	-
Dr. V. Sivakumar	PhD	IIT, Madras	2006	12 years	Associate Professor	13.7.2006	Aerospace	Structural Mechanics	28	1	-	3	-
Dr. A. R. Srikrishnan	PhD	IIT, Madras	1996	06 Years	Associate Professor	04.06.2012	Aerospace	High Speed Flows, Propulsions	25	3	-	2	-
Mr. TVK Sushil Kumar	M.Tech	IIT, Bombay	2004	7 years	Distinguished Faculty	03.01.2011	Aerospace	Avionics and Navigational AIDS	03	-	-	-	-
Dr. Balajee R	PhD	Nanyang Technological University, Singapore	1997	7 years	Assistant Professor	07.01.2011	Aerospace	Computational Fluid Dynamics	24	-	-	2	-
Dr. V. Laxman	Post Doc	Seoul Nat. Univ., S. Korea	2008	7 years	Assistant Professor	03.06.2011	Aerospace	Structural Dynamics	31	-	-	-	-
Dr. Kannan. R	PhD	IISc, Bangalore	2012	2 years	Assistant Professor	09.06.2016	Aerospace	Aerodynamics and propulsion	16	-	-	-	-
Mr. T. Rajesh Senthil Kumar	M.Tech	M.Tech, Amrita	2009	9 years	Assistant Professor	01.07.2009	Aerospace	Engineering Design	15	-	-	-	-
Vasanth Kumar G	MS	IIT Madras	2014	3 Years	Assistant Professor	17.7.2015	Aerospace	Applied Mechanics	04	-	-	-	-
Ajeesh G	PhD	Amrita	2017	1 Year	Assistant Professor	04.03.2017	Aerospace	Design & Manufacturing	18	-	-	-	-

Table B.5

Faculty Name	Qualification			Association with the Institution	Designation	Date of Joining the Institution	Department	Specialization	Academic Research			Project	
	Degree (highest degree)	University	Year of Graduation						Research Paper Publications	Ph.D. Guidance	Faculty Receiving PhD during the assessment year	Sponsored Research (Funded Research)	Consultancy and Product development
Dr. J. Chandrasekhar	PhD	IIT Bombay	1972	10 years	Professor	16.10.2008	Aerospace	Flight Dynamics, Simulators	35	11	-	-	
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Dr. A. R. Srikrishnan	PhD	IIT, Madras	1996	06 Years	Associate Professor	04.06.2012	Aerospace	High Speed Flows, Propulsions	25	3	-	2	
Mr. TVK Sushil Kumar	M.Tech	IIT, Bombay	2004	7 years	Distinguished Faculty	03.01.2011	Aerospace	Avionics and Navigational AIDS	03	-	-	-	
Dr. Balajee R	PhD	Nanyang Technological University, Singapore	1997	7 years	Assistant Professor	07.01.2011	Aerospace	Computational Fluid Dynamics	24	-	-	2	
Dr. V. Laxman	Post Doc	Seoul Nat. Univ., S. Korea	2008	7 years	Assistant Professor	03.06.2011	Aerospace	Structural Dynamics	31	-	-	-	
Dr. Kannan. R	PhD	IISc, Bangalore	2012	2 years	Assistant Professor		Aerospace	Aerodynamics and propulsion	16	-	-	-	
Mr. T. Rajesh Senthil Kumar	M.Tech	M.Tech, Amrita	2009	9 years	Assistant Professor	01.07.2009	Aerospace	Engineering Design	04	-	-	-	
Vasantha Kumar G	MS	IIT Madras	2014	3 Years	Assistant Professor	17.7.2015	Aerospace	Applied Mechanics	08	-	-	-	-

Table B.5

Note: Please provide details for the faculty of the department, cumulative information for all the shifts for all academic years starting from current year in above format in Annexure - II.

5.1. Student-Faculty Ratio (SFR) (20)

(To be calculated at Department Level)

No. of UG Programs in the Department (n): **01**

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

No. of Students in UG 2nd Year= **u1**

No. of Students in UG 3rd Year= **u2**

No. of Students in UG 4th Year= **u3**

No. of Students in PG 1st Year= **p1**

No. of Students in PG 2nd 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 18-19	CAY 17-18	CAY 16-17
u1.1	69	69	69
u1.2	69	69	69
u1.3	69	69	69
UG 1	207	207	207
Total No. of Students in the Department (S)	S1= 207	S2 = 207	S3= 207
No. of Faculty in the Department (F)	F1 = 9	F2 = 11	F3 = 10
Student Faculty Ration (SFR)	SFR1 = S1 / F1=23	SFR2 = S2 / F2 = 18.82	SFR3 = S3 / F3 = 20.7
Average SFR	SFR=(23+18.82+20.7)=62.52/3 = 20.84		

Table B.5.1

Marks to be given proportionally from a maximum of 20 to a minimum of 10 for average SFR between 15:1 to 25:1, and zero for average SFR higher than 25:1. Marks distribution is given as below:

5.1.1. 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
CAY	9	-
CAYm1	11	-
CAYm2	10	-

Table 5.1.1

5.2. Faculty Cadre Proportion (20)

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	Professor		Associate Professor		Assistant Professor	
	Required F1	Available	Required F2	Available	Required F3	Available
CAY	1	2	2	2	7	5
CAYm1	1	2	2	2	7	7
CAYm2	1	2	2	2	7	6
Average Number	RF1 = 1	AF1 = 2	RF2 = 2	AF2 = 2	RF3 = 7	AF3 = 6

Table B.5.2

Cadre Ratio Marks = $((AF1/RF1) + (AF2/RF2 \times 0.6) + (AF3/RF3 \times 0.4)) \times 10$

$$= (2 + 0.6 + 0.34) \times 10 = 29.4$$

5.3. Faculty Qualification (20)

$FQ = 2.0 \times [(10X + 4Y)/F]$ 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	$FQ=2.0 \times [(10X + 4Y)/F]$
CAY	7	2	10	15.6
CAYm1	8	3	10	18.4
CAYm2	7	3	10	16.4
Average Assessment				16.8

Table B.5.3

5.4. Faculty Retention (10)

No. of regular faculty members in CAYm2 = 10 CAYm1 = 11 CAY = 9

Details	CAY 18-19	CAYm1 17-18	CAYm2 16-17
Total number of faculty	9	11	10
Number of faculty retained for 3 years	9	10	9
Faculty retention ratio	100	90	90
Average	93.33		

Table B.5.4

5.5. Faculty competencies in correlation to Program Specific Criteria (10).

S. No.	Name of the Staff	Aerodynamics	Aero Propulsion	Aero-Structures / Materials	Systems	Design and Manufacturing / General Aerospace
1	Dr. J. Chandrasekhar				✓	✓
2	Dr. S. Bhowmik			✓		✓
3	Dr. V. Sivadas	✓	✓			
4	Dr. V. Sivakumar			✓		
5	Dr. A. R. Srikrishnan		✓			
6	Wg Cdr (Rtd) TVK Sushil Kumar				✓	✓
7	Dr. Balajee. R	✓				✓
8	Dr. V. Laxman			✓		
9	Dr. Kannan. R	✓	✓			
10	Mr. T. Rajesh Senthil Kumar	✓		✓		✓
11	Dr. Nandu Gopan	✓	✓			

(List the program specific criteria and the competencies (specialization, research publications, course developments etc.,) of faculty to correlate the program specific criteria and competencies.)

Department R&D Verticals

Aerodynamics	Aero Propulsion	Aero-Structures / Materials	Systems	Design and Manufacturing / General Aerospace
- Aerodynamics Optimization	- Atomization & Sprays and associated Instabilities	- Surface Engineering	- Flight testing	- Aero Design
Faculty member involved	Faculty member involved	- Adhesive Bonding	- Flight Simulator	- Space Flight Mechanics
Dr. V. Sivadas Dr. Nandu Gopan	Dr. V. Sivadas Dr. Nandu Gopan	- Nano-Composite	- Flight Dynamics	Faculty member involved
		- Thermosetting Composite	- Avionics	Dr. Balajee. R
- Computational Fluid Dynamics	- Combustion	- Thermoplastic Composite	- Control systems	
- Wind turbine Aerodynamics	- Heat transfer in combustion	Faculty member involved	Faculty member involved	- Aircraft design
- Flight Mechanics	- High speed flows	Dr. Shantanu Bhowmik	Dr. J. Chandrasekhar	- Airfoil shape Optimization
- Experimental Aerodynamics	- Heat transfer in Nuclear reactor		Wg Cdr (Rtd) TVK Sushil Kumar	Faculty member involved
- Hypersonic Flow	- Numerical modeling of flow and heat transfer	- Non-Linear Stress Analysis		Mr. T. Rajesh Senthil Kumar
- Compressible Flow	Faculty member involved	- Computational Analysis on Composite Materials		
- Unconventional MAVs	Dr. A R Srikrishnan	- Structural Stability and Optimization		
- Rarefied Gas Dynamics		Faculty member involved		
Faculty member involved	- Liquid drop	Dr. V. Sivakumar		
Dr. Balajee. R	- Liquid sprays and jets			
	- Combustion	- Structural Dynamics		
- Morphing (FSI)	- Microflows	- Aero elasticity		
- Blade design for MAV	Faculty member involved	- Rotary-wing Aero elasticity		
- Small unmanned Aerial Vehicles	Dr. Kannan.R	Faculty member involved		
- Fixed/Flapping wing MAVs Aerodynamics		Dr. V. Laxman		
- Experimental Aerodynamics				

- Computational Fluid Dynamics		- Morphing (FSI)		
- Bio-inspired low Reynolds number airfoils		Faculty member involved		
Faculty member involved		Mr. T. Rajesh Senthil Kumar		
Mr. T. Rajesh Senthil Kumar				
- Low Reynolds Number flow				
Dr. Kannan R				

5.6. Innovations by the Faculty in Teaching and Learning (10)

Course:

AES 331 Sem V Introduction to Aerospace Propulsion

15 AES 302 Sem V Aerospace Propulsion

Method: The above courses are theory courses without any lab component. However, certain sessions are held in the lab in order to introduce the students to the real configuration of aircraft engines, their components, relative positioning and size. In those sessions students get to know how the parts of the engine look like and are able to comprehend the functioning and the thermodynamic processes with more clarity.

Benefits: This approach directly contributes to the attainment of CO2 and CO3 in particular.

Course:

15 AES 212 Sem IV Compressible Fluid Flows

Method: In this course several new phenomena pertaining to fluid flows –including shock formation- are introduced. Since the physics of these is entirely different from what the students have learnt from Fluid Mechanics course, a series of CFD simulation results are used for providing visual feel for the occurrence of such flow phenomena. Though the students have not studied CFD at that level, they can get a better and clearer idea about the formation of shocks etc. by looking at the images. Typically text books do not present such images as students do not have CFD background in the 2nd year. In class room presentations this is not an issue as adequate introduction can be given to relate the simulation results to the real-life phenomena.

Benefits: This approach has been highly beneficial to the attainment of CO1 and CO3.

Course:

15 AES 481 Sem VII UAV Lab

In accordance with the 2015 curriculum, B.Tech Aerospace students are supposed to get flight test experience in their final year of study. Such a facility is available only at IIT Kanpur at a cost of Rs15,000/- for each student. Further getting a slot for private Universities to utilize the flight test facility is also difficult. To overcome this shortcoming, the Aerospace Department has installed a customized Flight Simulator in April 2018 and developed in house flight test procedures for the same. This facility gives almost realistic flight test experience to the students and has gone a long way in improving the teaching –learning process. All visiting dignitaries have highly appreciated this unique facility which has been setup for the first time in our country.

Syllabus: UAV Lab: Following modules are to be covered as laid down in the syllabus:

- Flight testing using UAV or Simulator to determine:
 - Glide performance
 - Climb rate
 - Range and endurance
 - Turn rate
 - Flight dynamics

Facility before purchase of simulator:

- In house UAV with on board data logging
- Open source software: Flight gear
- Flight test facility at IIT Kanpur- expensive

Limitations: Following limitations were experienced by the department for following the syllabus:

- No real time data
- Restrictions on flying (trees and turbulence)
- Flight gear not user friendly

Present Utilisation : Simulator

- Flight test lab: all experiments as per laid down procedures (FAA).
- Teaching aid for courses: Introduction to Aerospace technology (3), Control systems (3), Flight mechanics (3), Avionics and Flight dynamics (3) courses. Number of credits given in brackets
- Tradeoff studies in aero design lab(5)
- Exposure to advanced concepts like active control technology -CCV
- Final year projects.

5.7. Faculty as participants in Faculty development/training activities/STTPs (15)

- ☐ A Faculty scores maximum five points for participation
- ☐ Participation in 2 to 5 days Faculty/ Faculty development program: 3 Points
- ☐ Participation >5 days Faculty/ Faculty development program: 5 points

Name of the Faculty	Max. 5 per Faculty		
	CAYm1	CAYm2	CAYm3
	2017-18	2016-17	2015-16
Dr. S. Bhowmik	2 Days	-	-
Dr. V. Sivasdas	2 Days	-	-

Dr. V. Sivakumar	2 Days	5 days	-
Dr. A. R. Srikrishnan	2 Days	-	-
Mr. TVK Sushil Kumar	2 Days	-	-
Dr. Balajee R	2 Days	-	-
Dr. V. Laxman	2 Days	-	-
Dr. Kannan. R	2 Days	-	-
Mr. T. Rajesh Senthil Kumar	2 Days	-	-
Vasantha Kumar G	2 Days	-	-
Sum	20	5	-
RF= Number of Faculty required to comply with 20:1	10	10	-
Assessment = 3 × (Sum/0.5 RF) (Marks limited to 15)	12	3	-
Average assessment over last three years (Marks limited to 15) = 7.5			

Table B.5.7

5.8. Research and Development (75)

5.8.1. Academic Research (20)

Academic research includes research paper publications, Ph.D. guidance, and faculty receiving Ph.D. during the assessment period. Details are as given below.

JOURNALS 2016

S.No	Author	Title	Vol No.	Issue No.	Page. No	Publisher
1.	A.R. Srikrishnan	Vortex Suppression through Drain Port Sizing	Volume 29	Issue 4		ASCE Journal of Aerospace Engineering
2	TVk Sushil Kumar	Optimization of Building Envelope to Reduce Air Conditioning	Volume 9	Issue 4		Indian Journal of Science and Technology
3	Shantanu Bhowmik	Development of lightweight high-performance polymeric composites with functionalized nanotubes	Volume 133	Issue 21		Journal of Applied Polymer Science
4	Shantanu Bhowmik	Atmospheric Plasma Modification of Polyimide Sheet for Joining of Titanium with High Temperature Adhesive	Volume 65		63–69	International Journal of Adhesion and Adhesives
5	Shantanu Bhowmik	Comparative Studies of Solvent Bonding and Adhesive Bonding for Fabrication of Transparent Polymer	Volume 52	Issue 2	193–201	Journal of Surface Engineering and Applied Electrochemistry
6	Shantanu Bhowmik	Vaporized Solvent Bonding of Polymethyl Methacrylate	Volume 30	Number 8	826-841(16)	Journal of Adhesion Science and Technology

7	Shantanu Bhowmik	Adhesion Characteristics on Anodized Titanium and Its Durability under Aggressive Environments				Journal of Surface Review and letters
8	G. Vasanth Kumar	A Numerical Unsteady Analysis of a A Plunging Wing	Vol. 68	No. 2		Journal of Aerospace Sciences and Technologies
9	V. Sivakumar	Prediction of Stress Intensity Factor on Pre-cracked Composite Wing Rib Made-up of Carbon-epoxy IM7-8552	VOL 16, ISSUE 04, PAGE NUMBER 635-646			Journal of Failure Analysis and Prevention
10	Shantanu Bhowmik	Influence of chemically and plasma-functionalized carbon nanotubes on high-performance polymeric nanocomposites.	Vol: 28	Issue:05	570-580	High Performance Polymers
11	V. Sivakumar	Influence of surface activated carbon nano fiber on thermo-mechanical properties of high performance polymeric nano composites			p.0021998316 658540.	Journal of Composite Materials
12	Shantanu Bhowmik,	Novel Lightning Strike Protected Polymeric Composite for Future Generation Aviation				Journal of Aerospace Engineering
13	Shantanu Bhowmik	Novel High Performance Fire Resistant Polymer for Future Generation Aerospace				Journal of Materials Design and Application
14	V. Sivadas	Empirical Correlation of the Primary Stability Variable of Liquid Jet and Liquid Sheet under Acoustic Field	Vol. 138	Issue 8	084501/1-6	Journal of Fluids Engineering (DOI: 10.1115/1.4033028)
15	Shantanu Bhowmik,	Feasibility of polyetherketone (PEK) composites: a solution for long-term nuclear waste storage	Vol. 10, No. 3,			International Journal of Nuclear Energy Science and Technology (IJNEST)

16	Shantanu Bhowmik,	Hybrid nanocomposites based on poly aryl ether ketone, boron carbide and multi walled carbon nanotubes: evaluation of tensile, dynamic mechanical and thermal degradation properties				e-Polymers
17	Shantanu Bhowmik,	Novel Adhesion Promotion of Aluminium for Aerospace Environments				
18	Vaitla Laxman	Influence of fluctuating wind conditions on vertical axis wind turbine using a three dimensional CFD model	Vol. 158,		pp. 98-108	Journal of Wind Engineering and Industrial Aerodynamics
19	Shantanu Bhowmik	Effect of Surface Functionalization on Mechanical Properties and Decomposition Kinetics of High Performance Polyetherimide/MWCNT Nano Composites	Volume 90		147–160	Journal of Composite A

JOURNALS 2017

S.No	Author	Title	Vol No.	Issue No.	Page.No.	Publisher
1	Shantanu Bhowmik	Plasma Processing of Aluminum Alloys to Promote Adhesion: A Critical Review	Volume 5	, Number 1	79-104(26)	Reviews of Adhesion and Adhesives,
2	Mr. T. Rajesh Senthil Kumar	Aerodynamics of Discrete Location Camber Morphing Airfoils in Low Reynolds Number Flows	Vol 10(10),			Indian Journal of Science and Technology,

3	Shantanu Bhowmik	Physicochemical Characteristics of Solvent Vapor Bonded Polycarbonate				Journal of Polymers and the Environment
4	Shantanu Bhowmik	Performance evaluation of polybenzimidazole coating for aerospace application	vol. 105		190-199	Progress in Organic Coatings
5	Shantanu Bhowmik	Effect of titanium nitride coating for improvement of fire resistivity of polymer composites for aerospace application				
6	Vaitla Laxman	Influence of solidity and wind shear on the performance of VAWT using a free vortex model	Volume 7	Issue 2	787-796	International Journal of Renewable Energy Research
7	Mr. T. Rajesh Senthil Kumar	Numerical investigate ion of two element camber morphing airfoil in low Reynolds number flows	Vol. 12,	No. 7	1939 - 1955	Journal of Engineering Science and Technology
8	Shantanu Bhowmik	Effects of high energy radiation and thermo-chemical environments on polyetherimide composites: Futuristic approach to nuclear waste storage	Vol.11	No.1	80 - 97	International Journal of Nuclear Energy Science and Technology
9	Shantanu Bhowmik	Electrically conductive nano adhesive bonding: Futuristic approach for satellites and electromagnetic interference shielding	Vol. 4	No. 6	000-000	Advances in Aircraft and Spacecraft Science
10	Shantanu Bhowmik	Process optimization of functionalized WCNT / polyetherimide nanocomposites for aerospace application	Volume 127	5	193-203	Journal of Materials & Design
11	Balajee Ramakrishnananda	Modeling Non-equilibrium Glides in Flying Snakes				

12	R Kannan	An experimental study on the equilibrium shape of water drops impacted on groove-textured surfaces	87 (2017)		129–140	Experimental Thermal and Fluid Science
13	Shantanu Bhowmik	Characteristics of Simultaneous Epoxy-Novolac Full Interpenetrating Polymer Network (IPN) Adhesive	Volume 32 705-720	Issue 7,		Journal of Adhesion Science and Technology
14	Shantanu Bhowmik	Effect of TiN-deposition on adhesion characteristics of aluminium				Surface Engineering
15	Shantanu Bhowmik	Microstructure Development, Wear Characteristics and Kinetics of Thermal Decomposition of Hybrid Nanocomposites Based on Poly Aryl Ether Ketone, Boron Carbide and Multi Walled Carbon Nanotubes	Volume 27	Issue 6,	1649 to 1663	Journal of Inorganic and Organometallic Polymers and Materials
16	V. Sivakumar	Ballistic Impact Performance Study on Thermoset and Thermoplastic Composites	Volume 17,	Issue 6	1260–1267	Journal of Failure Analysis and Prevention

JOURNALS 2018

S.No	Author	Title	Vol No.	Publisher
1	A. R. Srikrishnan	Mixing enhancement using chevron nozzle: studies on free jets and confined jets	doi.org/10.1007/s12046-018-0898-	Indian Academy of Sciences
2	Balajee Ramakrishnananda	Studies on effusion cooling: Impact of geometric parameters on cooling effectiveness and coolant consumption	Vol. 77(2018)58–66	Aerospace Science and Technology

3	Shantanu Bhowmik	Comparative Studies of Energy Saving Polymers and Fabrication of High Performance Transparent Polymer by Solvent Bonding		Journal of Polymer Engineering
4	Shantanu Bhowmik	Interpenetrating Polymer Network Adhesive Bonding of PEEK to Titanium for Aerospace Application		Journal of Polymer Engineering
5	Vaitla Laxman	Numerical Study on Thrust Generation in an Airfoil Undergoing Nonsinusoidal Plunging Motion	Volume: 31 Issue Number: 4	Journal of Aerospace Engineering

Ph.D. guided /Ph.D. awarded during the assessment period while working in the institute

S.No	Name of Ph.D Guide	Name of the University
1	Dr. J. Chandrasekhar	Amrita Vishwa Vidya Peetham
2	Dr. S. Bhowmik	
3	Dr. V. Sivadas	
4	Dr. V. Sivakumar	
5	Dr. A. R. Srikrishnan	
6	Dr. Balajee R	
7	Dr. V. Laxman	
8	Dr. Kannan. R	

5.8.2. Sponsored Research (20)

Funded research from outside: (Provide a list with Project Title, Funding Agency, Amount and Duration)
Funding Amount (Cumulative during CAYm1, CAYm2 and CAYm3):

Amount > 50 Lakh – 20 Marks,
Amount > 40 and < 50 Lakh – 15 Marks,
Amount > 30 and < 40 Lakh – 10 Marks,
Amount > 15 and < 30 Lakh – 5 Marks,
Amount < 15 Lakh – 0 Marks

S.No	Title of the Project	Agency	Principal Investigator (s) (PI) & (Co –PI)	Grant in lakhs	Period	Status
1	Durability of High performance Nano Adhesive bonding of aluminum under aerospace environment	DRDO	Dr.S.Bhowmik	54.92	07.10.15 to 06.10.18	Completed

2	Development of ultra high temperature resistance polymeric nano composter for long distance space application	ISRO	Dr.S.Bhowmik	24.64	08.06.14 to 13.09.17	Completed
3	Investigation on Corban nano fiber reinforced polyether ketone/polyether imids as polymer composite container foe long time nuclear waste dispose	BARC	Dr.S.Bhowmik & Dr.V.Sivakumar	39.63	23.07.13 to 31.03.17	Completed
4	Investigation on effect of space radiation on space durable polymetric nano composite for future generation space mission	BARC	Dr.V.Sivakumar & Dr.S.Bhowmik	34.09	23.07.13 to 08.02.18	Completed
5	Coking in Semi-cryogenic Engines: Studies on Predicting the Onset of Coking in a Heated Tube with Isrosene / Kerosene	LPSC-ISRO	Dr.A.R.Srikrishnan (PI)	9.8	2016-2017	Completed
6	Effusion Cooling for Gas Turbine Combustors: Studies on Enhancement of Cooling Effectiveness by Design Improvisation	GTRE-DRDO	Dr.A.R.Srikrishnan (PI)	8.9	2016-2017	Completed
7	Pool Thermal Hydraulics Investigations of FBR 1 and 2 (PI)	IGCAR, Kalpakkam	Dr.A.R.Srikrishnan (PI)	15.48	2018-2020	On-going
8	Transforming global health through	Royal Academy of	Dr.A.R.Srikrishnan (Co-PI)	20	2018-2019	On going

	computational cook-stove design	Engineering, UK				
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5.8.3. Development activities (15)

- Product Development:** During the ‘Innovation lab” students are encouraged to convert their Ideas to Products. Similarly students are encouraged to convert their Final year projects to products and establish their own startups. An Incubation center at this campus funds and coordinates such activities. -

<p>Life of Recycled Plastic Composite Products would be several Years (25 to 30 Years)</p>	<p>Recycle of Plastic Wastes to Plastic Composite Products:-</p> <p>A process to recycle thermoplastic wastes such as polyethylene (PE) bags, polypropylene (PP) bags, polyethylene terephthalate (PET) bottles have been successfully formulated . The waste so recycled can be converted to composite and will replace wood based products. This product development was carried out as a student project and resulted in establishment of a startup. Rs 10 lacs was given as a grant by the incubation center towards this venture.</p>
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- Research laboratories**

	<p>Plasma and composites Processing lab:-</p> <p>This was set up with funding from government organizations, for research and development of lightweight composite materials.</p>
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- **Instructional materials:**

For last two years power point presentations have been made for courses and is available to the students in the AUMS platform for reference.

- **Working models/charts/monograms etc:**

- Cut out models of aero engines and avionics modules have been fabricated.
- A Ka 25 anti-submarine warfare helicopter and a Mig 23 fighter aircraft are available for 'hands on maintenance training' and familiarization classes.
- A fully functional flight simulator has been commissioned to facilitate flight testing and design of aircrafts.
- A propulsion test rig has been locally fabricated.

5.8.4. Consultancy (from Industry) (20)

No	Title of Consultancy	Name of Industry/Agency	Faculty in-charge	Amount in lakhs	Period	Status
1	Light weight bullet proof materials	L&T Coimbatore	Dr .Shantanu Bhowmik	34.5	May 18 to Mar 19	Completed

5.9 Faculty Performance Appraisal and development system (FPADS) (10)

After completion of an academic year, the Faculty fills up the Performa given in 'Annexure 5.1' and submits the same to the Chairperson. After verification the Chairperson forwards the same to Dean Engineering for his approval. Faculty who do not meet the expected standards are counseled on their weak areas and assisted by senior Faculty.

5.10. Visiting/Adjunct/Emeritus Faculty etc.(10)

S.no	Name	Time	Day	Subject title	Date	Total hour
1	Prof. Raju Ananth	0945-1045	Mon	Heat Transfer	Even Semester 2015-16	60
		1100-1200	Wed			
		1100-1200	Thu			
		0945-1045	Fri			
2	Prof. Raju Ananth	0945-1045	Mon	Heat Transfer	Even Semester 2016-17	60
		1200-0100	Tue			
		0945-1045	Thu			
		1100-1200	Fri			
3	Prof. Raju Ananth	0845-0945	Mon	Fundamentals of heed transfer	Even Semester 2018-19	45
		0945-1045	Thu			
		1200-0100	Fri			

CRITERION 6
FACILITIES AND TECHNICAL SUPPORT

CRITERION 6	Facilities and Technical Support	80
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6.1 Adequate and well equipped laboratories and Technical man power (40)

Sr. No	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the important equipment	Weekly utilization status (all the course which the lab is utilized) in hours	Technical Manpower Support		
					Name of the technical staff	Designation	Qualification
1	Aerodynamics	3	Low Speed wind tunnel	6	R SreePrasad/ N Gireesh	Technical Asst	BE
2	Aero structures	3	(i) Constant Strength Beam (ii) Combined Loading (iii) Sheer Center for open section (iv) Sheer Stress in solid circular shaft (v) Thin valve pressure vessel (vi) Buckling of column (vii) Un symmetrical bending of Wagner Beam (viii) Vibration of beam	6	R Sreeprasad/ N Gireesh	Technical Asst	BE
3	Propulsion	3	(i) Propeller Efficiency Test Rig (ii) Incompressible free Jet (iii) Supersonic Nozzle	6	R SreePrasad/ S Rajasekaran	Technical Asst	BE

			(iv) Flame speed Measurement				
4	Flight Testing	3	(i) Flight Simulator, (ii) RC Aircraft, (iii) Quad Copter (iv) KA 25 Helicopter (v) Mig 23 Aircraft	6	N Gireesh/ S Rajasekaran	Technical Asst	BE
5	Aircraft Design	3	Flight Simulator	6	S Rajasekaran	Technical Asst	BE

Table B.6.1

6.2 Laboratories maintenance and overall ambience (10)

Maintenance of Laboratory Equipment:-

1. Service and maintenance of equipment is carried out regularly.
2. Minor repairs are carried out by the technical staff of the department based on available resources and expertise.
3. Major repairs are outsourced by following the procedure of the University.
4. Stock register is maintained in laboratories.

Overall Ambience:-

1. Department has sufficient number of laboratories which are used to meet the curriculum and research requirements.
2. Necessary furniture for students is provided in each laboratory.
3. Laboratories are equipped with sufficient equipment for carrying out the experiments.
4. Laboratory manuals contain department vision, mission, PEO, PO, PSO, safety precautions, equipment handling instructions along with the details of the experiments .
6. Lighting and ventilation is adequate.
7. All the laboratories are equipped with white/chalk board and other such teaching-learning aids.
8. The Department has funded research equipment. Students and faculty are encouraged to utilize them.
10. Every laboratory has a dedicated technical staff. It is ensured that the deputed technical staff has sufficient skills for handling the equipment pertaining to that particular laboratory.

6.3 Safety Measures in laboratories (10)

Name of the Laboratory	Safety Measures
<ul style="list-style-type: none"> - Aero dynamics - Aero Structures - Aero Propulsion - On Job training hangar 	<ul style="list-style-type: none"> - Specific safety rules are displayed. - First aid box and DCP fire extinguisher are kept in the laboratory. - Periodical servicing of the equipment. - Appropriate storage areas.

6.4. Project laboratory (20)

The department has sufficient number of laboratory and funded research equipment. Utilisation of these equipment are as given below.

Sl. No	Name of the Equipment's	Project
1	Low speed wind tunnel	- Influence of one-dimensional groove structure as a wall roughness on the performance characteristics of lifting surfaces
2	Incompressible jet	Studies on mixing enhancement of Jets using Chevron nozzle
3	Universal testing machine Zwick roell	- Impact resistance of silicone and joining of silicone to thermoplastic composite for strategic applications. - Lightweight blast proof composites
4	50 Ton compressible molding machine	- Lightweight blast proof composites
5	High speed camera	- Experimental Characterization of Liquid Jets Emanating from an Effervescent Atomizer. - Characterization of Laminar- to - Turbulent Transition Utilizing Reynolds Apparatus in Combination with High-Speed Visualization. - Liquid drop impact onto inclined biological inspired solid surfaces. - Breakup characteristics of the liquid jet emanating from non-circular orifices
6	Plasma Vapor Deposition	- Lightweight blast proof composites
7	Flight simulator	- Implementation of Autopilot and CCV.
8	Multiple 64 GB Intel Zeon Servers.	- Simulation studies - Advanced simulations for research

CRITERION 7
CONTINUOUS IMPROVEMENT

CRITERION 7	Continuous Improvement	75
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7.1. Action taken based on the results of evaluation of each of the COs, POs & PSOs (30)

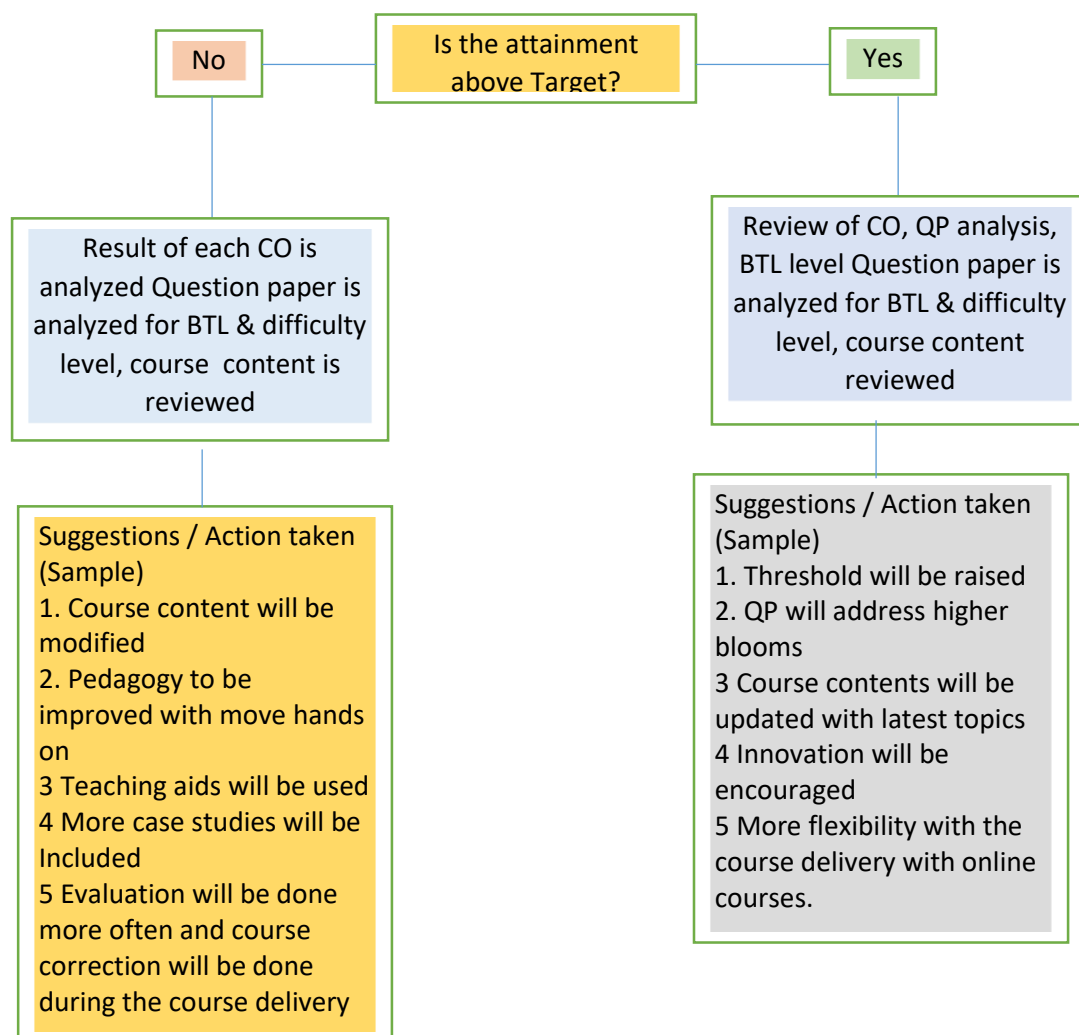
Identify the areas of weaknesses in the program based on the analysis of evaluation of COs, POs & PSOs attainment levels. Measures identified and implemented to improve POs & PSOs attainment levels for the assessment year including curriculum intervention, pedagogical initiatives, support system improvements,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

1. Course outcomes attainment is calculated for every course in the following manner.
 - a) Threshold of 50% is assigned for all theory courses and 70% for lab courses
 - b) The number of students who have scored more than the threshold (50%) is counted for arriving at the course outcome and percentage of students who have crossed the threshold will contribute to the course attainment (CO)
2. The weightage given to periodical test 1 and periodical test 2 and continuous assessment is 50% and that of End semester is 50%
3. This is converted to a weightage of 80 % and a 20% weightage is assigned to course exit survey
4. Programme outcomes attainments (PO) are arrived at by the following procedure
 - a) If a course is delivered to multiple sections average of the CO attainment is taken.
 - b) Percentage co-attainment is converted with level using the following logic

% attainment	Level
0-40	1
40-60	2
Above 60	3

- c) Using the PO articulation Matrix a target value for PO attainment is arrived at by taking a weightage average.

Action taken is based on the following flow chart



Academic Year 2014-2018			
POs	Target Level	Attainment Level	Observations
PO1:Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	2.3	2.5	Target achieved
Action taken: -While the targeted level has been achieved, it was felt that a closer coordination between the department requirements and the MPC syllabus could be beneficial to the program. Hence Faculty level coordination between Aerospace and Math's/Science departments in conducting the basic courses is being encouraged.			

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	2.2	2.5	Target achieved
Action taken: -The targeted level has been achieved. Faculty has been advised to ensure adequate coverage of analysis and applications in each course, during the 2019 syllabus review.			
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	2.3	2.5	Target achieved.
Action Taken: Target accomplished by emphasizing these aspects in the final year projects, along with other relevant courses.			
PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the Information to provide valid conclusions.			
PO4	2.3	2.4	Target achieved
Action Taken: The ongoing emphasis on complex problems in each course will be maintained. Syllabus revision will consider whether more tutorial hours are to be devoted for any course			
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.			
PO5	2.5	2.5	Target not achieved
Action Taken: Additional areas have been identified for improvement in modern tool usage skill development: (i) FEM course requires more hands-on sessions and this will be incorporated into the LTP scheme to be proposed for syllabus revision (ii) More hands-on assignments will be given as part of the CFD course (iii) Upgrading the computational infrastructure is under progress (iv) A new course on 'Computational thinking and problem solving' has been introduced.			
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.			
PO6	2.3	2.6	Target achieved
Action taken: Impact of the final year projects on the society has been included as a CO.			
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.			
PO7	2.1	2.6	Target achieved

Action taken:			
<ul style="list-style-type: none"> At least one Final year project is given on Environment and sustainability. A new course titled 'Environmental science and sustainability' has been introduced in the 2015 curriculum. Modules like safe disposal of electronic waste is being included in the syllabus of core courses for 2019 curriculum 			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	2.2	2.5	Target achieved
Action taken: Two new courses titled 'Amrita Value Program I and II' have been introduced in the third and fourth semesters respectively to sensitize students on following ethics in their daily life and profession. Students are advised on the seriousness of plagiarism and same is checked in their Final year project thesis.			
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO 9	2.3	2.5	Target achieved
Action taken: Students are given open lab projects for all lab courses. It gives them an opportunity to work as part of a team.			
PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	2.3	2.5	Target achieved
Action taken: To improve their communication ability, new courses on soft skills have been introduced in the IV and V semesters. A humanities elective on 'Technical communication' has also been introduced.			
PO11: 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO 11	2.1	2.6	Target achieved
Action taken: Project management and finance has been introduced as a CO for final year projects.			
PO12: 12. 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.			
PO 12	2.3	2.5	Target achieved
Action taken: Attributes of life-long learning is given more importance in final year project CO. Faculty constantly update their domain knowledge and impart the same during course delivery.			
PSO1: Students will learn governing principles in the fundamental disciplines of Aerospace Engineering (covering aerodynamics, guidance & control, propulsion and structures) along with their applications.			
PSO 1	2.3	2.5	Target achieved

Action taken: Senior most Faculty is detailed for fundamental courses. This helps the students to get a clear understanding of governing principles.			
PSO2: Students will be trained in the methodology and tools that are used in the fundamental design of aircraft and rockets.			
PSO 2	2.3	2.4	Target achieved
Action taken: A revised 5 credit course on Aero design has been introduced to give more hands-on experience to the students on designing different flying machines.			
PSO3: Students will have the ability to function in multidisciplinary teams in the Aerospace Engineering domain.			
PSO 3	2.4	2.5	Target achieved
Action taken: Students are encouraged to take multi-disciplinary topics as their final year projects.			

Table B.7.1

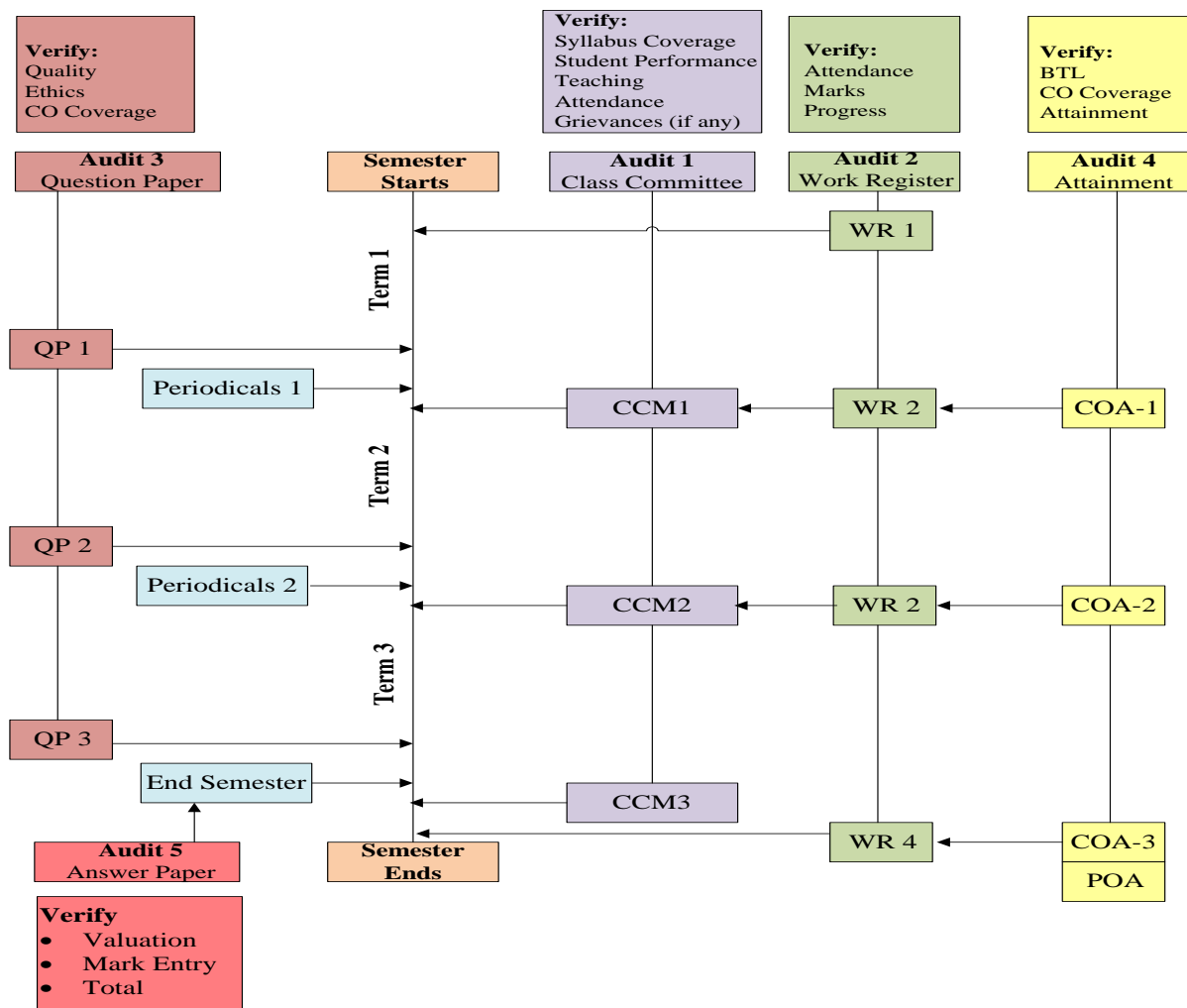
7.2. Academic Audit and Action taken thereof during the period of Assessment (15)

The department has an audit system in place to monitor the quality of the teaching and learning process to ensure that the mission and vision of the University and in turn that of the department are maintained. The academic audit comprises of end semester question paper audit, review of end semester answer sheets, lab assessment, class committee meetings and feedback on faculty. Publication of research papers is also subject to an academic audit procedure.

Class Committee Meetings are conducted before/after each Periodical Test and inputs from students and faculty are recorded and corrective measures if any are suggested on both sides. Each class is assigned a Class Advisor who can be approached by students/faculty for any academic grievances.

To ensure fair feedback from students the Chairperson takes the feedback from the class representatives.

To preserve research standards of the University any paper publication with the University affiliation undergoes a Plagiarism check and steps are taken to ensure that Plagiarism is below 20% for any publication. A Reviewer finally evaluates the technical level of the paper. Flow chart describing the academic audit is as given below.



7.3 Improvement in Placement, Higher Studies and entrepreneurship (10)

Academic Year	Core Companies	IT Companies	Others (Entrepreneur)	Higher Studies
	Highest Package		Highest Package	
2017-2018	-	9 Lakhs	-	14
2016-2017	-	7 Lakhs	-	14
2015-2016	-	6 Lakhs	-	20

Item	CAY 2017-2018	CAYm1 2016-2017	CAYm2 2015-2016
No. of Final Year Students	56	69	58
No. of students placed in companies	18	30	26
No. of students admitted to higher studies.	14	14	20

7.4. Improvement in the quality of students admitted to the program (20)

Assessment is based on improvement in terms of ranks/score in qualifying state level/national level entrances tests, percentage marks in Physics, Chemistry and Mathematics in 12th Standard and percentage marks of the lateral entry students.

ITEM		2017-2018	2016-2017	2015-2016
National Level Entrance Examination (Name of the Entrance Examination)	No. of Students admitted	-	-	-
	Opening Score/Rank	-	-	-
	Closing Score/Rank	-	-	-
State/Institute/Level Entrance Examination/Others (Amrita Engineering Entrance Examination)	No. of Students admitted	68	64	51
	Opening Score/Rank	294	813	85
	Closing Score/Rank	25719	25926	19570
Name of the Entrance Examination for Lateral Entry or lateral entry details	No. of Students admitted	-	-	-
	Opening Score/Rank	-	-	-
	Closing Score/Rank	-	-	-
Average CBSE/Any other Board Result of admitted students (Physics, Chemistry & Mathematics)		131.60	148.59	144.61

Table B.7.4

CRITERION 8
First Year Academics

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 ×20)/ FYSFR (Limited to Max. 5)
CAY	1380	79	17.47	5
CAYm1	1242	74	16.78	5
CAYm2	1020	65	15.69	5
Average	1214	72.67	16.65	5

Table B.8.1. First year student faculty ratio

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 $(5x + 3y)/RF$
CAY	63	16	69	5.26
CAYm1	56	18	62.1	5.38
CAYm2	46	19	51	5.63
AVERAGE	55.00	17.67	60.70	5.42

Table B.8.2 Qualification of faculty teaching first year common courses

8.3. First Year Academic Performance (10)

DEPARTMENT	NUMBER OF STUDENTS APPEARED IN THE EXAM	NUMBER OF SUCCESSFUL STUDENTS	TOTAL GRADE POINT OF ALL SUCCESSFUL STUDENTS	TOTAL GRADE POINT AVERAGE OF ALL SUCCESSFUL STUDENTS
			TOTAL	TOTAL
AEROSPACE ENGINEERING	60	60	890.83	7.42
CHEMICAL ENGINEERING	57	57	751.29	6.59
CIVIL ENGINEERING	59	59	792.29	6.71
COMPUTER SCIENCE AND ENGINEERING	397	397	5947.98	7.49
ELECTRONICS AND COMMUNICATION ENGINEERING	264	264	3938.94	7.46
ELECTRICAL AND ELECTRONICS ENGINEERING	108	108	1563.33	7.24
ELECTRONICS AND INSTRUMENTATION ENGINEERING	50	50	695.20	6.95
MECHANICAL ENGINEERING	244	244	3609.64	7.40
TOTAL	1239	1239	18189.50	7.34

Table B.8.3a First year academic performance of the students for the year 2017-2018

DEPARTMENT	NUMBER OF STUDENTS APPEARED IN THE EXAM	NUMBER OF SUCCESSFUL STUDENTS	TOTAL GRADE POINT OF ALL SUCCESSFUL STUDENTS	TOTAL GRADE POINT AVERAGE OF ALL SUCCESSFUL STUDENTS
			TOTAL	TOTAL
AEROSPACE ENGINEERING	56	56	882.75	7.88
CHEMICAL ENGINEERING	43	43	654.5	7.61
CIVIL ENGINEERING	65	65	944.17	7.26
COMPUTER SCIENCE AND ENGINEERING	377	377	5927.31	7.86
ELECTRONICS AND COMMUNICATION ENGINEERING	197	197	3021.95	7.67

ELECTRICAL AND ELECTRONICS ENGINEERING	123	123	1847.38	7.51
ELECTRONICS AND INSTRUMENTATION ENGINEERING	51	51	754.32	7.40
MECHANICAL ENGINEERING	191	191	2984.49	7.81
TOTAL	1103	1103	17016.87	7.71

Table B.8.3b First year academic performance of the students for the year 2016-2017

DEPARTMENT	NUMBER OF STUDENTS APPEARED IN THE EXAM	NUMBER OF SUCCESSFUL STUDENTS	TOTAL GRADE POINT OF ALL SUCCESSFUL STUDENTS	TOTAL GRADE POINT AVERAGE OF ALL SUCCESSFUL STUDENTS
			TOTAL	TOTAL
AEROSPACE ENGINEERING	48	48	731.00	7.61
CHEMICAL ENGINEERING	60	60	916.49	7.64
CIVIL ENGINEERING	63	63	941.98	7.48
COMPUTER SCIENCE AND ENGINEERING	285	285	4282.30	7.51
ELECTRONICS AND COMMUNICATION ENGINEERING	182	182	2609.57	7.17
ELECTRICAL AND ELECTRONICS ENGINEERING	108	108	1601.42	7.41
ELECTRONICS AND INSTRUMENTATION ENGINEERING	64	64	939.85	7.34
MECHANICAL ENGINEERING	185	185	2782.04	7.52
TOTAL	995	995	14804.65	7.44

Table B.8.3c First year academic performance of the students for the year 2015-2016

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)

The CO attainment is computed at Amrita School of Engineering, Coimbatore using the **Inpods Software**. The following procedure is followed to do the computation.

Step 1:	Faculty sets the assessment question paper with CO mapping, BTL mapping and Marks of each question.
Step 2:	Faculty enters the step 1 data in Inpods software and the bundle number is generated.

	Bundle Number is the unique number (Spread sheet) for a exam for a particular course for a particular class.
Step 3:	The answer paper is evaluated by the faculty and is shared with the students for verification.
Step 4:	The front sheet of the answer paper which contains the question wise mark is torn and collected back by the faculty.
Step 5:	Faculty sends those front sheet along with bundle number generated in step 2 to the data entry team
Step 6:	Data entry team enters the marks of each students, question wise, in the Inpods software with the help of bundle number(spread sheet).
Step 7:	The entry will be done by the faculty for assignment and quiz in inpods.
Step 8:	Step 1 to Step 6 will be followed for Periodicals 1, Periodicals 2 and End Semester.
Step 9:	The Course Attainment-Direct is computed by the Inpods software.

The process followed at Amrita School of Engineering, Coimbatore for CO computation in a theory course is given in Figure 3.2.1. In the CO attainment calculation for a course, 80% is contributed through direct and 20% through Indirect. As per the university regulation, 50% of the direct is contributed by Cumulative Internal Examination (CIE) and 50% from Semester End Examinations (SEE) for theory courses. In the CIE, Periodical 1, Periodical 2 and Continuous Assessment contributes 15, 15 and 20 respectively. For Lab courses, 80% and 20% is contributed by continuous assessment and end semester examinations respectively to the direct attainment.

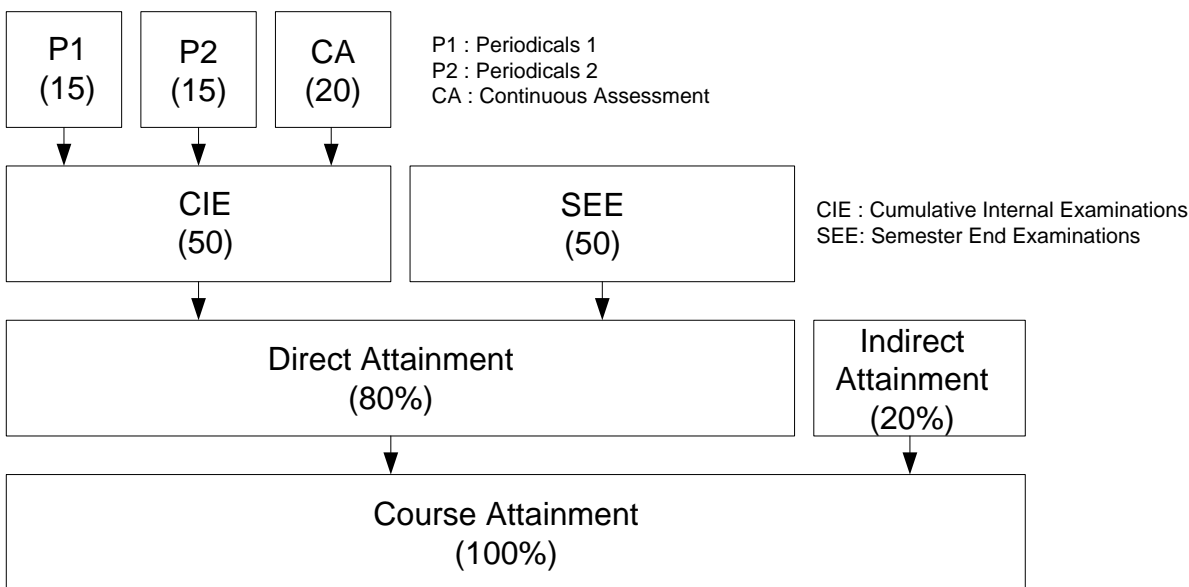
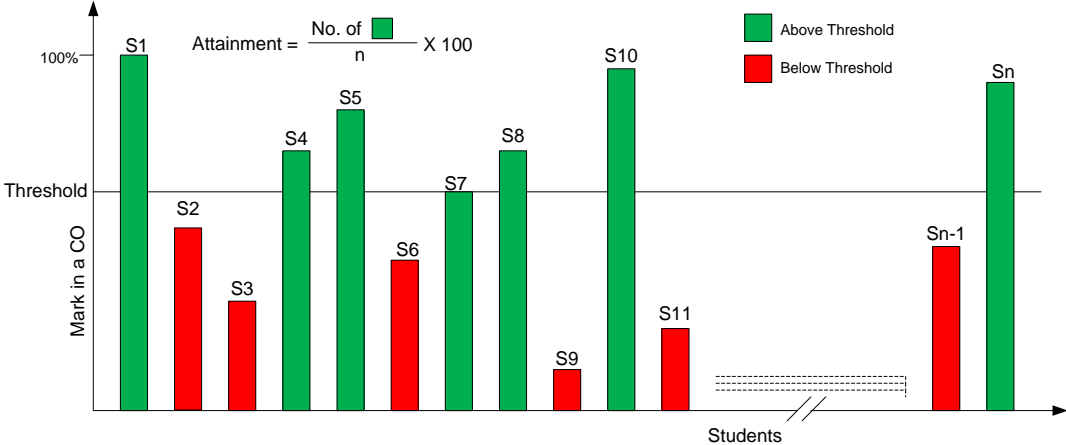


Figure B.8.4.1 CO attainment for theory courses

Inpods do the attainment calculation based on the following expression:

<p>Direct</p>	<p>The direct part of the CO attainment is computed through exams. The percentage of students in the class who scored more than threshold percentage of marks in the respective CO is the attainment.</p> 
<p>Indirect</p>	<p>Based on Survey</p> $Attainment = \frac{\sum_{i=1}^5 i * \text{no. of students gave } i \text{ option}}{5 * \text{no. of responses}}$

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

2014-2015

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6
CSE100	Computer Programming	2.6	2.6	2.6	2.6		
CSE180	Computer Programming Lab	2.0	2.0	2.0	2.0		
CUL101	Cultural Education -1	2.6	2.6	2.6	2.6	2.6	
CUL102	Cultural Education-2	2.6	2.6	2.6	2.6	2.6	
ECE100	Electronics Engineering	2.5	2.5	2.5	2.5		
EEE100	Electrical Engineering	1.5	2.0	2.0	2.0	2.0	
EEE180	Workshop B	1.2	1.2	1.2	1.2		
ENG111	Communicative English	2.6	2.6	2.6	2.6	2.6	
ENG112	Technical Communication	3.0	3.0	3.0	3.0	3.0	
MAT111	Calculus, Matrix Algebra	2.5	2.5	2.5	2.5	2.5	2.5
MAT112	Vector Calculus and Ordinary Differential Equations	2.2	2.6	2.6	2.6	2.6	2.6
MEC181	Engineering Drawing	2.5	2.5	2.5	2.5	2.5	2.5

MEC182	CAD	2.5	2.5	2.5	2.5		
MEC100	Engineering Mechanics	2.2	1.8	1.8	2.2	2.3	
MEC180	Workshop A	2.0	2.0	2.0	2.0		
CHY100	Chemistry	1.8	2.2	2.2			
CHY181	Chemistry Lab.	2.6	2.6	2.6	2.6	2.6	
PHY100	Physics	2.6	2.6	2.6			
PHY181	Physics Lab	3.0	3.0	3.0			

Table B.8.4.2a CO-Attainment Level-2014-2015(2010 onwards)

CO-Attainment Percentage 2014-2015

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6
CSE100	Computer Programming	62.33	66.11	64.90	66.22		
CSE180	Computer Programming Lab	54.44	55.41	55.20	54.44		
CUL101	Cultural Education -1	68.26	72.09	70.00	72.74	72.98	
CUL102	Cultural Education-2	85.68	89.15	89.75	89.99	89.85	
ECE100	Electronics Engineering	60.68	62.36	66.09	70.66		
EEE100	Electrical Engineering	39.26	47.71	57.91	63.04	63.04	
EEE180	Workshop B	23.35	23.35	23.35	23.35		
ENG111	Communicative English	67.72	78.88	72.67	66.30	66.74	
ENG112	Technical Communication	83.62	87.80	87.41	80.51	80.74	
MAT111	Calculus, Matrix Algebra	53.20	56.38	57.95	61.18	65.99	65.99
MAT112	Vector Calculus and Ordinary Differential Equations	58.57	69.67	61.42	60.16	63.82	66.58
MEC181	Engineering Drawing	63.10	63.10	63.10	63.10	63.10	63.10
MEC182	CAD	60.47	60.47	60.47	60.47		
MEC100	Engineering Mechanics	54.22	51.42	50.98	70.14	70.14	
MEC180	Workshop A	60.79	60.79	60.79	60.79		
CHY100	Chemistry	47.55	55.32	54.96			
CHY181	Chemistry Lab.	62.98	63.57	63.57	64.16	64.16	
PHY100	Physics	60.18	57.23	61.56			
PHY181	Physics Lab	86.45	86.45	86.45			

Table B.8.4.2b CO-Attainment Percentage 2014-2015

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
CSE100	CO1	64.16	3	57.62	2	60.89	2.50	68.11	3	62.33	2.60	50.00	YES
	CO2	71.19	3	57.62	2	64.41	2.50	72.91	3	66.11	2.60	50.00	YES
	CO3	68.71	3	57.62	2	63.17	2.50	71.84	3	64.90	2.60	50.00	YES
	CO4	73.86	3	57.62	2	65.74	2.50	68.11	3	66.22	2.60	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
CSE180	CO1	54.36	2	52.18	2	53.27	2.00	59.15	2	54.44	2.00	50.00	YES
	CO2	54.36	2	52.18	2	53.27	2.00	64.00	3	55.41	2.20	50.00	YES
	CO3	54.36	2	52.18	2	53.27	2.00	62.92	3	55.20	2.20	50.00	YES
	CO4	54.36	2	52.18	2	53.27	2.00	59.15	2	54.44	2.00	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
ENG112	CO1	88.49	3	80.15	3	84.32	3.00	80.78	3	83.62	3.00	50.00	YES
	CO2	96.93	3	82.17	3	89.55	3.00	80.78	3	87.80	3.00	50.00	YES
	CO3	97.99	3	80.15	3	89.07	3.00	80.78	3	87.41	3.00	50.00	YES
	CO4	80.73	3	80.15	3	80.44	3.00	80.78	3	80.51	3.00	50.00	YES
	CO5	81.30	3	80.15	3	80.73	3.00	80.78	3	80.74	3.00	50.00	YES
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
MAT112	CO1	59.15	2	47.15	2	53.15	2.00	80.27	3	58.57	2.20	50.00	YES
	CO2	86.89	3	47.15	2	67.02	2.50	80.27	3	69.67	2.60	50.00	YES
	CO3	66.26	3	47.15	2	56.71	2.50	80.27	3	61.42	2.60	50.00	YES
	CO4	63.11	3	47.15	2	55.13	2.50	80.27	3	60.16	2.60	50.00	YES
	CO5	72.26	3	47.15	2	59.71	2.50	80.27	3	63.82	2.60	50.00	YES
	CO6	79.17	3	47.15	2	63.16	2.50	80.27	3	66.58	2.60	50.00	YES

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
CHY100	CO1	53.25	2	31.53	1	42.39	1.50	68.20	3	47.55	1.80	50.00	NO
	CO2	72.67	3	31.53	1	52.10	2.00	68.20	3	55.32	2.20	50.00	YES
	CO3	71.79	3	31.53	1	51.66	2.00	68.20	3	54.96	2.20	50.00	YES
	CO4												
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
CHY181	CO1	68.15	3	51.23	2	59.69	2.50	76.13	3	62.98	2.60	50.00	YES
	CO2	69.62	3	51.23	2	60.43	2.50	76.13	3	63.57	2.60	50.00	YES
	CO3	69.62	3	51.23	2	60.43	2.50	76.13	3	63.57	2.60	50.00	YES
	CO4	71.09	3	51.23	2	61.16	2.50	76.13	3	64.16	2.60	50.00	YES
	CO5	71.09	3	51.23	2	61.16	2.50	76.13	3	64.16	2.60	50.00	YES
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
PHY100	CO1	73.20	3	40.10	2	56.65	2.50	74.32	3	60.18	2.60	50.00	YES
	CO2	65.81	3	40.10	2	52.96	2.50	74.32	3	57.23	2.60	50.00	YES
	CO3	76.65	3	40.10	2	58.37	2.50	74.32	3	61.56	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
PHY181	CO1	99.02	3	79.08	3	89.05	3.00	76.04	3	86.45	3.00	50.00	YES
	CO2	99.02	3	79.08	3	89.05	3.00	76.04	3	86.45	3.00	50.00	YES
	CO3	99.02	3	79.08	3	89.05	3.00	76.04	3	86.45	3.00	50.00	YES
	CO4												
	CO5												
	CO6												

CO-Attainment Level-2015-2016

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	3.00	3.00	3.00	3.00	3.00	3.00		
15CHE111	Introduction to Chemical Engineering	2.20	3.00	3.00	2.20	3.00	3.00	3.00	3.00
15CHE112	Material Balances	3.00	2.20	2.20	2.20				
15CVL102	Mechanics: Statics and Dynamics	2.60	2.60	2.60	2.60	2.60			
15CVL111	Introduction to Civil Engineering	2.00	2.20	2.20					
15CVL112	Engineering Graphics-CAD	2.36	2.36	2.36	2.36	2.36			
15CSE100	Computational Thinking and Problem Solving	3.00	3.00	3.00	3.00				
15CSE102	Computer Programming	2.20	2.20	2.20	2.20				
15CSE111	Computer Science Essentials	2.40	2.60	2.60	2.40	2.20	2.40		
15CSE180	Computer Programming Lab	2.00	2.20	2.20	2.00				
15CUL101	Cultural Education -1	2.60	2.60	2.60	2.60	2.60			
15CUL111	Cultural Education-2	3.00	3.00	3.00	3.00	3.00			
15ECE111	Solid State Devices	2.00	2.00	2.00	2.00	2.00			
15ECE112	Fundamentals of Electrical Technology	2.00	1.50	2.00	2.00	2.00	2.00		
15EEE111	Fundamentals of Electrical and Electronics Engineering	2.20	2.60	2.20	2.60	2.60	2.60		
15EEE180	Workshop B	2.20	2.20	2.20	2.20				
15ENG111	Communicative English I	3.00	3.00	3.00	3.00	3.00			
15MAT111	Calculus, Matrix Algebra	3.00	3.00	3.00	3.00	3.00	3.00		
15MAT121	Vector Calculus and Ordinary Differential Equations	2.60	2.60	2.60	2.60	2.60	2.60		
15MEC100	Engineering Drawing –CAD	2.60	2.60	2.60	2.60	2.60	3.00		
15MEC101	Engineering Drawing-CAD-II	3.00	3.00	3.00	3.00	3.00			
15MEC102	Engineering Mechanics	2.60	2.60	2.47	2.60	2.60			
15MEC111	Fundamentals of Mechanical Engineering	1.80	1.80	2.20	2.20	2.20			
15MEC180	Workshop A	2.20	2.20	2.20	2.20				
15CHY100	Chemistry	2.60	2.60	2.60					
15CHY181	Chemistry Lab.	2.60	2.60	2.60	2.60	2.60			
15PHY100	Physics	2.60	2.60	2.60					
15PHY181	Physics Lab	3.00	3.00	3.00					

Table B.8.4.2c CO-Attainment Level-2015-2016(2015 onwards)

CO-Attainment Percentage 2015-2016

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	80.20	84.87	84.87	86.53	86.53	86.53		
15CHE111	Introduction to Chemical Engineering	64.31	69.67	73.67	61.67	67.03	77.67	81.67	67.03
15CHE112	Material Balances	66.56	58.56	55.84	62.56				
15CVL102	Mechanics: Statics and Dynamics	65.37	67.09	76.71	72.09	67.79			
15CVL111	Introduction to Civil Engineering	41.00	50.30	52.40					
15CVL112	Engineering Graphics-CAD	63.75	65.30	65.84	66.24	67.18			
15CSE100	Computational Thinking and Problem Solving	86.26	85.15	86.35	86.01				
15CSE102	Computer Programming	64.52	57.15	61.65	59.68				
15CSE111	Computer Science Essentials	64.83	71.86	67.30	72.74	66.33	70.74		
15CSE180	Computer Programming Lab	48.55	50.35	49.95	48.55				
15CUL101	Cultural Education -1	72.24	74.07	72.73	73.14	71.76			
15CUL111	Cultural Education-2	83.07	83.86	81.95	83.66	85.15			
15ECE111	Solid State Devices	50.76	53.26	56.52	65.29	65.29			
15ECE112	Fundamentals of Electrical Technology	42.29	42.91	50.20	50.20	64.26	64.26		
15EEE111	Fundamentals of Electrical and Electronics Engineering	59.97	61.74	60.89	74.42	69.69	75.77		
15EEE180	Workshop B	64.82	64.82	64.82	64.82				
15ENG111	Communicative English I	87.14	90.46	90.89	83.71	83.94			
15MAT111	Calculus, Matrix Algebra	80.87	84.54	86.36	81.10	82.65	83.96		
15MAT121	Vector Calculus and Ordinary Differential Equations	64.55	66.31	65.03	61.40	70.38	72.60		
15MEC100	Engineering Drawing –CAD	63.85	63.85	63.85	63.85	63.85	75.00		
15MEC101	Engineering Drawing-CAD-II	69.45	69.45	69.45	69.45	69.45			
15MEC102	Engineering Mechanics	77.80	72.33	68.96	80.54	80.54			
15MEC111	Fundamentals of Mechanical Engineering	47.74	49.53	53.10	62.74	63.31			
15MEC180	Workshop A	61.00	61.00	61.00	61.00				
15CHY100	Chemistry	62.20	66.59	67.06					
15CHY181	Chemistry Lab.	71.53	71.53	71.53	71.53	71.53			
15PHY100	Physics	69.19	66.72	64.52					
15PHY181	Physics Lab	91.34	91.34	91.34					

Table B.8.4.2d CO-Attainment Percentage 2015-2016

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target (%)	Attainment Yes/No
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CSE 100	CO1	90.84	3	86.74	3	88.79	3.00	76.15	3	86.26	3.00	50.00	YES
	CO2	88.21	3	86.74	3	87.48	3.00	75.84	3	85.15	3.00	50.00	YES
	CO3	91.33	3	86.74	3	89.04	3.00	75.60	3	86.35	3.00	50.00	YES
	CO4	90.35	3	86.74	3	88.55	3.00	75.85	3	86.01	3.00	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target (%)	Attainment Yes/No
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CSE 102	CO1	93.59	3	29.64	1	61.61	2.00	76.15	3	64.52	2.20	50.00	YES
	CO2	75.32	3	29.64	1	52.48	2.00	75.84	3	57.15	2.20	50.00	YES
	CO3	86.69	3	29.64	1	58.16	2.00	75.60	3	61.65	2.20	50.00	YES
	CO4	81.63	3	29.64	1	55.64	2.00	75.85	3	59.68	2.20	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15ENG 111	CO1	93.25	3	84.28	3	88.77	3.00	80.66	3	87.14	3.00	50.00	YES
	CO2	101.54	3	84.28	3	92.91	3.00	80.66	3	90.46	3.00	50.00	YES
	CO3	102.60	3	84.28	3	93.44	3.00	80.66	3	90.89	3.00	50.00	YES
	CO4	84.67	3	84.28	3	84.47	3.00	80.66	3	83.71	3.00	50.00	YES
	CO5	85.25	3	84.28	3	84.76	3.00	80.66	3	83.94	3.00	50.00	YES
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MAT 111	CO1	80.97	3	78.26	3	79.61	3.00	85.91	3	80.87	3.00	50.00	YES
	CO2	90.14	3	78.26	3	84.20	3.00	85.91	3	84.54	3.00	50.00	YES
	CO3	94.69	3	78.26	3	86.47	3.00	85.91	3	86.36	3.00	50.00	YES
	CO4	81.55	3	78.26	3	79.90	3.00	85.91	3	81.10	3.00	50.00	YES
	CO5	85.41	3	78.26	3	81.84	3.00	85.91	3	82.65	3.00	50.00	YES
	CO6	88.70	3	78.26	3	83.48	3.00	85.91	3	83.96	3.00	50.00	YES

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target (%)	Attainment Yes/No
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MEC 100	CO1	54.12	2	64.46	3	59.29	2.50	82.10	3	63.85	2.60	50.00	YES
	CO2	54.12	2	64.46	3	59.29	2.50	82.10	3	63.85	2.60	50.00	YES
	CO3	54.12	2	64.46	3	59.29	2.50	82.10	3	63.85	2.60	50.00	YES
	CO4	54.12	2	64.46	3	59.29	2.50	82.10	3	63.85	2.60	50.00	YES
	CO5	54.12	2	64.46	3	59.29	2.50	82.10	3	63.85	2.60	50.00	YES
	CO6	69.44	3	77.01	3	73.23	3.00	82.10	3	75.00	3.00	50.00	YES

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	2.60	3.00	2.60	2.20	2.20	2.60		
15CHE111	Introduction to Chemical Engineering	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
15CHE112	Material Balances	3.00	2.20	2.20	2.20				
15CVL102	Mechanics: Statics and Dynamics	2.20	1.80	2.20	2.20	2.20			
15CVL111	Introduction to Civil Engineering	2.20	2.20	2.20					
15CVL112	Engineering Graphics-CAD	2.60	2.60	2.60	2.60	2.60			
15CSE100	Computational Thinking and Problem Solving	3.00	3.00	3.00	3.00				
15CSE102	Computer Programming	2.80	3.00	3.00	2.80				
15CSE111	Computer Science Essentials	2.80	3.00	3.00	2.80	2.60	2.80		
15CSE180	Computer Programming Lab	2.40	2.60	2.60	2.40				
15CUL101	Cultural Education -1	3.00	3.00	3.00	3.00	3.00			
15CUL111	Cultural Education-2	3.00	3.00	3.00	3.00	3.00			
15ECE111	Solid State Devices	2.50	2.50	2.50	2.50	2.50			
15ECE112	Fundamentals of Electrical Technology	3.00	3.00	3.00	3.00	3.00	3.00		
15EEE111	Fundamentals of Electrical and Electronics Engineering	2.60	3.00	2.60	3.00	2.60	3.00		
15EEE180	Workshop B	2.60	2.60	2.60	2.60				
15ENG111	Communicative English I	3.00	3.00	3.00	3.00	3.00			
15MAT111	Calculus, Matrix Algebra	3.00	3.00	3.00	3.00	3.00	3.00		
15MAT121	Vector Calculus and Ordinary Differential Equations	3.00	3.00	3.00	3.00	3.00	3.00		
15MEC100	Engineering Drawing -CAD	3.00	3.00	3.00	3.00	3.00	3.00		
15MEC101	Engineering Drawing-CAD-II	3.00	3.00	3.00	3.00	3.00			
15MEC102	Engineering Mechanics	3.00	3.00	3.00	3.00	3.00			
15MEC111	Fundamentals of Mechanical Engineering	3.00	3.00	2.60	3.00	3.00			
15MEC180	Workshop A	2.60	2.60	2.60	2.60				
15CHY100	Chemistry	3.00	3.00	3.00					
15CHY181	Chemistry Lab.	2.60	2.60	2.60	2.60	2.60			
15PHY100	Physics	2.60	2.60	2.60					
15PHY181	Physics Lab	3.00	3.00	3.00					

Table B.8.4.2e CO-Attainment Level-2016-2017(2015 onwards)

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	74.15	74.15	60.59	56.52	63.30	67.37		
15CHE111	Introduction to Chemical Engineering	86.83	97.71	90.43	70.43	84.99	81.31	83.15	79.55
15CHE112	Material Balances	69.32	56.60	56.60	58.44				
15CVL102	Mechanics: Statics and Dynamics	57.23	50.51	58.51	71.64	91.19			
15CVL111	Introduction to Civil Engineering	70.15	67.69	79.15					
15CVL112	Engineering Graphics-CAD	71.58	68.77	70.18	70.18	70.18			
15CSE100	Computational Thinking and Problem Solving	79.50	79.22	78.99	80.80				
15CSE102	Computer Programming	72.29	73.32	79.66	77.43				
15CSE111	Computer Science Essentials	71.47	77.26	73.51	76.94	71.35	74.94		
15CSE180	Computer Programming Lab	56.75	58.05	57.65	56.25				
15CUL101	Cultural Education -1	89.93	93.43	93.72	94.53	94.68			
15CUL111	Cultural Education-2	87.75	89.18	89.08	89.90	89.37			
15ECE111	Solid State Devices	56.82	58.08	64.14	67.17	67.93			
15ECE112	Fundamentals of Electrical Technology	75.70	75.70	75.70	75.70	83.94	83.94		
15EEE111	Fundamentals of Electrical and Electronics Engineering	71.77	72.05	75.09	79.24	77.72	80.75		
15EEE180	Workshop B	74.38	74.38	74.38	74.38				
15ENG111	Communicative English I	80.29	81.72	81.72	77.58	77.58			
15MAT111	Calculus, Matrix Algebra	75.38	75.83	86.40	73.64	75.49	75.34		
15MAT121	Vector Calculus and Ordinary Differential Equations	78.45	82.76	85.55	79.78	81.38	82.18		
15MEC100	Engineering Drawing -CAD	74.94	75.16	75.11	74.94	74.95	80.98		
15MEC101	Engineering Drawing-CAD-II	76.74	76.74	83.68	76.74	86.74			
15MEC102	Engineering Mechanics	82.00	77.92	78.13	86.90	86.90			
15MEC111	Fundamentals of Mechanical Engineering	79.79	68.41	67.71	69.44	78.75			
15MEC180	Workshop A	60.33	60.33	60.33	60.33				
15CHY100	Chemistry	75.89	77.85	77.11					
15CHY181	Chemistry Lab.	66.69	66.69	66.69	66.69	66.69			
15PHY100	Physics	72.25	69.51	70.50					
15PHY181	Physics Lab	91.44	91.44	91.44					

Table B.8.4.2f CO-Attainment Percentage 2016-2017

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CSE 102	CO1	80.36	3	72.85	3	76.61	3.00	55.00	2	72.29	2.80	50.00	YES
	CO2	78.46	3	72.85	3	75.66	3.00	64.00	3	73.32	3.00	50.00	YES
	CO3	95.29	3	72.85	3	84.07	3.00	62.00	3	79.66	3.00	50.00	YES
	CO4	93.21	3	72.85	3	83.03	3.00	55.00	2	77.43	2.80	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15ENG 111	CO1	96.96	3	62.32	3	79.64	3.00	82.88	3	80.29	3.00	50.00	YES
	CO2	100.54	3	62.32	3	81.43	3.00	82.88	3	81.72	3.00	50.00	YES
	CO3	100.54	3	62.32	3	81.43	3.00	82.88	3	81.72	3.00	50.00	YES
	CO4	90.18	3	62.32	3	76.25	3.00	82.88	3	77.58	3.00	50.00	YES
	CO5	90.18	3	62.32	3	76.25	3.00	82.88	3	77.58	3.00	50.00	YES
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MAT 121	CO1	81.24	3	73.33	3	77.29	3.00	83.11	3	78.45	3.00	50.00	YES
	CO2	92.00	3	73.33	3	82.67	3.00	83.11	3	82.76	3.00	50.00	YES
	CO3	86.48	3	73.33	3	79.90	3.00	83.11	3	80.55	3.00	50.00	YES
	CO4	84.57	3	73.33	3	78.95	3.00	83.11	3	79.78	3.00	50.00	YES
	CO5	88.57	3	73.33	3	80.95	3.00	83.11	3	81.38	3.00	50.00	YES
	CO6	90.57	3	73.33	3	81.95	3.00	83.11	3	82.18	3.00	50.00	YES

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MEC 180	CO1	76.57	3	43.21	2	59.89	2.50	62.09	3	60.33	2.60	50.00	YES
	CO2	76.57	3	43.21	2	59.89	2.50	62.09	3	60.33	2.60	50.00	YES
	CO3	76.57	3	43.21	2	59.89	2.50	62.09	3	60.33	2.60	50.00	YES
	CO4	76.57	3	43.21	2	59.89	2.50	62.09	3	60.33	2.60	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target (%)	Attainment Yes/No
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15PHY 100	CO1	83.60	3	59.87	2	71.73	2.50	74.33	3	72.25	2.60	50.00	YES
	CO2	76.74	3	59.87	2	68.30	2.50	74.33	3	69.51	2.60	50.00	YES
	CO3	79.22	3	59.87	2	69.54	2.50	74.33	3	70.50	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	2.50	2.50	2.50	2.50	2.50	2.50		
15CHE111	Introduction to Chemical Engineering	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00
15CHE112	Material Balances	3.00	3.00	3.00	2.00				
15CVL102	Mechanics: Statics and Dynamics	2.60	2.60	2.20	2.20	2.20			
15CVL111	Introduction to Civil Engineering	2.60	2.60	2.60					
15CVL112	Engineering Graphics-CAD	3.00	2.68	3.00	2.68	3.00			
15CSE100	Computational Thinking and Problem Solving	3.00	3.00	3.00	3.00				
15CSE102	Computer Programming	2.80	3.00	2.60	1.60				
15CSE111	Computer Science Essentials	2.80	3.00	3.00	2.80	2.60	2.80		
15CSE180	Computer Programming Lab	2.20	2.20	2.20	2.00				
15CUL101	Cultural Education -1	3.00	3.00	3.00	3.00	3.00			
15CUL111	Cultural Education-2	3.00	3.00	3.00	3.00	3.00			
15ECE111	Solid State Devices	2.00	2.00	2.00	2.00	2.00			
15ECE112	Fundamentals of Electrical Technology	2.00	3.00	2.50	2.50	2.50	2.00		
15EEE111	Fundamentals of Electrical and Electronics Engineering	2.60	2.60	3.00	2.60	3.00	2.60		
15EEE180	Workshop B	2.00	2.00	2.00	2.00				
15ENG111	Communicative English I	3.00	2.52	3.00	3.00	2.82			
15MAT111	Calculus, Matrix Algebra	3.00	3.00	3.00	3.00	3.00	3.00		
15MAT112	Vector Calculus and Ordinary Differential Equations	3.00	3.00	3.00	3.00	3.00	3.00		
15MEC100	Engineering Drawing -CAD	2.60	2.60	2.60	2.60	2.60	3.00		
15MEC101	Engineering Drawing-CAD-II	3.00	3.00	3.00	3.00	3.00			
15MEC102	Engineering Mechanics	3.00	3.00	3.00	3.00	3.00			
15MEC111	Fundamentals of Mechanical Engineering	2.20	2.20	2.20	2.20	2.20			
15MEC180	Workshop A	3.00	3.00	3.00	3.00				
15CHY100	Chemistry	2.60	2.60	2.60					
15CHY181	Chemistry Lab.	2.60	2.60	2.60	2.60	2.60			
15PHY100	Physics	2.60	2.60	2.60					
15PHY181	Physics Lab	3.00	3.00	3.00					

Table B.8.4.2g CO-Attainment Level-2017-2018(2015 onwards)

COURSE TITLE	COURSE	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
15AES111	Introduction to Aerospace Technology	53.97	60.32	58.73	58.73	61.90	63.49		
15CHE111	Introduction to Chemical Engineering	60.07	75.82	61.45	62.62	57.90	62.04	73.10	80.63
15CHE112	Material Balances	72.77	72.84	65.83	59.59				
15CVL102	Mechanics: Statics and Dynamics	70.22	65.62	70.65	65.36	61.70			
15CVL111	Introduction to Civil Engineering	57.02	60.29	62.67					
15CVL112	Engineering Graphics-CAD	85.92	89.00	84.79	87.78	82.30			
15CSE100	Computational Thinking and Problem Solving	79.47	77.67	79.49	79.38				
15CSE102	Computer Programming	68.08	67.55	59.23	37.21				
15CSE111	Computer Science Essentials	71.11	75.56	73.63	76.95	69.20	74.95		
15CSE180	Computer Programming Lab	56.95	58.75	58.35	56.95				
15CUL101	Cultural Education -1	81.90	83.87	79.77	81.78	83.31			
15CUL111	Cultural Education-2	82.98	81.10	78.29	78.82	79.96			
15ECE111	Solid State Devices	52.70	50.06	51.51	50.51	51.58			
15ECE112	Fundamentals of Electrical Technology	59.16	65.92	52.15	65.92	71.65	64.65		
15EEE111	Fundamentals of Electrical and Electronics Engineering	66.86	58.84	66.59	70.20	79.96	69.57		
15EEE180	Workshop B	67.83	67.83	67.83	67.83				
15ENG111	Communicative English I	74.44	85.94	82.32	72.09	69.95			
15MAT111	Calculus, Matrix Algebra	72.79	74.86	85.31	71.83	73.84	73.43		
15MAT121	Vector Calculus and Ordinary Differential Equations	76.56	81.49	78.92	77.74	79.20	80.40		
15MEC100	Engineering Drawing -CAD	70.83	70.83	70.83	70.83	70.83	80.81		
15MEC101	Engineering Drawing-CAD-II	81.54	81.54	81.54	81.54	81.54			
15MEC102	Engineering Mechanics	80.47	80.65	80.17	86.64	86.64			
15MEC111	Fundamentals of Mechanical Engineering	62.53	61.79	68.46	69.20	69.57			
15MEC180	Workshop A	74.77	74.77	74.77	74.77				
15CHY100	Chemistry	68.23	68.24	71.47					
15CHY181	Chemistry Lab.	65.68	65.68	65.68	65.68	65.68			
15PHY100	Physics	71.16	68.54	69.82					
15PHY181	Physics Lab	88.01	88.01	88.01					

Table B.8.4.2h CO-Attainment Percentage 2017-2018

Sample Calculations of CO-Attainment:

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CSE 180	CO1	56.56	2	58.33	2	57.44	2.00	55.00	2	56.95	2.00	50.00	YES
	CO2	56.56	2	58.33	2	57.44	2.00	64.00	3	58.75	2.20	50.00	YES
	CO3	56.56	2	58.33	2	57.44	2.00	62.00	3	58.35	2.20	50.00	YES
	CO4	56.56	2	58.33	2	57.44	2.00	55.00	2	56.95	2.00	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MEC 100	CO1	83.89	3	56.22	2	70.06	2.50	73.91	3	70.83	2.60	50.00	YES
	CO2	83.89	3	56.22	2	70.06	2.50	73.91	3	70.83	2.60	50.00	YES
	CO3	83.89	3	56.22	2	70.06	2.50	73.91	3	70.83	2.60	50.00	YES
	CO4	83.89	3	56.22	2	70.06	2.50	73.91	3	70.83	2.60	50.00	YES
	CO5	83.89	3	56.22	2	70.06	2.50	73.91	3	70.83	2.60	50.00	YES
	CO6	91.95	3	73.13	3	82.54	3.00	73.91	3	80.81	3.00	50.00	YES

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15MEC 180	CO1	86.59	3	62.74	3	74.67	3.00	75.19	3	74.77	3.00	50.00	YES
	CO2	86.59	3	62.74	3	74.67	3.00	75.19	3	74.77	3.00	50.00	YES
	CO3	86.59	3	62.74	3	74.67	3.00	75.19	3	74.77	3.00	50.00	YES
	CO4	86.59	3	62.74	3	74.67	3.00	75.19	3	74.77	3.00	50.00	YES
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15CH Y181	CO1	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO2	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO3	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO4	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO5	80.87	3	45.92	2	63.40	2.50	74.82	3	65.68	2.60	50.00	YES
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15PHY 100	CO1	84.25	3	57.18	2	70.71	2.50	72.96	3	71.16	2.60	50.00	YES
	CO2	77.28	3	57.18	2	67.23	2.50	73.82	3	68.54	2.60	50.00	YES
	CO3	80.56	3	57.18	2	68.87	2.50	73.63	3	69.82	2.60	50.00	YES
	CO4												
	CO5												
	CO6												

Course	COs	Internal Examination		End Semester Examination		Direct		Indirect		Final Course Attainment		Target	Attainment
		(CIE)		(SEE)		50% of CIE and 50% of SEE				80% of Direct and 20% of Indirect			
		Attainment	Level	Attainment	Level	Attainment*	Level	Attainment	Level	Attainment	Level		
15PHY 181	CO1	98.63	3	82.96	3	90.80	3.00	76.87	3	88.01	3.00	50.00	YES
	CO2	98.63	3	82.96	3	90.80	3.00	76.87	3	88.01	3.00	50.00	YES
	CO3	98.63	3	82.96	3	90.80	3.00	76.87	3	88.01	3.00	50.00	YES
	CO4												
	CO5												
	CO6												

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)

COURSE TITLE	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Computer Programming	CSE100	2.64	2.65	2.66									
Computer Programming Lab	CSE180	2.27	2.27	2.27		2.33							
Cultural Education -1	CUL101						2.99	2.99	2.99	2.99	2.99	2.99	2.99
Cultural Education-2	CUL102						3.00	3.00	3.00	3.00	3.00	3.00	3.00
Electronics Engineering	ECE100	2.52	2.53	2.59									2.52
Electrical Engineering	EEE100	1.71	1.67										
Workshop B	EEE180	1.25	1.25	1.25						1.25			1.25
Communicative English	ENG111								2.61	2.66	2.63		2.63
Technical Communication	ENG112								2.98	2.98	2.98		2.98
Calculus, Matrix Algebra	MAT111	2.04	2.05										
Vector Calculus and Ordinary Differential Equations	MAT112	2.38	2.40	2.39									2.38
Engineering Drawing	MEC181	2.61	2.61	2.61	2.61		2.61				2.61		2.61
CAD	MEC182	2.39	2.39	2.39		2.39					2.39		2.39
Engineering Mechanics	MEC100	1.99	1.99	1.98	1.99								1.99
Workshop A	MEC180	2.33	2.33	2.33		2.33				2.33	2.33		2.33
Chemistry	CHY100	1.85	2.11	2.13	2.13								
Chemistry Lab.	CHY181	2.61	2.61	2.61									
Physics	PHY100	2.27	2.27										2.27
Physics Lab	PHY181	2.93	2.93	2.93	2.93	2.93	2.93						

Table B.8.5.1a PO-Attainment for 2014-2015

COURSE TITLE	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Introduction to Aerospace Technology	15AES111	3	3		3		3	3		3	3		3
Introduction to Chemical Engineering	15CHE111	2.55	3.00		3.00	2.00			3.00				
Material Balances	15CHE112	2.25	2.25	2.20	2.00								
Mechanics: Statics and Dynamics	15CVL102	2.6	2.6										
Introduction to Civil Engineering	15CVL111	2					2.2	2.2		2.2			
Engineering Graphics-CAD	15CVL112	2.36	2.36	2.36	2.36	2.36							2.36
Computational Thinking and Problem Solving	15CSE100	3.00	3.00	3.00		3.00			3.00	3.00	3.00		
Computer Programming	15CSE102	2.27	2.27	2.27									
Computer Science Essentials	15CSE111	2.54	2.52	2.52									
Computer Programming Lab	15CSE180	2.05	2.03	2.05		2.15							
Cultural Education -1	15CUL101						2.63	2.63	2.63	2.63	2.63	2.63	2.63
Cultural Education-2	15CUL111						2.50	2.50	2.50	2.50	2.50	2.50	2.50
Solid State Devices	15ECE111	2.00	2.00										2.00
Fundamentals of Electrical Technology	15ECE112	1.87	1.88	1.83									1.93
Fundamentals of Electrical and Electronics Engineering	15EEE111	2.44	2.37	2.62									
Workshop B	15EEE180	2.39	2.39	2.39					2.39	2.39	2.39		2.39
Communicative English I	15ENG111								2.95	2.95	2.95		2.95

Calculus, Matrix Algebra	15MAT111	2.95	2.95	2.95									2.95
Vector Calculus and Ordinary Differential Equations	15MAT121	2.41	2.39	2.39									2.42
Engineering Drawing -CAD	15MEC100	2.50	2.50	2.50	2.51		2.51				2.50		2.51
Engineering Drawing-CAD-II	15MEC101	2.60	2.60	2.60	2.60		2.60				2.60		2.60
Engineering Mechanics	15MEC102	2.57	2.57	2.57	2.57								2.57
Fundamentals of Mechanical Engineering	15MEC111	2.12	2.13	2.13	2.13		2.20	2.20		2.12			2.10
Workshop A	15MEC180	2.49	2.49	2.49		2.49				2.49	2.49		2.49
Chemistry	15CHY100	2.58	2.60	2.60	2.60								
Chemistry Lab.	15CHY181	2.78	2.78	2.78									
Physics	15PHY100	2.61	2.61										2.61
Physics Lab	15PHY181	2.99	2.99	2.99	2.99	2.99	2.99						

Table B.8.5.1b PO-Attainment for 2015-2016

COURSE TITLE	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Introduction to Aerospace Technology	15AES111	2.53	2.60		2.40		2.67	2.44		2.80	2.50		2.42
Introduction to Chemical Engineering	15CHE111	3.00	3.00		3.00	3.00			3.00				
Material Balances	15CHE112	2.25	2.25	2.20	2.00								
Mechanics: Statics and Dynamics	15CVL102	2.12	2.12										
Introduction to Civil Engineering	15CVL111	2.2					2.2	2.2		2.2			

Engineering Graphics-CAD	15CVL112	2.6	2.6	2.6	2.6	2.6							2.6
Computational Thinking and Problem Solving	15CSE100	2.95	2.95	2.95		2.95			2.95	2.95	2.95		
Computer Programming	15CSE102	2.88	2.90	2.92									
Computer Science Essentials	15CSE111	2.75	2.72	2.72									
Computer Programming Lab	15CSE180	2.37	2.35	2.37		2.47							
Cultural Education -1	15CUL101						2.60	2.60	2.60	2.60	2.60	2.60	2.60
Cultural Education-2	15CUL111						2.58	2.58	2.58	2.58	2.58	2.58	2.58
Solid State Devices	15ECE111	2.43	2.43										2.43
Fundamentals of Electrical Technology	15ECE112	3.00	3.00	3.00									3.00
Fundamentals of Electrical and Electronics Engineering	15EEE111	2.80	2.77	2.87									
Workshop B	15EEE180	2.76	2.76	2.76					2.76	2.76	2.76		2.76
Communicative English I	15ENG111								2.72	2.72	2.72		2.72
Calculus, Matrix Algebra	15MAT111	2.85	2.85	2.85									2.86
Vector Calculus and Ordinary Differential Equations	15MAT121	3.00	2.99	3.00									2.99
Engineering Drawing -CAD	15MEC100	2.89	2.89	2.89	2.89		2.89					2.89	2.89
Engineering Drawing-CAD-II	15MEC101	2.97	2.97	2.97	2.97		2.97					2.97	2.97
Engineering Mechanics	15MEC102	3.00	3.00	3.00	3.00								3.00
Fundamentals of Mechanical Engineering	15MEC111	2.92	2.89	2.91	2.94		3.00	2.90					2.90
Workshop A	15MEC180	2.52	2.52	2.52		2.52					2.52	2.52	2.52

Chemistry	15CHY100	2.89	2.89	2.87	2.87								
Chemistry Lab.	15CHY181	2.72	2.72	2.72									
Physics	15PHY100	2.70	2.70										2.70
Physics Lab	15PHY181	2.99	2.99	2.99	2.99	2.99	2.99						

Table B.8.5.1c PO-Attainment for 2016-2017

COURSE TITLE	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Introduction to Aerospace Technology	15AES111	2.2	2.2		2.2		2.2	2.2		2.2	2.2		2.2
Introduction to Chemical Engineering	15CHE111	2.20	2.60		2.20	2.20			3.00				
Material Balances	15CHE112	2.04	0.86			3.00							
Mechanics: Statics and Dynamics	15CVL102	2.36	2.36										
Introduction to Civil Engineering	15CVL111	2.6					2.6	2.6		2.6			
Engineering Graphics-CAD	15CVL112	2.87	2.87	2.87	2.87	2.87							2.87
Computational Thinking and Problem Solving	15CSE100	2.90	2.90	2.90		2.90			2.90	2.90	2.90		
Computer Programming	15CSE102	2.41	2.29	2.37									
Computer Science Essentials	15CSE111	2.75	2.72	2.72									
Computer Programming Lab	15CSE180	2.44	2.42	2.44		2.54							
Cultural Education -1	15CUL101						2.54	2.54	2.54	2.54	2.54	2.54	2.54
Cultural Education-2	15CUL111						2.47	2.47	2.47	2.47	2.47	2.47	2.47
Solid State Devices	15ECE111	2.05	2.05										2.05

Fundamentals of Electrical Technology	15ECE112	2.42	2.40	2.41									2.37
Fundamentals of Electrical and Electronics Engineering	15EEE111	2.58	2.62										
Workshop B	15EEE180	2.36	2.36	2.36					2.36	2.36	2.36		2.36
Communicative English I	15ENG111								2.76	2.46	2.83		2.70
Calculus, Matrix Algebra	15MAT111	2.80	2.80	2.80									2.82
Vector Calculus and Ordinary Differential Equations	15MAT121	2.94	2.95	2.95									2.94
Engineering Drawing -CAD	15MEC100	2.86	2.86	2.86	2.86		2.86				2.86		2.86
Engineering Drawing-CAD-II	15MEC101	3.00	3.00	3.00	3.00		3.00				3.00		3.00
Engineering Mechanics	15MEC102	3.00	3.00	3.00	3.00								3.00
Fundamentals of Mechanical Engineering	15MEC111	2.40	2.40	2.40	2.40		2.40	2.40		2.40			2.40
Workshop A	15MEC180	2.91	2.91	2.91		2.91				2.91	2.91		2.91
Chemistry	15CHY100	2.60	2.60	2.60									
Chemistry Lab.	15CHY181	2.75	2.75	2.75									
Physics	15PHY100	2.67	2.67										2.67
Physics Lab	15PHY181	2.97	2.97	2.97	2.97	2.97	2.97						

Table B.8.5.1d PO-Attainment for 2017-2018

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

POs	Target Level	Attainment Level	Observations
PO1: Engineering Knowledge			
PO1	2	2.5	The target level was not attained by 15ASE111, 15MEC111, and 15ECE111 and the action taken are for the above mentioned courses for which the target was not met.
<p>Action 1: Include more examples involving applications of fundamentals in lectures.</p> <p>Action 2: Practical applications of engineering drawing skills are incorporated in the next syllabus revision.</p> <p>Action 3: Focus to enhance student's skill in CAD software. Course content is oriented towards the same.</p> <p>Action 4: More focus on discussions related to approaching a problem, using foundational engineering knowledge for solving problem is included.</p>			
PO2: Problem Analysis			
PO2	2	2.5	The target level was not attained by 15ASE111, 15CVL102, 15MEC111, and 15ECE111 and the action taken are for the above mentioned courses for which the target was not met.
<p>Action 1: Motivate the students to learn on their own and give presentations in class.</p> <p>Action 2: Scope of the course is widened to incorporate more fundamental topics in the next syllabus revision.</p> <p>Action 3: Course delivery to focus more on fundamental concepts and usage of the same to solve complex problems.</p> <p>Action 4: Solving numerical problems as typical examples on all topics within the class room.</p>			
PO3: Design/Development of Solutions			
PO3	2	2.6	The target level was not attained by 15MEC111, and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
<p>Action 1: Every lecture topic is accompanied by sample codes for different problem scenarios. The lectures also include code walk-through which discusses more the problem solving aspect rather than</p>			

syntax.

Action 2: The evaluation lab questions demand the students to code solutions for real-world problem scenarios.

Action 3: In addition, the evaluation rubric places almost equal weightage on the design of solutions in par with the implementation

PO4: Conduct Investigations of complex problems

PO4	2	2.1	The target level was not attained by 15MEC111, and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
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Action 1: The complex building drawings are separated by simple components for better understanding.

Action 2: More fundamental topics are included in the next syllabus revision.

Action 3: Course delivery to focus more on fundamental concepts and usage of the same to solve complex problems.

PO5 :Modern tools usage

PO5	2	2.8	Attainment is more than target
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Action 1: Level can be increased

PO6 : Engineer and Society

PO6	2	2.3	The target level was not attained by 15MEC111, and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
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Action 1: The practical project helps in motivating the students about the importance of civil engineering in community building.

Action 2: Ought to connect the course content to the practical engineering design. Course delivery will be oriented towards the relevant practical applications of concepts.

Action 3: Ought to connect the course content to the practical engineering design. Course delivery will be oriented towards the relevant practical applications of concepts.

PO7 : Environment and Sustainability

PO7	2	2.4	The target level was not attained by 15ASE111 and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
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Action 1: Stress on the importance and need to create sustainable and green solutions in future in class lectures.

Action 2: The students are aware of the different branches of civil engineering with their applications.

Action 3: Presentations from students will be encouraged.

PO8 : Ethics			
PO8	2	2.3	Attainment is less than target
<p>Action 1: Introduce Human Value courses/Programmes.</p> <p>Action 2: Arrange Career guidance program, corporate lectures and motivational talks will be arranged to gain knowledge of professional ethics and responsibilities</p>			
PO9 : Individual & Teamwork			
PO9	2	2.5	The target level was not attained by 15MEC100 and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
<p>Action 1: The relation between different branches of civil engineering should be emphasized among the students.</p> <p>Action 2: Students are encouraged to work out/ discuss about real time problems applying the fundamentals learned.</p>			
PO10 : Communication			
PO10	2	2.4	The target level was not attained by 15MEC100, 15MEC101 15MEC111, and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
<p>Action 1: Give more opportunities for the students to communicate in the form of class presentations and written reports and give feedback to them for improvement in these areas.</p> <p>Action 2: Will offer a session on line strokes that highlights the concept of depth of field in engineering drawing.</p>			
PO11 : Project management & Finance			
PO11	2	2.5	Attainment is more than target
<p>Action 1: The cost estimation will be included as a part of project/assignment, this will improve the knowledge regarding project management and finance</p>			
PO12 : Lifelong learning			
PO12	2	2.5	The target level was not attained by 15ASE111, 15MEC111, and 15ECE111, and the action taken are for the above mentioned courses for which the target was not met.
<p>Action 1: Course delivery to be oriented towards linking the fundamental concepts to practical usage.</p> <p>Action 2: Explain the relevance of the course in student's career and highlight each of its contents relevance in future.</p> <p>Action 3: The correlation of the learned principles with the application levels are elaborated to the students through simple examples.</p>			

Table B.8.5.2 Observation and action taken

CRITERION 9
STUDENT SUPPORT SYSTEMS

9.1 Mentoring system to help at individual level (5)

Amrita's approach to mentoring and counseling the students is guided by the vision of imparting a value based education to our students. The role of a dedicated and hardworking faculty body is vital towards achieving this objective. A balanced and effective mentoring is in place, maintaining a healthy relationship between faculty members and students. Mentoring and counseling are planned for the following aspects:

- Improve Academic performance.
- Develop a Research Orientation
- Guidance for Professional Career, Higher Studies & Skill Development
- Resolve Personal Issues: Behavioral; psychological
- Encourage Spirit of Innovation by motivating and training students to participate in Contests, Conferences, Projects and Internships
- Motivate to pursue Extra-curricular and Social activities
- Encourage students to participate in Cultural activities, Arts and Sports.
- Develop Personality and Character
- Foster Good Values, Healthy living and Discipline.

Student Portfolio

The Student Portfolio with personal details along with their academic performance and progress is maintained as follows:

- Personal file: A detailed personal file is maintained in the School Administration Office, recording all relevant aspects of a student(Annexure B 9.1*). This is supplemented by two automated software.
- Amrita vishwa vidyapeetham Management System (AUMS) Software: A master database holding all academic records (Annexure B 9.2*).
- Campus Management System (CMS): A database containing essential information, both academic (operational) and non-academic elements, required for effective mentoring and counseling of students at multiple levels. The information is stored as Work Registers, Counseling Diaries, Achievements, and Disciplinary actions (Annexure B 9.3*, 9.4*, 9.5* and 9.6*).

The Mentoring Structure

An effective student mentoring and counseling system has been implemented in the institution. The Department Chairperson assisted by Department Vice Chairperson(s) steer, direct and oversee this vital aspect:-

Class Advisors: Class Advisors (CA) are appointed for every 20 students when the students join for the UG programme. Class Advisors so nominated hold the responsibility until the students complete the programme. The CAs will maintain all records of their respective wards assigned to them in the work register/ counseling diary in the CMS. They shall guide and counsel the students on maintaining good academic performance, attendance and discipline. They shall advise the students, monitor the courses undergone by them, monitor their performance in tests and also look into their personal difficulties. They guide students on internships and higher studies and facilitates the students wishing to pursue the various programmes offered by Amrita Centre for International Programmes (ACIP). Advisor also keeps track of Co-curricular, Extra Curricular achievements and Social activities. This will be frequently reviewed by the Department Chairperson. The CAs shall inform the parents regarding the academic progress and attendance percentages immediately after the periodical tests(Annexure B 9.7* & 9. 8*).

Batch Coordinator: A Batch Coordinator is nominated at the commencement of an academic programme. A senior Faculty so nominated coordinates the functioning of all the CAs of the batch; tracks the academic progress of the students; guides students on internships and higher studies and facilitates the students wishing to pursue the various programmes offered by Amrita Centre for International Programmes (ACIP).

Class Committee: Class committee comprises the Chairperson, Class Advisor and student representatives. This committee is formed with the overall goal of improving the effectiveness of the teaching-learning process. In the two meetings held in a semester immediately after the periodical tests, feedback is taken from the student members representing the entire class, so as to improve the teaching-learning process and also to address other issues/grievances. The chairperson and advisor disseminate important activities in the department such as schedule of placement training classes, participation of students in extracurricular and co-curricular activities, conferences and workshops, internship opportunities, industry training and also inviting volunteers for any planned central activities. The other aspects that may be addressed during the Class Committee meeting are:

- Resolve any issues faced by students in the class room/ laboratories.
- Clarify Rules & Regulations of the degree program.

- Discuss the academic progress and the coverage of syllabus.
- Analysis of student performance.
- Identify slow learners, if any, and plan necessary support measures.
- Track attendance shortage and caution students lacking the requisite percentage.

Academic Processes (Mentoring)

A systematic and structured orientation programme is conducted for the freshers, (both on academic and cultural aspects) as given below:-

Orientation of Fresher's (Academic)

Amrita attracts UG students with varied academic (CBSE/ State Boards/ ICSE) and cultural backgrounds (from abroad as well). At the commencement of the academic programme, orientation training is imparted to freshers in two stages:-

- Stage1: A School level orientation is organized over one full day. Attendance by parents as well ensures clear understanding of both academic, and living environment (Annexure B 9. 9*).
- Stage 2: Conducted at the department level.

Programme Specific

- Weekly Counseling Sessions: Counseling sessions are scheduled in the time-table. The faculty mentors discuss issues related to academics and grades with the assigned students leading to improved academic achievement in both theory and lab subjects (Annexure B 9.10*).
- Professional Orientation of 2nd Year Students: Conducted for 2nd Year students, so as to orient them professionally to the respective engineering discipline they have enrolled for.
- Choice of Electives: As the student progresses, guidance and mentoring is done on the choice of electives (Annexure B 9.11*).
- Co-Curricular activities: Mentoring is provided to encourage students on all co-curricular activities, viz, participating in contests, conferences, publications etc.
- Mentoring for Higher Education: Students planning to pursue higher studies are constantly guided and mentored by the Dept.

- Support for Placements: Continuous support is rendered by the Dept. in tandem with the efforts of the Corporate and International Relations (CIR) to prepare students to achieve dream placements. During the beginning of final year, pre-placement training sessions are offered to the students. This will make the students more confident during the placement sessions.

Course Work Specific

- Tutorial Classes: Tutorial sessions are embedded into the curriculum, enabling a direct first level mentoring by respective teaching faculty.
- Class Committee/ Department Advisory Committee Meetings and Follow up Mentoring Actions: Feedback is taken from the student representatives during the Class Committee meetings on the effectiveness of teaching. Based on this feedback, mentoring and counseling of faculty is done by the Department Chairperson/ Senior professors. Student grievances are also addressed during the Department Advisory Committee meetings. The information is escalated to Dean Engineering, if warranted, for further action.
- Student Mentors: Students are encouraged to contribute in the academic and personal growth of peers/ juniors by providing assistance as and when required.

Alumni Interaction

Visiting alumni are a great source of inspiration to the student body. They interact with the students, share their experiences and guide them. This has benefitted especially, the motivated students who plan to pursue higher studies (both in India and abroad).

Personal Issues- Counseling & Resolution of Personal Problems: A healthy and peaceful state of mind goes a long way to enable students to concentrate in academics. Counseling students on personal issues is therefore vital, and hence has been incorporated into the system (Figure1). Categories of issues encountered are: interpersonal relationships, behavioral abnormalities, adjustment to the campus environment, emotional disturbances, family related problems etc.

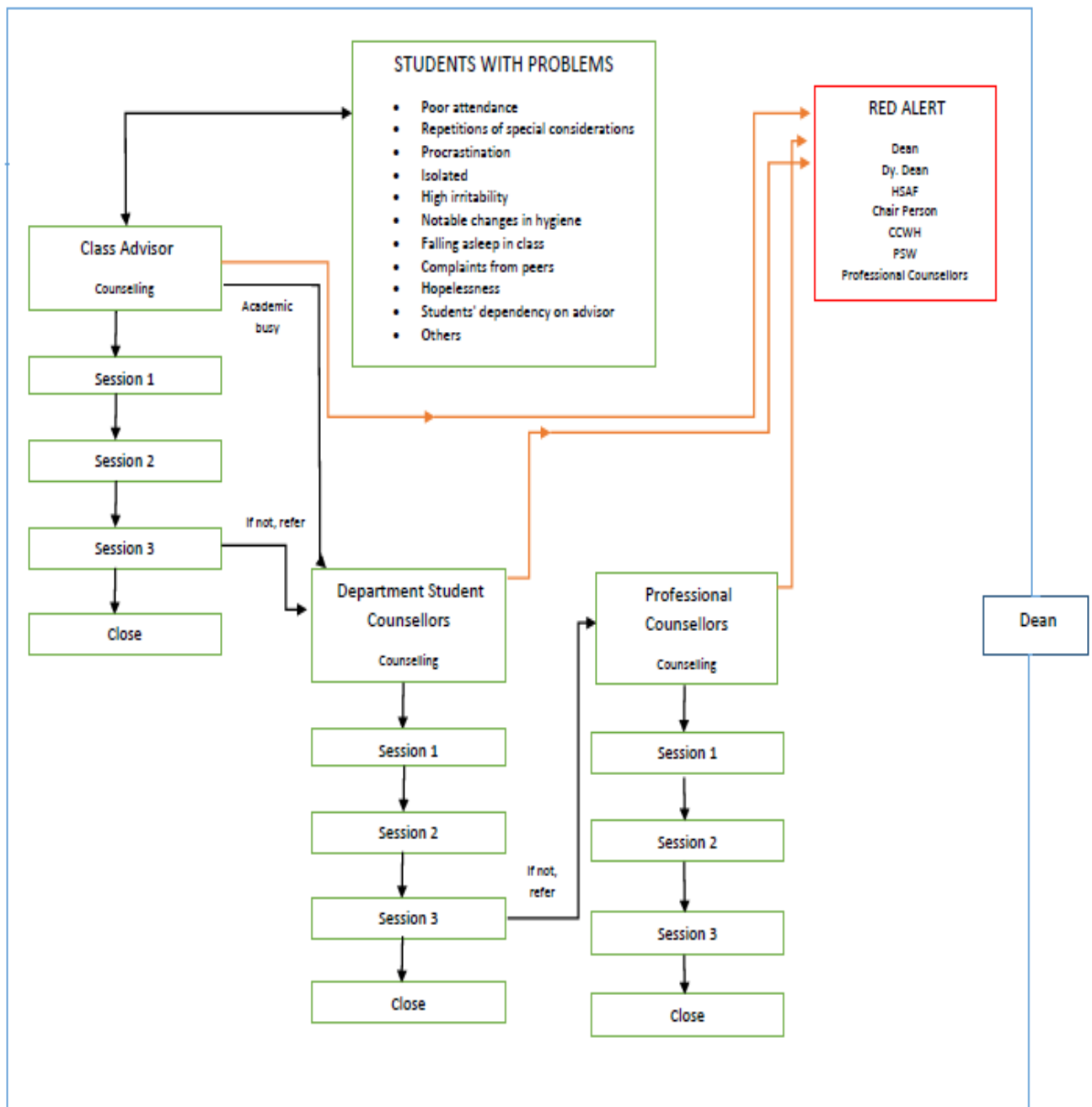


Figure B.9.1a The Counseling Work Flow

The Counseling Structure

Department Faculty Counselors: While the Class Advisors focus primarily on dealing with academic issues, a network of Department Faculty Counselors have been trained and nominated, to handle behavioral issues beyond the immediate scope of the Class Advisors. The staffing planned is as follows, based on the availability of trained faculty (Annexure B 9.12a*):

- Major Departments – 02
- Minor Departments – 01

Professional Counselors: Cases are escalated and referred to the professional counselors when such a necessity is felt by the Departments. They provide individual and group counselling to the students to help them maintain and improve their emotional, intellectual, physical and spiritual well-being through a process of self-discovery that promotes overall well-being. Two Professional Counsellors directly interact with students in need of personal counselling to alleviate stress and anxiety, achieve enhanced self-esteem, attain good inter-personal skills and ultimately help to achieve educational goals. Through the two-tier system of Class Advisors and Department Counsellors, a personal rapport is established with the individual students. Cordial relations are also developed with parents by interacting with them on need basis. For confidential help and exigencies, students are advised to directly contact the help line No.91-9487302905 or email to wecare@cb.amrita.edu (Annexure B 9.12b*). A summary of counseling activities carried out by them is given at Annexure B 9.12c*. They also carry out training of the Dept. Counselors (Annexure B 9.12d*)

Chief Faculty Wardens (CFW) and Wardens of Hostels: The CFW and the network of wardens play a crucial role in identifying students needing counseling. All cases needing focused care and attention are referred to the Class Advisors/ Department Counselors

The Work Flow of Counseling Process

- Level-1:(Respective Class Advisors / Teaching faculty/ Hostel Wardens).At the first level, behavioral issues noticed by a warden or a class handling faculty, if not addressed by them, are referred to the Class Advisor.
- Level-2: (Department Faculty Counselors / CFW).In case the issue is not resolved by the functionaries mentioned at Level-1, it is escalated.
- Level-3: Professional Counselors. The case is referred to the Professional Counselor, from any level, if warranted.

Wherever required, parents are also invited to render their support and cooperation for effective counseling of their wards. Cases needing psychiatric treatment are referred to premium hospitals in the City. A strategy for counseling and monitoring students, generally followed by Depts are given at Annexure B 9.12e*. Minutes of

one Counselors Meeting of 27 Jun 2018 is given at Annexure B 9.12f*. Follow up action is given at Annexure B 9.12g*, Annexure B 9.12h* and Annexure B 9.12i*.

Student Support Extended for Value Based Education

To follow up on the stated mission of the University, “to provide value-based education and mould the character of younger generation”, varied multi-pronged steps have been initiated to by way of offering opportunities to students to learn by example. Towards this, a strong foundation is laid for holistic education through Live-in-Labs, Amrita Serve, Amala Bharatham, IAM meditation techniques, Amrita Yoga and Geetamritam (BhagavatGeeta camp) etc. A special programme is run for the freshers as Amrita Learning to Integrate Values and Excellence(ALIVE)projects in Care to Care, Combating Social evils, Organic Farming,AmalaBharatham (Swatchata drive), Amrita Quench (Conservation of water), Holistic Personality, etc. (Annexure B 9.13*)

Efficacy of Mentoring System:

The mentoring-counseling system in place in the School of Engineering has reaped rich dividend in the following ways:-

- A gradual and systematic induction of the students assisted in effective transition to college life, reducing their sense of isolation and homesickness. This gave the students confidence to face the rigors of academics.
- The mentors provided impartial advice, individual and personal care and encouragement to the students all through their academic years. This created a positive work environment and developed a supportive relationship between students and staff. A mixture of harmonious and happy atmosphere prevalent in the campus enable the students to focus on academics and research.
- The placement statistics, success in GATE/ CAT exams, and admit to premier institutions in India and abroad are testimony to the efficacy of the mentoring and counseling procedure adopted to sustain the academic rigor.
- Enhanced the efficacy of the teaching learning process.
- Increased the comfort level of the students by progressing them through a systematic and structured path to their graduation.

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

Faculty Feedback analysis process

Feedback is collected for all courses and 100% participation of the students is ensured. This is done by on-line teacher evaluation through AUMS. Ability of teaching and comprehensive ability of the teachers will be analysed. All the comments written by the students in feedback forms will be communicated to the respective faculty members along with their feedback levels to know their strengths and weaknesses and to enhance their teaching skills. The evaluation index of all teachers is obtained from the process and appreciations/corrections for individual staff member are given by the Chairperson.

Chairperson/Class advisors visit the classes shortly after the commencement of the semester where the students are given a platform to express their views regarding the subjects, faculty and any other issues they are facing. During this period the Advisor/Chairperson emphasize the importance of each subject, its applications and also about the other activities planning in the semester. According to the student feedback Chairperson will find a solution to their problems, if any, with the support of Class Advisors. This will ensure a smooth atmosphere for the students in the semester. The faculty in charge of each subject will start the classes with a introduction of the subject with an emphasis on prerequisite, if any, the syllabus, lecture plan, course outcome etc.

After each periodical test a **class committee meeting** is convened in the presence of the Chairperson and the Class Advisor with the representatives of the class. In cases where the performance is very poor more student representatives will attend the meeting. The students' exam performance, their attendance status, class in general etc. is discussed during the meeting. Students are encouraged to present their view points with reference to each subjects. All these points are noted down by the Class Advisor and report to all the faculty. In case if the students find any subject very difficult it will be communicated to the concerned Chairperson.

9.3. Feedback on facilities (5)

9.3.1 In Amrita hostels, students get ample opportunity to interact with their peers and get enriched both academically and culturally. Utmost importance is given to inculcate values which will help the residents to live in harmony with their friends and equip them to develop an integrated personality which will go a long way in shaping their future. There are nine hostels in the campus. Details of facilities extended are enumerated in the Hostel Handbook (Annexure B 9.14a*).

The feedback on central facilities is taken on a regular basis from the students, and is incorporated into the system of both academic and counseling structure. A survey taken from Final Year students is shown in Table B.9.2a below. The analysis of the report is given at Annexure B 9.14b*.

Table B.9.3.1a Exit Feedback 2016-2017 batch

Feedback of Final Year Students (2015-2016 Batch) - Residents - Report							
Total Responses: 1113							
Measure of positivity = positive responses/negative responses = (Very Good + Good) / (Very Bad + Bad)							
S.No	Parameters	Very Good	Good	Average	Poor	Very Poor	Positivity
1	Waste Management System	334	515	186	30	49	10.7
2	Drinking Water	294	531	200	40	49	9.2
3	Dining Hall Capacity	240	582	194	40	58	8.3
4	Hostel surroundings (Garden, Hygiene)	304	521	188	49	52	8.0
5	Dining Hall Hygiene	245	534	228	40	67	7.2
6	Visits By Resident Warden	248	529	222	45	70	6.7
7	Mess Hall Infrastructure	207	518	264	57	68	5.8
8	Room Furniture Adequacy	254	468	258	72	62	5.3
9	Hostel Room/Corridor Hygiene	258	471	245	69	71	5.2
10	Toilet Cleanliness	272	461	240	74	67	5.0
11	Accessibility of staff	192	516	261	70	75	4.8
12	Electrical Equipments Availability	239	473	247	84	71	4.5
13	Sports Facilities (Gym, Outdoor, Indoor etc.)	207	471	275	85	76	4.2

14	Laundry Facility	181	454	310	83	86	3.7
15	Behavior Of Hostel Staff	209	470	246	86	103	3.6
16	Reading Room Facilities (News Papers, Magazines etc.)	176	402	345	111	80	3.0
17	Food Serving Mechanism	160	414	306	103	131	2.4
18	Attention On Problems	155	401	273	130	155	1.9
19	Role Of Student Representatives	147	372	298	148	149	1.7
20	Computerized Gate pass Management System (CMS)	177	388	222	117	210	1.7
21	Recreational Facilities	156	279	340	197	142	1.2
22	Quality of Food	110	239	304	173	288	0.8

Table B.9.3.1b Feedback on Department Facilities

Feedback from 2015-16 , 2016-17, 2017-18 & 2018-19 Batches - Report						
Sl no	Parameters	Very Good	Good	Average	Poor	Very Poor
1	Environmental Engineering Lab	7	104	6		
2	Materials Testing Lab	3	140	27	3	
3	Survey Lab	5	145	19	2	
4	Construction Material Lab	1	150	19	2	
5	Hydraulic Engineering Lab	6	148	19		
6	Geotechnical Engineering Lab	4	105	15		
7	CAD LAB	10	151	5		
8	Class Room Facilities		149	59	9	

9.4. Self-Learning (5)

The curriculum offers courses like seminar on current technical topics and major projects, where topics are self-selected based on the selection of the guide. Every student has to submit a home assignment based on topics beyond syllabus in all courses in all semesters. Well-equipped Central Library and department library provides assistance for self-learning. Students can access NPTEL video lectures for better understanding of the concepts. TEQIP- QEEE classes are also conducted. Civil Engineering Association and ICI student Chapter organizes activities such as workshop, seminar and group discussion etc in every semester. The students are also encouraged to participate in technical events/workshops conducted by other institutions/organizations which also will enhance their knowledge. Industrial visits are arranged to benefit the students to improve their practical exposure

Facilities to support Self learning

- **Computing Facility:** The intranet site- intranet.amrita.edu hosts links to various IT enables services like Digital Library, Central Library book search etc. The campus is also part of the National Knowledge Network (NKN) of National Mission on Education through Information and Communication Technology (NMEICT) – a project of Ministry of HRD.
- **WiFi at Amrita:** All hostels and academic blocks are covered by WiFi.
- **Cisco Networking Academy:** Established as one of Regional Academies by CISCO in India in 1998. It is a comprehensive e-learning program. The Academy is currently an Instructor Training Centre (ITC) and Academy Support Center (ASC). The Academy offers certificates like CCNA, CCNP and ITE.
- **Clubs such as Aero SAE, SAE, Anantam, Shrishti, and respective Department Technical Clubs** contribute and complement the self-learning process.
- **Seminars and workshops** are organized for the students to enhance their skill. Students are encouraged to attend/ participate in technical events conducted in premium institutions in the country.
- **Students are encouraged to participate in various contests** which will help them to learn new technologies.
- **Visits are organized to select industries to provide exposure to students.**

- Students are encouraged to take MOOC courses from platforms such as Coursera and NPTEL.
- Students participate in programming contests like TGMC (The Great Mind Challenge Contest conducted by IBM), ACM ICPC (programming contest conducted by ACM), and Aspirations (programming contest conducted by Infosys) etc. Participation in these contests provide insight into application development.
- Students take up competitive examinations like GATE and CAT.

Academic Processes promoting Self Learning

- Certain topics of the syllabus (approximately 5%) of selected subjects are left for self study by the students and evaluated in the End semester examinations. This is seen to motivate students towards self-learning.
- The questions for the examinations ought not to have been discussed in the class. This encouraged students to explore reference books.
- The curriculum offers mini project in selected courses during the 2nd/ 3rd year, which motivates the student to explore problems and challenges beyond the prescribed study material.
- After their foray into mini projects in the junior classes, the students are exposed to project based courses, thereby encouraging independent thinking. The component of self-learning is evaluated in these courses. This experience is further enhanced during the Final Year student projects.
- Student are given assignments, (up to 5% weightage) beyond the scope of the syllabus to encourage to develop their self-learning capabilities.
- Encouragement is given for conduct of research oriented projects in the senior semesters. Students possessing a CGPA above 8.0, and aspiring for a Distinction grade, are required to have a publication in a Scopus Indexed journal.

9.5. Career Guidance, Training, Placement (10)

Corporate and Industry Relations

The Directorate of Corporate and Industrial Relation (CIR) is a unique setup, among the educational institutions in India, primarily for the career development of students. Its mission statement clearly set the direction and activities in this endeavour.

CIR's mission

“To facilitate holistic career development of students through comprehensive and systematic training on Life Skills and build competence in core areas through innovative practical applications”

CIR's functions are organised under eight units namely, Career Counselling, Career Competency Development, Higher Learning Initiatives, Entrepreneurship Development, Corporate Relations, Placement, Marketing Communication, and Corporate Training. Each of these units works in collaboration with the other units of CIR and also with the various departments of the university. Each of these units has its team in all the campuses with the heads located in the Coimbatore campus.

CIR is well equipped with faculties, staff, infrastructure etc. for its effective functioning. The total strength of CIR stands at 92 with the breakup of 47 in Coimbatore, 23 in Amritapuri, 16 in Bangalore, 5 in Kochi and 1 in Mysore. It has its own independent offices in all the campuses. CIR's infrastructure facilities include Auditoriums, Conference Halls, Interview rooms and Class rooms. The Coimbatore CIR unit has a total floor area of 55,541 sq. ft.

Career Counselling

In Career Counselling students' career aspirations are captured from an early stage, while they are in the campus for their UG or PG programs. Each student is provided with a Career Planning workbook, as early as third semester for B Tech, Arts and Sciences (ASAS) UG, and Integrated MSc/MA programs and first semester for M Tech and Management programs to systematically plan and execute their short-term and long-term goals. It starts with capturing the personal aspirations of students and culminating with goal setting and job acquisition. To guide students in this, each student is assigned to a mentor, who is a CIR faculty.

Career counselling is a process in which a counsellor and counselee(s) are in a dynamic and collaborative relationship, focused on identifying and acting on the counselee's goals, in which the counsellor employs a repertoire of diverse techniques and processes, to help bring about self-understanding, understanding of behavioural options available, and informed decision-making in the counselee, who has the responsibility for his or her own actions.

Career counselling basically consists of four elements:

1. Self-awareness

When individuals are considering career options, it is useful to assist them in attaining greater self-awareness by asking about their aspirations, interests, values, and skills in order that they might better understand which jobs are suited to them and which ones are not a good match.

2. Job market information

Students get job market information primarily through CIR. The Placement unit of CIR has details like job profiles, recruitment process, and remuneration etc. of multiple companies from the recruitment processes carried out during previous years. Students interact with the Placement unit and get the details of interest. They also get job details from the CIR faculty whom they interact with for career counseling. Students also get information on job market from social media, company websites, magazines, books and newspapers. They are encouraged to read newspapers to enrich their knowledge on job markets. They attend presentation and talks by companies, which is a good source for job market information.

3. Decision-making/ setting goals

In making a decision about the kind of work to pursue, it is important to integrate self-awareness with job market information to arrive at the best fit for the person. It is often useful to engage in a discussion and weigh the pros and cons of the various choices. Setting both short term and long-term goals is also a useful activity for students to engage in.

4. Job search

Individuals may need assistance with job search strategies such as writing a résumé and cover letter, mastering presentation skills, group discussion skills, interview skills etc.

In the Table B.9.5a below, please find the number of student's undergone career counselling in the last four academic years.

Table B.9.5a Number of students undergone career counselling

Academic Year	Description of counselling Activities	Number of students benefited	Remarks
2014 - 15	One to one counselling	983	Personal File for each student
2015 - 16	One to one counselling	1141	Personal File for each student
2016 - 17	Counselling for poor performers	151	Special training for weak students.
2017 - 18	Career Planning Guide and counselling	1101	Career Planning Guide for each student

Career Competency Development

The Career Competency Development unit has the responsibility of building foundation in students for successful career and making them industry ready as they complete their studies at the institute. Towards this it conducts multiple activities and life skills training is primary among them. CIR is equipped with well qualified and experienced in-house faculties for this training. It researches into emerging industry scenarios and arranges training by industry experts and distinguished academicians in such areas. It conducts training in foreign languages, organizes coaching classes for competitive examinations like GRE, CAT, GATE etc. within the campus premises. It conducts mock interview for all the pre-final year students during their sixth semester. It conducts pre-placement training before the commencement of the placement season. It conducts company specific training ahead of the placement process by respective companies.

Life Skills

Life skills defined as “abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life”, include skills and knowledge related to problem solving, critical thinking, communication, interpersonal aspects and self-management. This skill set is one of the essential ingredients for career advancement irrespective of career lines.

The objective of life skills training is to enhance and sharpen the problem solving, communication and interpersonal skills of students. It is intended to support the academic curriculum to fully prepare the job aspirants to be industry ready. Life skills education aims to provide students with strategies to make healthy choices that contribute to a meaningful life. More specifically the following are achieved.

- Introduction to the concepts, development and enhancement of life skills to equip the students to be effective in her/his personal and professional life.
- Enablement for campus to corporate transition by helping students to understand and acquire the knowledge, skills and attitudes which are required for successful transition.

By the end of the life skills training, the student would have a clear life goal and the confidence and strategy to move towards the same. The achievement of this outcome will largely depend on the motivation level and intellectual commitment the student possesses.

Life skills is grouped under three broad categories namely Soft Skill, Verbal Skill and Aptitude Skill. A brief description of each of these is provided below:

Soft Skill

Interpersonal skill plays a crucial role in the career and personal life of an individual. For example, the skill to effectively deal with the various stakeholders in a large program is very much required for the successful completion of that program. In the personal life too, effectively associating with the other members of the family is very crucial for successful personal life. Soft skill courses help the students to develop this skill set through continuous practice in activities like group discussion, presentation, role play etc.

Verbal Skill

The ability to communicate effectively with others is of greater importance to achieve personal and organizational goals. Learning to communicate better is a survival need in this era of technological advancements. Verbal skill courses provide students with ample learning opportunities to improve their ability to communicate effectively. It make them learners for life and also enable them to take up the verbal tests conducted by the recruiters with a lot of confidence.

Aptitude Skill

Aptitude is the ability to learn or to develop proficiency in an area, if provided with appropriate education or training. Aptitude is a component of a competency to do a certain kind of work at a certain level. A test is a systematic procedure for comparing people's performance, knowledge, attitudes, skills, or competence. This course is intended to support students to become familiar and proficient with the latest trends in aptitude testing conducted by companies during their recruitment process.

Course Structure

CIR conducts life skill courses for the undergraduate (UG) and postgraduate (PG) students as part of the academic program in the university. In B Tech the life skill courses are offered over a period of four semesters, while in M Tech the life skill courses are offered over a period of two semesters. In the case of all ASAS UG programs, the life skill courses are offered over a period of three semesters. In all the programs, the life skill courses are structured in such a way that all courses are completed by the end of pre final year before the commencement of the campus placement process. They are credit based courses in almost all the programs.

In the Table B.9.1b below, please find the number of student's undergone career counselling in the last four academic years.

Table B.9.5b Students undergone career counselling in the last four academic years.

Academic Year	Course Name	Course code	Number of students Benefited	Remarks
2014 - 15	Life Skills	SSK111	1151	B Tech 3 rd , 4 th , 5 th and 6 th semesters
		SSK112	1011	
		SSK113	983	
2015 - 16	Life Skills	SSK111	981	B Tech 3 rd , 4 th , 5 th and 6 th semesters
		SSK112	1140	
		SSK113	1141	
2016 - 17	Life Skills	15SSK221	995	B Tech 3 rd , 4 th , 5 th and 6 th semesters
		SSK112	988	
		SSK113	982	
2017 - 18	Life Skills	15SSK221	1101	B Tech 3 rd , 4 th , 5 th and 6 th

Academic Year	Course Name	Course code	Number of students Benefited	Remarks
		15SSK321	992	semesters
		15SSK331	994	

Core Competency

In core competency development, the focus is on engineering students. Developing core competency is challenging due to the multiplicity of the disciplines and the dynamic nature of the industry requirements. Our strategy here is to adopt a multi-pronged approach consisting of the following:

- Guest Lectures
- Certification Programs
- Technical Sessions
- Special Classes for Performing Students
- Industry Internship
- Industry Electives

Guest Lectures

CIR organizes guest lectures for the students and faculty in all the engineering disciplines. CIR through its industry contacts identifies experts in various fields of engineering and invites them to the University for Interaction with the department faculty and addressing the students. In such programs the visiting experts present industry scenarios, industry problems, challenges and ways to overcome through actual examples from projects. This provides a great opportunity for the students to realistically expand their knowledge, clarify doubts and make plans for developing competency required by industry. This also helps the faculty to understand the industry scenarios and bring-in the industry outlook in their teaching. Guest Lectures are organized throughout the year covering all engineering disciplines.

In the Table B.9.5c below, please find the summary of the guest lectures organized during the last four academic years.

Table B.9.5c Guest lectures organized during the last four academic years.

Academic Year	No. of Guest Lectures conducted								
	AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE	Total
2014 - 15	5	4	4	5	5	4	4	5	36
2015 - 16	4	4	5	4	4	4	3	7	35
2016 - 17	2	3	5	7	5	6	3	9	40
2017 - 18	2	4	2	4	4	4	4	2	26

Certification Programs

CIR facilitates certifications in languages and industry-demand technologies, in the technology area, CIR through their research and with the inputs from industry, identifies certain certification programs. Subsequently through a registration process interested students are identified and CIR *conducts training for these students. Through a series of tests, potential students who can clear* the certification examination are identified and generally a good percentage of them get certified. CIR makes sure that the certification examinations are conducted by the respective agencies in the campus and well in time.

In the Table B.9.5d below, please find the summary of the certification programs conducted during the last four academic years.

Table B.9.5d Certification programs conducted during the last four academic years.

Academic Year	Certification Program	Category	Number of students Attended
2014 - 2015	BEC	English Language	5
2015 - 2016	BEC	English Language	4
2016 - 2017	BEC	English Language	17
	NI – CLAD Certification	Technology	15
2017 - 2018	BEC	English Language	42
	NI – CLAD Certification	Technology	61
	Autodesk – Revit Certification	Technology	49

Technical Sessions

CIR conducts technical sessions for the pre final year students of all engineering disciplines in both B Tech and M Tech streams. These are conducted during the sixth / second semester for the B Tech / M Tech students. During this period, CIR conducts classes in programming languages.

In Table B.9.5e below, please find the summary of the technical sessions conducted during the last four academic years for the B. Tech. students.

Table B.9.5e Technical sessions conducted during the last four academic years

Academic Year	Number of Technical Sessions conducted for sixth semester students							
	AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE
2014 - 15	8	11	12	11	9	10	8	11
2015 - 16	13	12	11	13	12	13	14	12
2016 - 17	11	11	13	11	11	12	12	12
2017 - 18	9	10	11	11	12	11	9	14

Special classes for top performing students

CIR also conducts special sessions for high profile students to prepare them for high profile jobs. Right now, such trainings are conducted for computer science students to build and enhance their skills in problem solving, which is sought by many of the top paying software companies. In this program, CIR organizes special sessions by distinguished academicians and continuous sessions by internal faculties from the department and CIR.

In the Table B.9.5f below, please find the summary of the special classes conducted during the last four academic years.

Table B.9.5f Special classes conducted during the last four academic years.

Academic Year	Program	Number of hours engaged	Number of students participated	External/Internal trainer
2015 - 16	Problem Solving and Coding Session	30	101	Internal (Dr. Vidhya B / Ardra P S)
	Interactive Sessions on Problem Solving and Algorithms	12	114	External (Prof. Pandu Rangan Chandrasekharan, IIT Madras)
2016 - 17	Problem Solving and Coding Session	12	75	Internal (Dr. Vidhya B / Ardra P S)
	Interactive Sessions on Problem Solving and Algorithms	12	70	External (Prof. Pandu Rangan Chandrasekharan, IIT Madras)
2017 - 18	Problem Solving and Coding Session	25	95	Internal (Dr. Vidhya B / Ardra P S)
	Interactive Sessions on Problem Solving and Algorithms	12		External (Prof. Pandu Rangan Chandrasekharan, IIT Madras)

Industry internship

Industry training is an integral component for core competency building and students typically go for this training during the summer and winter vacations. There are three categories of training under this namely in-plant training, summer internship and internship as part of the employment offer.

In-plant training is done during the summer vacation following the end of second year and before beginning of third year. CIR supports students in this activity. Internship is organized during the summer vacation following the end of third year and before the beginning of the final year. Students apply for such internship programs with the selection based on academic records, tests, and interviews. Summer vacation internships are for a period of one to one and half months and most of the companies pay stipend during this training program. CIR supports students in this activity.

In internship as part of the placement offer organizations give training, want the students to do project over one or two semesters and evaluate them at the end of the training leading to confirmation of placement. These internships are paid and typically done over a period of one semester for B Tech students and two semesters for M Tech students. Students submit a report at the end of internship program and based on overall performance they are given full time employment.

In the Table B.9.5g below, please find the number of students got placement internships during the last four academic years.

Table B.9.5g Students got placement internships during the last four academic years.

Academic Year	No. of Interns
2014 - 2015	117
2015 - 2016	138
2016 - 2017	184
2017 - 2018	187

Foreign Languages

CIR is very proactive when it comes to providing foreign language learning opportunities to students. It has been conducting foreign language classes in three important languages namely: German, Spanish, and French.

Since 2003, extra-curricular German language classes are offered to students and young staff-members at Amrita vishwa vidyapeetham, Coimbatore, by a German native teacher. The courses (mostly basic A1-level, sometimes also A2-level) last for two semesters and end with an examination through the Goethe-Institut, Chennai, and Coimbatore. Mostly the examiners come to the Coimbatore Campus to conduct the examination. Each academic year almost all students who had registered for the exam, had successfully completed with grades “very good”, “good”, or “satisfactory”.

We have been conducting foreign language training and certification programs in Spanish and French too. In the Table B.9.5 (h) below, please find the summary of the German, French and Spanish classes during the last four academic years.

Table B.9.5h Summary of the German, French and Spanish classes during the last four academic years.

Academic Year	Foreign Language	Number of students Attended
2014 - 2015	German	64
	French	28
2015 - 2016	German	43
	Spanish	52
2016 - 2017	German	70
	Spanish	25
2017 - 2018	German	66

Higher Learning Initiatives

CIR facilitates higher learning of students, who plan to pursue MBA, M Tech or MS programs in the country or abroad. A sizeable number of students pursuing the B Tech program in the university have plans to go for management education in well-known institutes in the country and abroad. This primarily requires a good score (percentile) in the qualification examination like CAT, GMAT etc. CIR identifies external institutes who conduct such training programs and selects the best through a process of evaluation, discussions and negotiations.

There are many students from the engineering discipline who have plan to pursue their MS programs in universities abroad or M Tech / ME programs within the country. The students who plan to do their MS in universities abroad, necessarily requires a good score / percentile in GRE and TOEFL for the US universities and IELTS and country specific examination for the European universities. CIR identifies external institute, who can provide a such training and selects the best through evaluation, discussion and negotiation. For the benefit of students who plan to join Indian Public Sector Undertakings or go for engineering post graduate studies with in India, CIR brings in the best institute who can prepare them for GATE.

The selected institutes conduct the training classes in CIR premises during evening hours after the regular classes. These training classes are monitored for the quality of faculty, number of training hours and timing of the classes.

CAT

Amrita students are offered special training for CAT (Common Admission Test). Experts from external training institutes conduct training at CIR premises twice or thrice a week. Approximately 200 hours of rigorous training and several online mock tests containing different levels of questions make the students capable of scoring well in CAT. Scholarship is offered to select students based on the performance in the test conducted.

GRE

CIR facilitates training for GRE aspirants through well-established external institutes. Exhaustive classroom training of 90 hours include areas like quantitative aptitude, verbal aptitude and analytical reasoning, and analytical writing etc. They provide study materials as well as around 25 hours for previous year test paper

discussion. Online mock tests are also conducted on a regular basis. The classes are conducted weekly twice or thrice in the evening at CIR premises

GATE

CIR organizes special training for GATE (Graduate Aptitude Test in Engineering) aspirants. Experts from external institutes come to Amrita and provide exclusive training for our students. 350-400 hours of rigorous training includes approximately 250 hours of classroom training on core engineering subjects, engineering mathematics and general aptitude and more than 100 hours of periodic tests. Online tests help the students to analyze their performance and improve their test taking strategy. Students of small batches are formed according to their branch and classes are conducted separately during evening hours at CIR premises.

In the Table B.9.5i below, please find the summary of the competitive examination training during the last four academic years.

Table B.9.5i Competitive examination training during the last four academic years.

Academic Year	Competitive Exam training	Number of students attended
2014 - 15	GRE	33
	CAT	51
	GATE	57
2015 - 16	GRE	36
	CAT	57
	GATE	59
2016 - 17	GRE	47
	CAT	41
	GATE	53
2017 - 18	GRE	53

Academic Year	Competitive Exam training	Number of students attended
	CAT	51
	GATE	41

Placement specific Interviews and Training

Mock Interviews

CIR conducts mock interviews for all the pre final year B Tech students during the 6th semester. The mock interviews are conducted by a panel consisting of an industry expert and head of the UG team. Students are called as per a schedule and interviews are conducted and feedback is given. The following Table B.9.5j lists the mock interviews conducted during the last 4 academic years.

Table B.9.5j Mock interviews conducted during the last 4 academic years

Academic Year	Students attended Mock Interview Branch wise							
	AEE	CHE	CIE	CSE	ECE	EEE	EIE	MEE
2014 - 15	57	43	53	281	182	115	56	196
2015 - 16	69	60	67	351	199	129	61	207
2016 - 17	56	65	55	291	173	106	59	177
2017 - 18	48	60	63	284	182	108	64	185

Pre Placement Training

CIR conducts pre-placement training for all branches of engineering during the summer vacation between pre-final year and final year with the focus on life skills and technical skills. The pre-placement training is full day program for two to three weeks and typically three hours per day is allotted for technical training. This training is provided to both B Tech and M Tech students. Technical trainings are conducted by CIR technical faculty, invited industry experts and department faculty.

In the Table B.9.5k below, please find the summary of the pre placement training during the last four academic years.

Table B.9.5k Pre placement training during the last four academic years

Academic Year	Average Number of session taken during Pre placement training
2014 - 15	33
2015 - 16	33
2016 - 17	34
2017 - 18	47

Company Specific Training

In addition to the pre placement training, CIR conducts company specific training one or two days in advance of the placement process by respective companies. In these training an overview of the company, job profiles and previous years' questions are discussed.

In the Table B.9.5l below, please find the summary of the pre placement training during the last four academic years.

Table B.9.5l Company specific training conducted during the last four academic years

Academic Year	No. of Trainings
2015 - 16	42
2016 - 17	38
2017 - 18	86

Special Training for Underperforming Students

CIR conducts special sessions for students who are not able to secure a job during the June to Dec period of the recruitment process. The recruitment process generally starts in June and continues till June next year. Such

students are identified and given supportive training in their weak areas. Generally, such trainings are in aptitude skill, verbal skill and technical subjects. These trainings are conducted during the winter vacation in between the 7th and 8th semesters. There are cases where students are given additional coaching, on one to one basis, to face technical and HR interviews.

Corporate Relations

The Corporate Relations unit is the primary nodal point for bringing industry to Amrita. It meets with industries across the country and abroad and presents Amrita's credentials and brings them to the university. It is instrumental in signing Memorandum of Understanding with industry for funded research projects, setting up labs, funded student projects, conducting workshops in emerging technologies, guest lectures, internships, in-plant trainings, faculty development programs etc. It helps to bring in industry experts as part of the committee for curriculum development.

It has the following objectives:

- Build and maintaining good rapport with various industries for the benefit of faculty and students.
- Sign Memoranda of Understanding with major companies, research agencies and institutions to provide opportunities for the faculty and students to work on latest technologies.
- Expose students and faculty to industry practices and developments in technology.
- Facilitate visits by senior industry leaders for interaction with faculty and students.
- Organize guest lectures, seminars and webinars conducted by industry for the benefit of students.
- Secure sponsorships from industry for technical events like conferences, seminars, symposia, workshops and student contests through strategic relationships.
- Setting up labs along with industry
- Mentoring for students by industry leaders for promoting entrepreneurship
- Seek the help of companies to spare working products / prototypes for academic demonstration purposes.
- Facilitate in-plant training, industry visits, summer and final semester internship for students across all disciplines and campuses.

- Undertake consultancy and sponsored research in consonance with the expertise available in the university.
- Promoting Management / Executive Development Programmes
- Soliciting support from reputed companies each year for the Corporate Action Plan with respect to engineering, management, biotechnology and other disciplines.
- Initiate appropriate measures to support Heads of Placement of Engineering, Management and other disciplines so as to improve the quality and range of placements that match the aspiration levels of students and enhance the image of the university.
- Representing / participating in events conducted by industry / other institutions

During the last four academic years it has signed MoUs with industries and the following is a summary list

Table B.9.5m MoUs with industries during the last four academic years

Academic Year	No. of MOUs Signed / Renewed
2014 - 15	18
2015 - 16	9
2016 - 17	6
2017 - 18	14

Industry Electives

CIR facilitates to bring in top in demand industry topics, especially in emerging technologies, to the university curriculum to be offered as elective or core courses. This helps a lot in making the students more in line with the industry by the time they pass out of the university. This is done under the umbrella of the Memorandum of Understanding signed between the industry and the university. When a new course is suggested to be introduced by the industry, CIR gets the curricula reviewed by the department and works with the department in completing all the internal formalities in introducing the course as an elective or as a core. Subsequently the industry trains the faculty through multiple training sessions and the trained faculty in turn teach the students. This has got two benefits of faculty getting trained in latest technologies by industry who in turn teach a large number of students.

In the Table B.9.5n below, please find the summary of the industry electives during the last four academic years.

Table B.9.5n Industry electives during the last four academic years

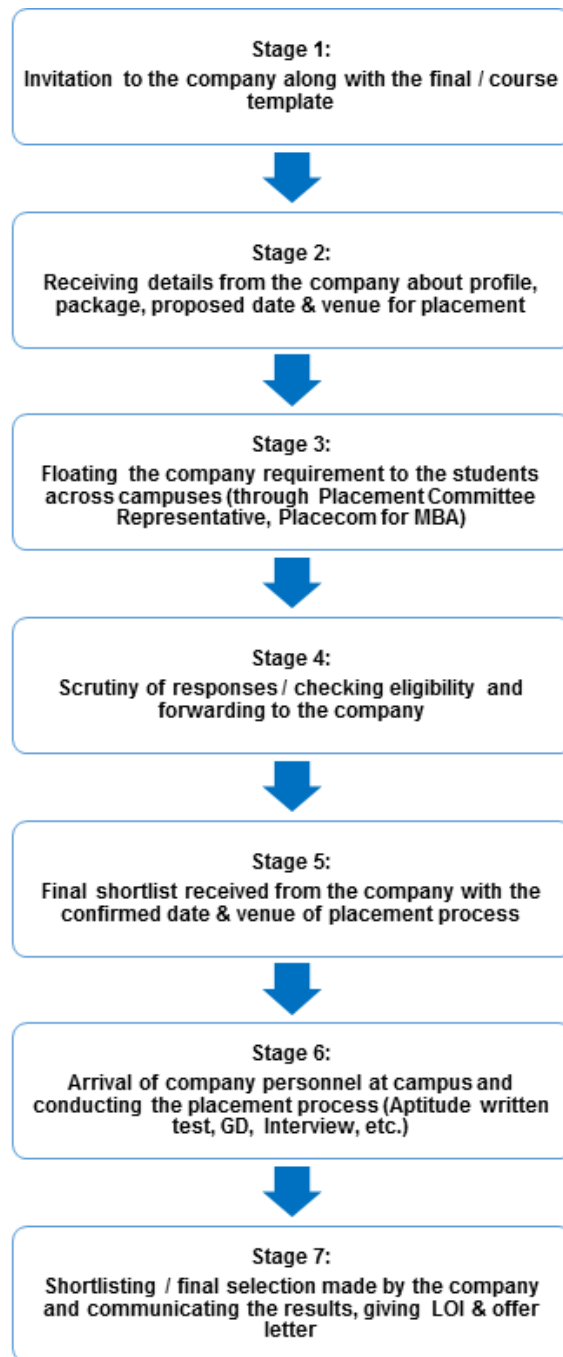
Academic Year	Industry Elective executed	Course Code	Department which offered the Electives	Number of students Completed the course
2014 – 15	IT Essentials	CSE 380	CSE	363
	Business Intelligence	CSE 457	CSE	198
2015 – 16	IT Essentials	CSE 380	CSE	223
	Big Data Analytics	CSE459	CSE	162
2016 – 17	IT Essentials	CSE 380	CSE	324
	Big Data Analytics	CSE459	CSE	106
2017 – 18	Foundations of IT	15CSE377	CSE	227
	Big Data Analytics	CSE459	CSE	285

Placement

The Placement unit does an important role and ensures that all eligible students are placed and continuously strives to raise the bar on the average salary and the highest salary year on year. Along with the Corporate Relations unit, it connects with industries across the country and arranges placement talks and conducts placement process. Year on year, it succeeds in increasing the number of industries visiting Amrita. It is our earnest endeavor to see that the students are placed in jobs as per their career aspiration. Major global corporations regularly visit Amrita to meet its talent requirements. At the end of each placement process, feedback is collected from the officials of the recruiting companies, which is a valuable input to bring in improvements in the career competency development programs.

The stages involved in the placement process is depicted in the diagram below. It consists of 7 stages as described in the diagram

Figure B.9.5a Stages involved in the placement process



The summary of the placement statistics during the last 3 years is shown below Table B.9.5o

Table B.9.5o Placement statistics during the last 3 years

	2018 Batch			2017 Batch			2016 Batch		
	Regd. Eligible	Placed	%	Regd. Eligible	Placed	%	Regd. Eligible	Placed	%
B.Tech.									
CSE	219	218	99.54	275	272	98.91	244	237	97.13
ECE	125	123	98.40	152	150	98.68	152	150	98.68
EEE	58	56	96.55	78	74	94.87	93	92	98.92
EIE	41	41	100.00	41	37	90.24	50	49	98.00
Mech.	82	80	97.56	147	131	89.12	163	159	97.55
Chemical	28	19	67.86	35	26	74.29	38	35	92.11
Aerospace	23	20	86.96	36	31	86.11	43	40	93.02
Civil	16	9	56.25	32	30	93.75	35	35	100.00
Total	592	566	95.61	796	751	94.35	818	797	97.43
%	95.61			94.35			97.43		
Average Salary	4.8			4.5			4.2		
No. of companies visited	108			98			89		

9.6. Entrepreneurship Cell (5)

Amrita Centre for Entrepreneurship (ACE) - Expanding the Power of Choice

The Facility at ACE

ACE has its own separate mentoring desk, library, laboratory, and workshop facility. The mentoring in terms of career options and nurturing startup ideas is provided here. As students get a wide range of courses and programmes to choose from while entering the university, likewise they have a set of choices even before graduating successfully from Amrita. According to Prof. C. Parameswaran, Director - CIR, "The Directorate of Corporate & Industry Relations of the University facilitates students with three options – Placements, Higher Studies and Entrepreneurship". Thus, one of the options for students passing out of Amrita who have the urge to start something is to become an entrepreneur. To nurture the entrepreneurial spirit among youngsters who dare to innovate and initiate, Amrita Centre for Entrepreneurship (ACE) was established by CIR in June, 2011.

The ACE library has its own collection of books and other entrepreneurship-related materials.

There is a laboratory for students interested in building circuits. A workshop with facilities like lathe machine, drilling and welding equipment is also available.

Management of ACE:

ACE operates with the support of Director, CIR and his office. Effectively it is a two member team comprising Mr. R. Krishnan (Head) and Mr. D. Sakthivel (Coordinator). Its activities include:-

- Managing ACE Membership
- Organising entrepreneurship-focused programmes (own as well as funded)
- Mentoring budding entrepreneurs
- Creating and nurturing the entrepreneurship ecosystem

ACE activities draw their direction from the objectives– creating a culture and an ecosystem for infusing entrepreneurial spirit. Its objectives include the following:

- Design, develop and execute high impact entrepreneurship programmes and create opportunities for Amrita students at local and national levels. The programmes would include talks, games and exercises, short courses, events, mentoring, incubation and networking.
- Form student clubs in each campus to promote entrepreneurship.
- Create a powerful 'ACE Community' by bringing in institutional members, hiring / seeking support from faculty, mentors and experts, besides identifying student leaders to form Entrepreneurship Clubs.
- Develop the capacity of ACE to run a mature set of entrepreneurship development programmes within 5 years. The capacity building services covering Consulting, Faculty Development, leadership development, Creation of a pool of volunteers to participate in ACE programmes and setting up E-Clubs.

In the words of Prof. C. Parameswaran, Director-CIR, "The ACE charter has as its aim to provide an eco-system that will kindle, nurture and support the innate desire and ideas lying dormant in the individual and create avenues to fructify those ideas into meaningful enterprises".

Thus, the ACE roadmap for entrepreneurship development, which has these stages:

The first stage has been to sensitize and promote entrepreneurship. This included entrepreneurship awareness campaigns using posters, membership drive through induction programmes, conducting seminars, workshops & interactive sessions, idea generation & business plan competitions and calling alumni entrepreneurs to ACE.

The second stage has been to create and foster entrepreneurship. This is done as follows:

- Hands-on work on innovative project ideas;
- Mentorship (by ACE, alumni, other entrepreneurs & CODISSIA);
- Entrepreneurship Awareness Camps (EAC) with EDI, through DST-NIMAT funding;
- EDP with EDI, through DST-NIMAT funding (for alumni in industry); and
- FDP with EDI, through DST-NIMAT funding (for alumni in academia).

The third stage is to nurture entrepreneurship. This is done by providing business incubation facility (like TBI, STEP) and arranging funds (linking corporate funding, investors, angel network, VCs).

The fourth stage is to recognize and celebrate entrepreneurship. This is done by rewarding entrepreneurs (alumni award) and obtaining sponsorship. The fifth stage is institutionalizing the movement. This happens through the introduction of courses in Entrepreneurship, publication of case studies, provision for incubating, VC funding, etc.

Based on the roadmap, ACE has been progressing in the following manner:

- Conducting programmes with funding from Department of Science & Technology (DST)'s NSTEDB, routed by Entrepreneurship Development Institute of India (EDII), Ahmedabad. On an average, one programme per year, of the following three types:
 - 3-day Entrepreneurship Awareness Camps (EACs)
 - 2-week Faculty Development Programme (FDP) on Entrepreneurship
 - 1-month Entrepreneurship Development Programme (EDP)
- Mentoring inputs along with alumni & associations like CODISSIA, TiE, ICTACT, etc.
- Arranging for certificate courses with the help of external experts
- Conducting competitions - Business Plans, Business Quiz, Best Technical Idea
- Expanding membership base and issuing E-Club membership cards
- Providing library, laboratory and workshop facilities for ACE members
- Organising talks, seminars, workshops etc. regularly and during tech-fest, Anokha
- Conducting club induction programmes for interested freshmen
- Identifying opportunities and working collaboratively with incubators for mature ideas requiring fund support

EFFECTIVENESS OF ACE IN ENHANCING ENTREPRENEURSHIP

- ACE has achieved the following results till the end of December 2018:
 - Obtained a funding of over Rs. 19 lakhs for promoting entrepreneurship
 - Acquired a membership base of over 1000 students and alumni
 - Successfully conducted 7 Entrepreneurship Awareness Camps (EACs)
 - Effectively organized 4 Faculty Development Programmes (FDPs) on Entrepreneurship

- Smoothly executed 3 Entrepreneurship Development Programmes (EDPs)
- Has been regularly providing mentoring to budding entrepreneurs
- Constantly provided exposure and motivation to ACE members to follow their passion.
- Some of the main reasons for success at ACE include:
 - ACE began with 3-day EACs to gain confidence, competence and contacts in the entrepreneurship ecosystem. Once the network was established through the initial 3 years' activities, then moving on to conduct programmes of longer duration like FDP (2-weeks) and EDP (4 weeks).
 - ACE has been taking the support of the Director who appreciates the importance of entrepreneurship and encourages students to take this route
 - Some of the best entrepreneurs have been coming to ACE to inspire participants
 - ACE regularly brings alumni entrepreneurs to the forum to get a better connect
 - ACE organises industry visits in EACs for a lasting impact on budding entrepreneurs
 - ACE does networking through membership bodies like ICTACT, TiE and CODISSIA
 - ACE conducts competitions like the Product Design Award, with cash prizes

SUCCESS STORIES FOR EACH OF THE ASSESSMENT YEARS TO BE MENTIONED (PERIOD 2014-2018)

2014-15

Success of ACE Members

- 175 students registered for the Entrepreneurship Awareness Camp (EAC) with funding from NSTEDB, Department of Science & Technology (DST), Govt. of India, routed via EDI India, Ahmedabad.
- In a pilot Certification Programme on Breakthrough Innovation by University of California, Berkeley Extension and Intel partner, FICE, 25 March – 6 May, 2014, out of 27 participating teams from 21 colleges, the top 2 teams selected by Dr. John Danner and Dr. Mark Coppersmith in the Top 10, were from ACE, Amrita.
- Mr. Karthik Srinath, is an alumnus of Amrita Coimbatore, who completed his B.Tech. - Mechanical Engineering, from the batch of 2011-2015. He had been an active member of ACE in the Quadra Cycle

Project, where he gained the confidence to do everything. His impressive story is about how he gained in confidence and successfully overcame several challenges through grit and determination, coupled with hard work. Mr. Karthik is the founder of three firms, with a total project cost of the order of 3 crores.: (1) GREEN FIBERS, which is into coir fibre manufacturing, (2) GREEN PITH PRODUCTS, which is into coir pith block manufacturing, and (3) ANNAMALAI ORGANIC FOOD PRODUCTS, which is into oil manufacturing.

- Mr. N. Karthikkeyan, is another Amrita alumnus who completed his B.Tech. (Mechanical Engineering) from 2011 - 2015 batch, before enrolling for his MBA (Marketing) at PSG Institute of Management. He is the Founder of Scribble3D, which is into gifting, e-commerce and 3D Printing technology. He has also started Iyal Vanigam, which is into Organic Food retail. He has also partnered with Kodesam to provide a farm experience to students and corporates.
- Mr. Hari Nagendiran, who passed out of ASB in 2014, and the Managing Director of Chocolate Teddies, started promoting his company and taking it to the next level.

2015-16

Success of ACE Members

- 80 students registered for the Entrepreneurship Awareness Camp (EAC) with funding from NSTEDB, Department of Science & Technology (DST), Govt. of India, routed via EDI India, Ahmedabad.
- All 16 participants who attended the FDP on Entrepreneurship, gave positive feedback.
- Out of 27 participants who attended the EDP under EDII-DST-NIMAT Project, 8 started their ventures successfully.

Success stories of EDP participants – Names & Ventures

K. Vasantha Kokilam, Candlefire Development Academy, 168, DPF Street, Lakshmi Mills, CBE
Subi Prabhakaran, Cake Dew, Puthuvalil House, Chathannoor, Kollam 691572 Kerala
M S Sooraj Subramanian, Earlang Dreams, 97, Chokalingam Pillai Street, Nataraja Nagar, Madurai

Hariharan S, Nuthukku Muttai , Sri Krishna College, Palakkad Main Rd. Kuniamuthur, CBE
R. Kumaresu, The Shake Studio , Sri Krishna College, Palakkad Main Rd., Kuniamuthur, CBE
P.Amuthan, Amuthan Trading , 29A,Durai Samy Layout, Peelamedu, CBE
Alagappan Manickam, ALST & Co. , Ranga Konar St, Anupperpalayam, Ram Nagar, CBE
Anil Subahar, Shape recruiters , No.19, Malaya St., Vasantham Nagar, Kovaipudur Pirivu, CBE

2016-17

Success of ACE Members

- 75 students registered for the Entrepreneurship Awareness Camp (EAC) with funding from NSTEDB, Department of Science & Technology (DST), Govt. of India, routed via EDI India, Ahmedabad.
- ACE Product Design Award Contest was conducted on 14th October, 2016 and the results were declared on 24th October, 2016 and the prize winners were awarded cash prizes as per the details given below:
 - 1st Prize : Ikram Shah V., S. P. Harish & Guru Prasath: Agriculture-related solution to clear wild plants grown in fields,
 - 2nd Prize : Anudeep K., Nandika V., Meghavarshini V., Ganesh V. & Abhijith Vivek: Making a cost effective and energy efficient solar cooker
 - 3rd Prize : P. Santhosh: Automation of water pump using Microcontroller: household & industrial use
- Four students from ECE Department of Amrita School of Engineering, three of whom were ACE members, had secured Runner-Up position in the Bosch Makeathon. The event had happened on 18th, 19th and 20th November, 2016 at Nasscom 10000 Startups, Bangalore. The team members are: Ikram Shah V, Karthikeyan S., Subhash Chandran S. and Adithya Bharadwaj U.
- All 20 participants who attended the FDP on Entrepreneurship, gave positive feedback.

- Out of 25 participants who attended the EDP under EDII-DST-NIMAT Project, 7 started their ventures successfully.

Success stories of EDP participants – Names & Ventures

Mr. Prasanna Balaji, Coral Textiles , 293/1A, Mullai Nagar, Iduvampalayam road, Periyandipalayam, Tirupur
Mr. Sushil Sivanesh E, Impresso Gifts as a new venture under Impresso 3D , MIG B 190, Brindhavan Nagar 3rd Cross, SITRA, Coimbatore, Poonga Nagar, Civil Aerodrome Post, Peelamedu, CBE
Mr. Surya Narayanan.P, Sportico 40 Sakthi Green Land, Thiruvalluvar Street, Vellakinar Pirivu, GN Mills (PO), CBE
Mr. Sathish Kumar.P, SKV Paper Product , Lalitha ammal Thottam, Vellamadai PO, Kalipalayam, CBE
Mr. Rajan R, Chellam Canteen , 126, ponnaiya Raja puram 4th street, CBE
Mr. K.S. Mohan Kumar, Latlon Technologies Pvt. Ltd , Kathir IT Park, Neelambur, CBE
Mr. M. Thirunavukrasu, Agri fly , Iswaraya Apartment, Veeranam Road, Kelampakkam, Chennai

2017-18

Success of ACE Members

- 82 students registered for the Entrepreneurship Awareness Camp (EAC) with funding from NSTEDB, Department of Science & Technology (DST), Govt. of India, routed via EDI India, Ahmedabad.
- Abhijeet Singh, CEO, BookBecho.com, won the award for Best Business Idea and also for bagged the Second Prize as Student Innovator in the Regional Startup Activation Program (RSAP 2017) conducted by Forge Accelerator along with Entrepreneurship Development & Innovation Institute - Tamil Nadu (EDII-TN). S. Karthikeyan's start-up idea was selected in the top 24 and also announced as a special mention by RSAP. The students were felicitated on 26 April, 2017.

- ACE member, Ms. Vamanie Perumal, was awarded the Suyasakthi Viruthugal, Homepreneur Awards – category of Education and Literature, the one of a kind initiative by Brand Avatar to acknowledge women entrepreneurs who make societal impact. The event was telecasted on News 7 Tamil channel on Independence Day 2017.
- ACE members, Ikram Shah and Vamanie Perumal were successful in making it to the NEXT 12 'Ideas WORTH PROTOTYPING' selected by EDII-TN & FORGE. They were awarded a cash prize of Rs. 25,000 each as a recognition of their efforts and to help them meet the expenses of furthering the outcomes in creating prototypes for their solutions. The jury hunted down Top 18 Ideas from among the 700 innovative ideas provided by the students of Tamil Nadu. After subsequent rounds of mentoring, screening, and competitive selection, the Top 36 ideas were shortlisted for the 3-day residential Boot Camp at FORGE.FACTORY. After rigorous process of selection the Top 18 ideas pitched to a jury of top experts, investors, and entrepreneurs on the Demo Day (4th day) organised on the 3rd December, 2017.
- In the Innovative Project Contest 2K18, organized for generating novel product-development / service-related ideas through student presentations made at two-levels. Totally 18 teams (20 Projects) applied in the first level presentation on 16th March, 2018. Top three projects were selected based on uniqueness of the project, technical details, market potential & profitability, fund position and timeline & resources to build and demonstrate a working model. The 3 winning projects were:
 - 1st Prize (Rs. 5000/=): Reclined Electric Berth by Anumantharaja V & Team
 - 2nd Prize (Rs. 3000/=): Beans Dehuller Machine by Shivaguru Prakash G & Team
 - 3rd Prize (Rs. 2000/=): Solar Desalination by Akhilesh Ravindran & Team

The other 6 teams at 2nd level received consolation prizes (Rs. 500/= each)
- All 21 participants who attended the FDP on Entrepreneurship, gave positive feedback.
- Out of 26 participants who attended the EDP under EDII-DST-NIMAT Project, 9 started their ventures successfully.

Success stories of EDP participants – Names & Ventures

<p>Dr. Indumathy R., RGPAL GLOBAL, 65, Thaneer thotti Veedi, Mugasimangalam, Alandurai Post, CBE</p>

Mr. Amarnath B., SPETIX ENTERPRISES AND SERVICE PVT LTD, Kadavnthra, Kochi
Mr. Siva Kumar. M, Cyber Star Exports and Imports, VJ Nagar 2nd Street, Kottaipalayam, CBE
Mr. Vignesh M.. Sri Vignesh Enterprises, 3/160,Kaveri Tank Street, Theethipalayam, CBE
Mr. Menon Vishnu Janardhan, Garpenter, Avinashi, CBE
Mr. Satheeshkumar S., Satheesh Industrials, 14/18b-1, P.N. Lay Out, Vedapatti, CBE
Mr. C M Sathyaprakash, Yakshini Eco Garments, 302,D Block,Tulips Apartment,Nava India Signal, CBE
Mr. Vignesh Prasanna, The Rapidgo Logistics, 1/447 H.5, Near Neelambur Tollgate, Chinniampalayam, CBE
Mr. Harsha Mukund Soundararajan, Microskin India Pvt Ltd, Kk Pudur, CBE

OVERALL, 2014-18

- EACs: 661 participants have benefited from 7 EACs. More and more students are now aware of and exercising their choice of the third option – entrepreneurship.
- FDPs: 57 participants have so far benefitted from the 4 FDPs organized under the EDI-DST-NIMAT scheme. Several participating colleges like JCT College of Engineering, Sankara College of Science & Commerce, Sri Krishna College, IIVM, Annapoorna Engineering College and Selvam Engineering College, have started conducting their own programmes through EDI-DST-NIMAT funding based on our inputs, contacts and guidance.
- EDPs: 78 participants have benefitted from the 3 EDPs conducted by ACE so far. This includes some student alumni as well. About 30% (24 numbers) of the EDP participants have started their ventures after successfully attending our programme.

9.7 Co-curricular and Extra-curricular Activities (10)

Students are engaged in co-curricular and extra-curricular activities and field trips through student chapters and forums, which provide opportunities for students to explore new fields of interest, cultivate leadership skills, and learn teamwork. While the co-curricular activities are held under the aegis of the respective departments, the extra-curricular activities and sports are organized by the Office of Students Welfare and Department of Sports respectively. Every department has its own association through which various department symposia, workshops and other technical and non-technical events are conducted. Students are encouraged to compete in state and national level sports and cultural competitions. Several festivals and events are organized drawing inspiration from our rich Indian culture. A Talent Search Program is organized for the freshmen (Annexure B 9.15a*). An annual cultural festival Amritotsavam is organized to showcase the talents of students (Annexure B 9.15b*). Several music and dance programs are organized by inviting renowned artists through SPIC MACAY. Student representatives are elected for conduct of the cultural and sports activities. All the students of ASE are divided into four Houses in order to promote healthy competitions in Sports and Cultural events. Student Secretaries/ Jt. Secretaries and Captains / Vice Captains (for cultural events and sports respectively) are elected for each House every year through a democratic process (Annexure B 9.15 c* and 9.15d*).

9.7.1 Co-Curricular Activities

Technical workshops, guest lectures and competitions are conducted regularly by the departments through department student association. The details are furnished in Criterion 4.5

9.7.2 College Techfest (ANOKHA)

ANOKHA is the national engineering tech fest of Amrita School of Engineering, Coimbatore India. Having successfully completed eight editions, ANOKHA has had an average annual participation of over 10,000 students from top-ranking engineering institutions in India like IITs, BITS, NITs and IIITs participating as well as partner universities in USA and Europe like University of New Mexico, EVRY France and Uppsala University-Sweden. It has a prize-money of Rs. 15 lakhs with 100+ plus highly competitive contests in all disciplines of engineering, sciences, robotics, gaming, business incubation, social media & entrepreneurship, cubing and short-film making. Taking up themes of global importance and societal relevance like Innovation, sustainable development, green trends, Technopolis - smart city and national security, it witnesses 30+ workshops in various cutting-edge areas of various engineering disciplines, robotics, business, sciences & humanities, start-

up pitchfest and finance including its own edition of TEDx-like distinguished talk series called “Lumiere”(Annexure B 9.15e*, 9.15f* and 9.15g*).

The workshops have been offered by leading companies such as Amazon, Microsoft, Mathworks, Cisco, Intel, National Instruments and Robert Bosch. Other highlights of the techfest include fascinating exhibitions & Autoshow, Meet the CEO programme, school outreach and product design, development & demonstration. Anokha provides the students an invaluable chance to discover, develop and demonstrate their talent, to excel and provides an innovative podium to stand on and succeed. This student-driven techfest showcases and celebrates the innovation, ingenuity, teamwork and talent of engineering students of AMRITA. Some of the world renowned artists who have been part of the entertainment spectacle include Percussionist, Sivamani; playback singers, Vijay Prakash, Karthik, Benny Dayal, Haricharan, Rahul Nambiar, Alaap Raju, Shaktisree Gopalan, Sunitha Sarathy, Ranjani-Gayatri and Nikita Gandhi.

Conduct of a techfest of this magnitude and proportions, for the students and by the students, develops organizational and leadership skills; enlarges their vision; exposes them to new technologies and innovation; facilitates and offers a platform for interaction with leading tech companies; and lastly this association among peer groups from across the length and breadth of the country promotes a sense of national integration.

9.7.3 Extra-Curricular Activities – Sports

Amrita School of Engineering encourages the students to be healthy in body and mind. Sports provide an excellent opportunity for students to interact with each other, develop true sportsman spirit and team spirit, as well as to stay healthy. The Students of Amrita School of Engineering are divided into four teams viz Amritamayi, Anandamayi, Chinmayi and Jyothirmayi. The Students participate in clean and fair voting to select their Captains and Vice Captains. The Intramural Events are conducted during the Annual Sports Meet. Staff Tournaments are also conducted in certain games / event every year in both sections. Our students regularly participate in South Zone / All India Inter University Competitions and National Level Inter Collegiate Tournaments.

- **Infrastructure**(Annexure B 16a*):

- Outdoor Games:

- | | |
|------------------------|--------------------------|
| 1). Basketball (M & W) | 2). Ball Badminton (M&W) |
| 3). Cricket (M) | 4). Football (M) |

- | | |
|------------------------|---------------------|
| 5). Kabaddi (M) | 6). Tennis (M & W) |
| 7). Volleyball (M & W) | 8). Tenni-Koit (W) |
| 9). Swimming (M & W) | 10). Hockey (M) |
| 11). Handball (M) | 12). Throw ball (W) |
| 13). Athletics (M & W) | 14). Frisbee (MW) |

- Indoor Games:

- | | |
|-----------------------------|------------------------|
| 1). Carrom (M&W) | 2). Chess (M&W) |
| 3). Shuttle Badminton (M&W) | 4). Table Tennis (M&W) |
| 5). Weight Lifting (M) | 6). Power Lifting (M) |

- Gymnasium: There are three gymnasiums in the Campus with the following equipment:

- Cardio Equipment:

- 1) Up Ride Bicycle (Viva fitness)
- 2) Elliptical Cross Trainer (Motus & Viva Fitness)
- 3) Imported Motorized Treadmill (Motus 900)

- Strength Equipment: 6 in 1 Multi Gym, 12 in 1 Multi Gym, 8 Station Multi Gym, 10-in-1 Personal Gym, Twister, Cable Cross Over, Hacks Squat, Smith Machine, Calf Rise, Inner & Outer Thigh, Nelco Weight Lifting Set, Benches (Incline, Decline, Flat and Multi-Purpose), T-Bar Rower, Preach Curl Stand, Dumbbells (with Rubber Rings and with groove), Barbell Plates, Barbell Rods Set (4 Different Size) and Rod Racks.

- **Student Activities- Sports:** Students are participating every year in various tournaments such as (Annexure B 9.16b*):

- Coimbatore District Level Association Tournaments
- National / International Tournaments organized by other Universities
- Inter Collegiate Tournaments conducted by some other colleges
- Inter Campus Tournaments of our own five campuses.
- Inter University Tournaments-All India / South Zone Level

- **Programmes Conducted:**

- Talent Search for Freshers,
- Intramural Competitions for all students
- Annual sports day for every academic year
- Inter-Campus Tournament in Selected Disciplines
- Summer and Winter Coaching Camps in Swimming.
- Friendly Matches in Intra and Inter Departmental Level
- Amrita Super League (ASL)-Staff & Students Combined Sevens Football Tournament. (viii). Amrita Premier League (APL) - Intra Campus Level T20 Tournament.
- Organizing South Zone Inter University Tournaments in selected Games.

- **State of the Art Facilities:**

- **Swimming Pool:**Amrita Swimming Pool is of Olympic Standard with 50m X 25m in Size and contains 2.4 million litres of water. A Toddlers Pool is to accommodate babies and for the professionals to have Warm-Up. State-of art machinery purifies 2.4 million liters of water with in six hours. It is one of the few international standard swimming pools wherein the State, National and International Swimming Competitions can be conducted.

- **Synthetic Tennis Court:**

- **Arogya Sadanam (New Gym):**A multipurpose Indoor Gymnasium with a size of 8200sq feet consists of 4 Shuttle Synthetic Badminton Courts, 2500 Sq Feet of Gym Centre and playing provision for Table Tennis, CaromBoards and Chess.

- **Work In Progress:** A Standard Basketball Court near Vasishta Bhavanam, and Specialized 3 Concrete & 2 Mud Cricket Pitches.
- **Aagneya Sports Club:** Sports Club Aagneya plays a vital role in conducting various Sports Events at Intra Campus Level Open Tournaments such as Campus Marathon, Amrita Badminton League, Amrita Basketball League, Amrita Volleyball League, Amrita Table Tennis League, etc. Student Officer Bearers organize the events. It gives a platform to bring out the sporting talent from a larger group.
Students winning laurels in South Zone/ National level sports are awarded grace marks (Annexure B 9.16

c*)

9.7.4 Extra-Curricular Activities –Student Clubs

16 student-managed Clubs are active in the campus (Table B.9.7.4). The dedicated Student Counsellors encourage students in participating in the various extracurricular activities. Students are encouraged to join at least one of the following Student Forums to fine tune their innate raw talents to ultimately compete in various competitions held at National and South East Asian Levels. It is ensured that the quality and content of the programs organized by these forums are in tune with the Norms of the Association of Indian Universities.

Table B.9.7.4 Cultural Forums and Social Clubs (Annexure B 9.17a*)

S.No	Name of the Club
1	Amrita Talkies
2	Asthra - Science Club
3	Kalakriti- Arts Club
4	Nādam
5	Nature Club
6	Natyasudha –Dance Club
7	NSS
8	Photography Club
9	Team Media
10	Ragasudha
11	Sahaya Club
12	Srishti Club MUN. Toast Masters
13	Aagneya - Sports Club
14	Vision – Eye Donation Motivation Forum
15	Wellness Club
16	SPIC MACAY

- **Events Conducted by student Clubs**– Given at Annexure B 9.17 b*
- **Participation in Association of Indian Universities (AIU)** – Annexure B 9.17 c*
- **NSS Activities 2017-2018:** The summary of NSS activities carried out by the students of Amrita is given below:-

Year	Activity
11 Mar 2017	Lake Cleaning Drive- Selva Chinithamani Kulam Lake
28 Mar 2017	Blood Donation Camp

13 Oct 2017	Safe Diwali – Say NO to crackers
14 Oct 2017	Tree Plantation Drive – Campus
15 Oct 2017	NSS volunteers of Unit 1 paid a visit to Mother Theresa Old age home at Puliayakulam, Ramanathapuram Coimbatore
18 Jan 2018	Health Awareness Programms – NSS & GEM Hospital
21 Jan 2018	Lake Cleaning Drive -Kumarasamy lake- Muthannankulam
24 Jan 2018	National Youth Day Celebrations
24 Jan 2018	The Aswin Maharaj Foundation music therapy for cancer patient
15 Feb 2018	Blood Donation Camp
15 Aug 2018	Cleaning of 3km stretch of road - part of the Swachata Pakhwada

- **Conduct of Festivals& Cultural Events**

Various Festivals and events are organized in the campus to promote harmony and awareness on the Indian Culture. Celebrations are organized on the occasion of Gurupournima, Navarathri, Ugadi, Pongal, Onam, Ganesh Chaturthi, Gokulashtami, National Nutrition Week, International Yoga Day, and Amma’s Birthday.

- Talent Search: It is a vibrant and extensive program, spanning over several weeks, organized to identify the freshmen having raw talents in dramatics, skits, quiz, dance, music, debate, literature, sports and games etc. The freshmen participate enthusiastically in large numbers and exhibit their talents.
- Amritotsavam: It is the mega annual cultural festival, spreading over a couple of weeks, with a large participation of students and staff. Cultural events, quiz, debates, songs, dances, essay competitions etc are organized completely by the students who invariably enrich their leadership qualities and team spirit.
- Gokulashtami: The birthday celebrations of Sri Krishna are conducted with a lot of pomp and splendor. The campus takes on a festive look and the students, faculty and non-teaching staff show extraordinary zeal and commitment in organizing various vibrant cultural programs. A grand procession with floats depicting various significant episodes in the life of Sri Krishna is a major attraction. Students are exposed to fabrication work, group performances and organizing skills.

- **Amma's Birthday:** Our Chancellor's Birthday is celebrated on 27th of September every year at Amritapuri. A large number of dignitaries along with thousands of devotees from all walks of life belonging to various countries gather to get the blessings of Amma. Our students and faculty members render voluntary services. Students develop project management and leadership skills while actively participating in organizing such a mammoth event.

ADDITIONAL INFORMATION RELATED TO STUDENT SUPPORT SYSTEM (9.8 TO 9.10)

9.8 Student Support Committees: The following Committees are in place to support the students and also to ensure and promote discipline in the campus (Annexure B 9.18*):

- A general Disciplinary Committee – Chairperson and 15 members
- Anti-Ragging Committee- Chairperson and 7 members
- Women's Complaints and Redressal Cell - Chairperson and 3 members
- SC/ST Complaints & Redressal Cell – Chairperson and 4 members
- Emergency Response Team – 11 members

9.9 Insurance Plans for Students: Our Institution is providing different kinds of insurance plans for our students to attain the maximum benefits at the time of unpredictable events.

- **Amartya Siksha Yojana-(Students Education Protection Policy):** This policy provides protection for the education of the students in case of the occurrence of any unforeseen events to the insured parent /guardian such as, Accidental death /permanent total disability due to accident/ death during surgical operation or death within seven days thereafter whilst in the hospital. In the event of such death, the entire educational expenses of the student concerned will be met by the insurance company till his / her completion of the course in this institution.
- **Special Contingency Insurance Coverage:** This policy covers the reimbursement of Medical expenses incurred by the students due to accident occurred while the students are commuting to college / inside the campus / participation in authorized tours, excursions etc. Accidental claims shall be made up to `2 Lakhs per year.

- **Sampoorna Suraksha:** Life Insurance coverage to the students and active till their completion of their studies in our Institution. Upon the happening of death of the insured (due to any cause), 3 Lakhs is payable to their nominee.

9.10 Amritanidhi Scholarships (Annexure B 9.19*)

Scholarship is awarded as fee waiver for first year, based on the rank scored in the All India Amrita Entrance Examination. A candidate has to score a minimum CGPA without any arrear at any point of time as per the University rules, in order to earn the fee waiver in the subsequent years. Scholarship amount is reimbursed in September after the last date of admissions. Scholarship will be withdrawn if the student gets involved in any disciplinary action during his / her period of study in the university. Scholarship is renewed on request in subsequent years on consistent academic performance by securing CGPA scores as given below:-

For 2016 & 2017 batch students

8.0 and above in the case of award of 90% scholarship.

7.5 and above in the case of award of 50% scholarship.

7 and above in the case of award of 25% scholarship.

For 2018 batch students

8.0 and above in the case of award of 90% scholarship.

7.5 and above in the case of award of 75% scholarship.

7 and above in the case of award of 50% scholarship.

In respect of the previous batches, scholarship amount of Rs50,000/- per annum was given and the students are eligible if they have secured a CGPA more than 6, without possessing any arrears. The status of disbursement of scholarship for the past three years is as follows:

Table B.9.10a Amritanidhi Scholarships - Academic Year - 2016-17

DEPT	2013-IVyr	2014-III Yr	2015-II Yr	2016 – I Yr			Dept wise
	Rs.50000	Rs.50000	Rs.50000	90%	50%	25%	Total
AE	4	4	3	1	1	0	13
CIVIL	5	3	3	0	0	0	11
CSE	14	10	11	18	25	31	109
CHEMICAL	7	5	3	0	0	0	15
ECE	6	10	10	2	9	2	39
EIE	4	4	0	0	0	0	8
EEE	7	3	6	0	0	0	16
MECH	3	4	3	2	4	10	26
TOTAL	50	43	39	23	39	43	237

Table B.9.10b Amritanidhi Scholarships - Academic Year - 2017-18

DEPT	2014 - IVyr	2015 - III Yr	2016 –II Yr			2017—I Yr			Dept wise
	Rs.50000	Rs.50000	90%	50%	25%	90%	50%	25%	total
AE	4	3	1	0	0	0	2	2	12
CHEMICAL	3	3	0	0	1	0	0	0	7
CIVIL	5	2	0	0	1	0	0	0	8
CSE	10	10	13	30	25	15	22	23	148
ECE	10	10	3	1	7	4	7	6	48
EIE	3	0	0	0	0	0	0	0	3
EEE	4	6	0	0	0	0	1	2	13
MECH	4	3	3	8	5	3	8	7	41
TOTAL	43	37	20	39	39	22	40	40	280

Table B.9.10c Amritanidhi Scholarships - Academic Year - 2018-19

DEPT	2015-IVyr	2016-III Yr			2017 –II Yr			2018 -I Yr			Dept wise
	Rs.50000	90%	50%	25%	90%	50%	25%	90%	50%	75%	Total
AE	3	1	0	0	0	2	2	2	4	2	16
CIVIL	1	0	0	1	0	0	0	0	2	0	4
CSE	10	13	29	25	12	15	18	44	55	38	259
CHEMICAL	2	0	0	1	0	0	0	0	0	0	3
ECE	10	3	0	6	1	3	6	4	23	7	63
EIE	0	0	0	0	0	0	0	0	0	0	0
EEE	4	0	0	0	0	0	2	1	0	3	10
MECH	2	2	7	5	3	5	6	0	14	4	48
TOTAL	32	19	36	38	16	25	34	51	98	54	403

***Note: All Annexures (B.9.1 to B.9.19) for criterion 9 have not been included in the SAR report and will be available in the institute during inspection.**

CRITERION 10

Governance, institutional Support and Financial Resources

CRITERION 10	Governance, institutional Support and Financial Resources	120
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10.1. Organization, Governance and Transparency

Amrita Vishwa Vidyapeetham is a multi-campus, multi-disciplinary research academia that is accredited 'A' by NAAC and is ranked as one of the best research institutions in India. The Chancellor of the University, Mata Amritanandamayi Devi, is a world renowned Humanitarian and Spiritual leader who strives to bring peace and prosperity to the entire world. Under the guidance of the Chancellor, Amrita has consistently been ranked in the top 10 Universities in India and was ranked 8th in the Universities category by the National Institutional Ranking Framework (NIRF) in 2018 and 2019. Amrita Vishwa Vidyapeetham continuously collaborates with top US Universities including Ivy league universities and top European universities for regular student exchange programs, and has emerged as one of the fastest growing institutions of higher education in India. The School of Engineering is equipped with best-in-class infrastructure and highly qualified faculty.

10.1.1. State the Vision and Mission of the Institute

Vision:

To be a global leader in the delivery of engineering education, transforming individuals to become creative, innovative, and socially responsible contributors in their professions.

Mission:

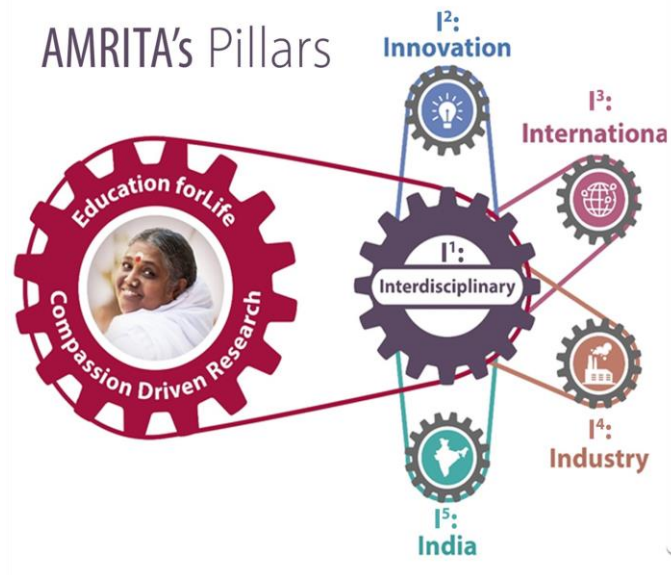
- To provide best-in-class infrastructure and resources to achieve excellence in technical education,
- To promote knowledge development in thematic research areas that have a positive impact on society, both nationally and globally,
- To design and maintain the highest quality education through active engagement with all stakeholders – students, faculty, industry, alumni and reputed academic institutions,
- To contribute to the quality enhancement of the local and global education ecosystem,
- To promote a culture of collaboration that allows creativity, innovation, and entrepreneurship to flourish, and
- To practice and promote high standards of professional ethics, transparency, and accountability

10.1.2. Availability of the Institutional Strategic Plan and Its Effective Implementation and Monitoring

Quality and commitment have been the corner stones for the success of Amrita. Being a multi-campus, multi-disciplinary university, decentralized administration was essential to maintain agility and quality.

The concept of process and process owners facilitated decentralization of activities and delegation of authority, while maintaining accountability. After being awarded the “Deemed to be University” status in 2003, Amrita’s recognition can be attributed to the key five strategic pillars:

- Inter-disciplinary
- Innovation
- International
- Industry
- India



Building on these strategic pillars is absolutely critical for Amrita to be recognized as a world class university

a. Inter-disciplinary:

Offer degree programs that are inter-disciplinary/intra-disciplinary in nature. The degree programs are designed to fit with the thematic research areas of the school.

Initiate and secure funds for inter-disciplinary projects from Govt agencies and industry

Four new programs that are intra/inter-disciplinary in nature will be introduced from AY 2019-20. Five more programs involving automation & rural technology, cyber physical system security and forensics, data analytics and medical systems, vision based systems for smart transportation and bioinformatics will be introduced between calendar year 2021-2026.

b. Innovation:

Innovative teaching-learning process: Strengthening the curriculum and introducing pedagogical changes that would trigger better knowledge gain. Introduction of modular mathematics courses was implemented in 2015. It is planned to further modularize the mathematics courses during the 2019 curriculum revision.

Introduce flexible curriculum with open electives across all engineering departments. The 2019 curriculum aims at being flexible and learner centric.

Carry out innovative research that can result in patents and entrepreneurship. A 20% increase in patent filing was observed from 2015-19 relative to 2010-15. The goal is to be able to file at least three patents a year from the School of Engineering.

c. International:

Currently, more than 140 MoU's have been signed with foreign universities which allow student exchange programs, dual degree programs, internships and projects. The strategic plan calls for at least an additional 100 MoU's with universities ranked in the top 500 of the world ranking. Goal is to increase the number of collaborations with reputed foreign universities by 50% in the next 5 years.

d. Industry:

Amrita's engagement with industry is critical to ensure that (a) the curriculum and pedagogy matches with the needs of the industry; (b) to ensure that the research problems chosen are industry relevant problems and (c) industry gets a chance to assess the calibre and quality of Amrita. Goal is to increase the industry consultancy amount by 50% relative to 2018 funding amount.

e. India:

The founding trust of Amrita has adopted 103 villages across India. Experiential learning (named as Live-in-Labs), introduced in 2015, is part of the curriculum. Primary goal is to ensure that the society benefits from all the research work done at Amrita.

Monitoring the execution of the strategic plan is handled by the Board of Management, which is the Apex body of Amrita.

10.1.3. Governing body, administrative setup, functions of various bodies, service rules, procedures, recruitment and promotional policies

Other academic and research progress are handled by various committees comprising of administrators, chairpersons, professors and faculty members of the departments. The following committees are in place to provide directions, make decisions, implement and monitor progress of various functions.

1. The Board of Management consists of the following members:

- | | |
|---|-----------|
| • Swami Amritaswarupananda Puri | President |
| • Swami Ramakrishnanada Puri | Member |
| • Br. Abhayamrita Chaitanya, Pro-Chancellor | Member |
| • Dr. P. Venkat Rangan, Vice Chancellor | Member |

• Dr. Prem Nair, Dean – Faculty of Medicine	Member
• Dr. Bipin Nair, Dean – Faculty of Sciences	Member
• Dr. Shanti Nair, Dean, Research	Member
• Dr. U. Krishnakumar, Dean - Faculty of Arts, Media & Commerce	Member
• Dr. K. Sankaran, Registrar	Member Secretary

Board of Management (BoM) consists of 9 members and conforms to guidelines set by regulatory bodies, and includes; three humanitarian leaders who are also authors of several scholarly books, one institutional leader, four eminent scientists, one eminent doctor.

BoM meets at least twice a year to both review past progress and approve future plans. BoM handles the following important aspects:

- I. To establish campuses, schools, centers and departments with adequate investment in infrastructure and quality of faculty
- II. To maintain a highly professional ambience and environment for faculty, students and staff to succeed and to redress grievances
- III. To confer, grant or award Degrees, Diplomas, Certificates and other academic titles and distinctions
- IV. To maintain proper accounts and other relevant records
- V. To ratify all appointments of Faculty and Staff

2. Academic Council

List of Members:

1. Br. Abhayamrita Chaitanya (Pro-Chancellor)
2. Dr. P. Venkat Rangan (Vice Chancellor) - Chairman
3. Dr. K. Sankaran (Registrar)
4. Dr. Prem Nair (Dean – Faculty of Medicine)
5. Prof. C. Parameswaran (Director, Corporate & Industry Relations)
6. Dr. Bipin Nair (Dean – Faculty of Sciences)
7. Dr. Shanti Nair (Dean Research)
8. Dr. Sasangan Ramanathan (Dean – Faculty of Engineering)
9. Dr. V.S. Somanath (Dean – Faculty of Business)
10. Dr. Krishnashree Achuthan (Dean, PGP Programmes)
11. Dr. Maneesh Sudheer (Dean International Programmes)
12. Dr. Balakrishnan Shankar (Associate Dean, Amritapuri Campus)
13. Dr. R. Dhandapani (Controller of Examinations)
14. Br. (Dr.) Sankara Chaitanya (Director, School of Ayurveda)
15. Br. Sudeep (Director, Amritapuri Campus)
16. Br. Dhanraj (Director, Bangalore Campus)
17. Dr. U. Krishnakumar (Dean – Faculty of Arts, Media & Commerce)
18. Br. Sunil Dharmapal (Director, Mysuru Campus)

19. Dr. C. R. Muthukrishnan (Former Dy. Director, IITM – External Member)
20. Dr. V. Radhakrishnan (Former Prof., IITM – External Member)
21. Dr. A. H. Kalro (Former Director, IIMK - External member)
22. Dr. Bharat Jayaraman (Professor, SUNY Buffalo – External Member)
23. Dr. Jyothi S. N (Principal, School of Engineering, Amritapuri Campus)
24. Dr. S. G. Rakesh (Associate Dean, Bangalore Campus)
25. Dr. Vishal Marwaha (Principal, School of Medicine)
26. Dr. Balagopal Varma R (Principal, School of Dentistry)
27. Prof. K. T. Moly (Principal, College of Nursing)
28. Dr. M. Sabitha (Principal, School of Pharmacy)
29. Dr. Vasudevan Nampoothri (Principal, School of Ayurveda)
30. Prof. C. Vidya Pai (Principal, School of Arts & Science, Mysuru)
31. Dr. M. Savitha Pande (Principal, School of Education)
32. Dr. Nandakumaran V. M. (Principal, School of Arts & Science, Amritapuri Campus)
33. Dr. Sriram Devanathan (Prof. Dept. of Chemical Engineering, Coimbatore)
34. Dr. Raghuraman (Chairman, School of Business, Coimbatore)
35. Prof. Sunanda Muralidharan (Chairperson, Dept. of Management, Kochi)
36. Prof. Manoj P (Chairperson, Dept of Management, Bangalore)

The Academic Council meets at least twice a year to deliberate on the following functions:

- To prescribe and ratify courses of study leading to degrees and diplomas
- To take periodical review of the activities of the Schools/Departments/Centres and to take appropriate action with a view to maintaining standards of instruction
- To devise measures for improvement of standards of teaching, research and training
- To frame policies with regard to admissions
- To ensure fair conduct of examinations
- To award fellowships and studentships, free-ships, concessions, travel fellowships, scholarships, medals, prizes etc.
- To put in place guidelines for attendance and discipline

3. Executive Committee

List of Members:

Dr. S Mahadevan (Dy. Dean) – Chairman

Mr. N Ravindran (GM Purchasing)

Br. Harikumar (Manager, Finance)

Frequency of Meeting: Once a week

4. Research Committees also called Thrust Area Groups

- The quality of research is handled at the department level by thrust area groups.

- Chairperson oversees the progress of research.

5. Internal Quality Assurance Cell (IQAC)

The IQAC is the quality monitoring cell with members from all departments, centers and administrative offices. There a total of 60 members.

IQAC aims to develop a system for conscious, consistent and catalytic action to improve the academic and administrative performance of the institution. IQAC evolves mechanisms and procedures for ensuring timely, efficient and progressive performance of academic, administrative and financial tasks, optimization and integration of modern methods of teaching, learning and evaluation and ensuring the adequacy, maintenance and functioning of the support structure. Some of the functions of the IQAC are:

- Development and application of quality benchmarks/parameters for the various academic and administrative activities of the institution.
- Dissemination of information on the various quality parameters of higher education.
- Organisation of workshops, seminars on quality related themes and promotion of quality circles.
- Documentation of the various programmes/activities leading to quality improvement.
- Preparation of the Annual Quality Assurance Report (AQAR) to be submitted to NAAC based on the quality parameters.

Frequency of meeting is at least twice a year.

6. Library Committee

Dr. M Sethumadhavan (Head, Center for TIFAC-CORE in Cybersecurity) – Chairman

Dr. K M Mini (Chairperson, Dept. of Civil Engineering)

Mr. M Sreevalsan (Head, ICTS)

Dr. K. I. Ramachandran (Prof, Center for Computational Engineering and Networking)

Frequency of Meeting: At least twice a year

7. Council of Wardens

Prof S . Ranganathan – Chairman

Mr. C. Arun Kumar (Dept of Computer Science & Engg) – Vice Chairman & Faculty warden

Dr. Saravanan (Dept of Mech Engg)

Mr. P. Gopakumar (Manager, ICTS)

Mr. Adarsh S (Dept. of Electronics and Communication Engg)

Dr. K Bagavinar (Dept of Physical Education)

Mr. Vijay Narayanan (Office of Dean Engg)

Ms. R. Aarthi (Dept. of Computer Science & Engg)

Dr. P. R. Janci Rani (Asst. Prof, Office of Student Welfare)

Frequency of Meeting: Once a month

8. Tech Fest Committee

A total of 20 faculty mentors from various departments

Total of 150 students

Frequency of meeting: As and when needed

9. Sports Committee

Dr. O J Kumaresan – Chairman

Members are inducted from various departments depending on the nature of event being conducted

Frequency: As and when required

10. Cultural Committee

Dr. Shailendra K (Prof. Office of Student Welfare) – Chairman

Members are inducted from various departments depending on the nature of event being conducted

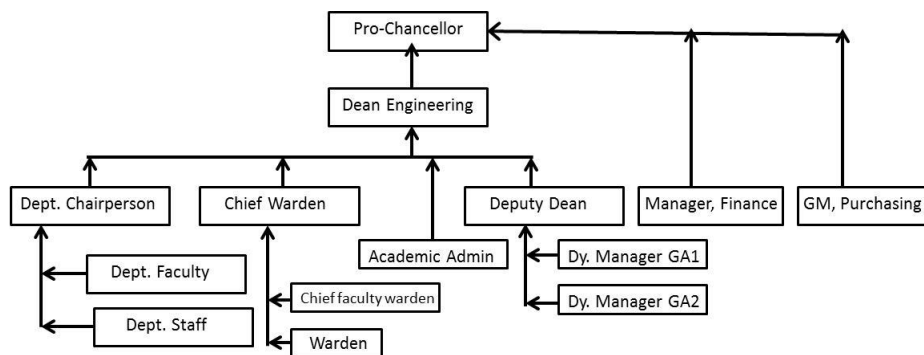
Frequency: As and when required

11. Purchase Committee

Each department has its own purchase committee. Purchase committee can consist of anywhere between 3-5 faculty members.

Frequency of meeting: On an as needed basis

Organization Structure (key functions shown) of the School of Engineering, Coimbatore



Recruitment Policy

Procedure for non-tenure appointments

All non-tenure Faculty appointments (Assistant Professors) as well as non-teaching appointments are done at School level by a committee consisting of Head of School, HR Head, Chairperson of the Department/Center and Senior faculty. In this aspect, there is a significant decentralization and empowerment of heads of schools in selection.

Faculty Recruiting & Promotions Committee

All tenure appointments i.e. associate professor and professor are evaluated and ratified by the faculty recruiting & promotions committees that include Deans of Faculties, Director, Human Resources, Chairperson of the department and senior professors. These appointments are based on peer review, presentation by faculty and interview. There is a conscious effort made by this committee to recruit talent from top institutes in India and abroad leveraging on the linkages facilitated by Amrita Centre for International Programs (ACIP).

Service rules

Service rules are framed by Board of Management of Amrita Vishwa Vidyapeetham so as to be in conformity with UGC regulations as well as best practices followed in internationally well reputed Universities. These rules broadly fall under the following aspects:

- Teaching and instructional duties: Direct teaching to students includes scheduled classroom teaching of theory, laboratory sessions, and regularly scheduled project group meetings at bachelor's and master's levels. Indirect teaching includes mentoring sessions, research guidance to students, seminars, journal clubs, Ph.D. advising, etc. Mandatory minimum teaching (based on UGC rules) for all Amrita Faculty are set as 16 hours of direct teaching (classroom and laboratory, UG and PG) to students. In addition, there are indirect teaching hours, teaching preparation work hours, research work hours, all of which together should add up to a full working week. Any reduction from the above required hours of direct teaching can only be in lieu of following university approved duties:
 - Departmental duties (2 hours per week only at the associate professor and professor levels)
 - Sponsored Research Project responsibilities (up to 4 hours per week)
 - Industrial consulting and management development programs (up to 4 hours per week)
 - Clinical services (for clinical faculty)
 - Senior administrative roles as assigned/appointed by the University

All faculty must attempt to use latest teaching methodologies, including ICT based methods, and provide access to such ICT rich learning material to students.

- Research duties: Research duties include publishing of research papers, patent filing, consultancy, securing funded extramural grants and organizing of international conferences. The mandatory research paper requirements are as follows:

Each department is mandated to organize one international conference every two years. While organizing such Conferences University will give infrastructure support but the organizing faculty in the department is responsible to apply and secure adequate extra mural funding to cover travel and lodging of international delegates.

- Administrative duties: Faculty are expected to serve on departmental, school-level, campus-level and university-wide committees such as admissions, sports, cultural, techfest, discipline, anti-ragging cell, hostel etc.

- Societal & Community engagement: In alignment with the university's ethos and vision of the Chancellor AMMA, faculty are expected to actively contribute in various societal and community engagement initiatives such as Live-in-Labs, Swachh Bharat (Amala Bharatham), Village adoption, Green friends etc
- Appointment & Probation: An employee will be on Probation for a period of two years from the date of appointment which is liable to be extended at the discretion of the committee for further periods not exceeding one year. An employee will be confirmed in the permanent position only on satisfactory completion of probation. Until the employee is informed in writing, an employee shall be deemed to be a probationer.
- Salary structure, perks and allowances: As per the prevailing norms, an employee appointed shall be paid monthly salary as mentioned in the appointment letter with effect from the of joining Amrita Vishwa Vidyapeetham
- Promotions: Any faculty member in order to qualify for continuing increments and/or promotion must demonstrate significant accomplishments in both teaching and research as prescribed from time to time by the University. The committee evaluates and ratifies all tenure promotions from assistant professor to associate professor, as well as, associate professor to professor. These promotions are based on peer review, presentation by faculty and interview by the committee. All multiple increments (other than routine annual cost of living increase increments) and promotions from assistant professor to associate professor, as well as, associate professor to professor, must be approved by faculty recruitment & promotions committee
- Superannuation: Superannuation age for employees of the Amrita Vishwa Vidyapeetham shall be 58 years, and shall superannuate on the last date of the month in which the employee attains the superannuating age.
- Termination of Appointment: An employee on Probation is liable to be terminated from service with either side serving one month notice period or salary in lieu of the notice period. A permanent employee in the Academic Departments shall serve three months' notice period or salary in lieu of the notice period which shall invariably be in a manner that shall not affect the academic responsibilities entrusted to a faculty and with due diligence. A permanent employee in the Non-Teaching Departments shall serve one month's notice period or salary in lieu of the notice period.
- Leave: An employee may avail leave as per the rules and regulation of Amrita Vishwa Vidyapeetham as will be in vogue at any given time.

Conduct

An employee shall adhere to the Conduct Rules of Amrita Vishwa Vidyapeetham, while in service failing which they are liable for punitive action for violation of such Rules and in the extreme case termination services without notice and/or compensation thereof. They shall be laid down as an Annexure to the appointment letter and each appointee shall be required to sign an acknowledge as having read and accepted the same. The conduct rules are as follows:

(a) Every employee shall at all times maintain absolute integrity and devotion to duty and also be honest and impartial in official dealings

(b) An employee shall at all times be courteous with other members of the staff, students, and members of the public

(c) Unless otherwise stated specifically in the terms of appointment, every employee is a whole time employee of Amrita Vishwa Vidyapeetham and may be called upon to perform such duties, as may be assigned by competent authority, beyond scheduled working hours and on Closed Holidays and Sundays. These duties shall inter-alia include attendance at meetings of Committees to which an employee may be appointed by Amrita Vishwa Vidyapeetham

(d) An employee shall be required to observed the scheduled hours of work, during which the employee must be present at the designated place of duty

(e) Except for valid reasons and/or unforeseen contingencies, no employee shall be absent from duty without prior permission

(f) An Employee should perform all the duties that are entrusted to the post designated to the employee and also any work that may be assigned by Dean/Chairperson/Competent Authority including attending to exam work assigned either by the Department or Amrita Vishwa Vidyapeetham during any time of the year. An employee shall work diligently and safeguard the interest and objectives of Amrita Vishwa Vidyapeetham at all times

(g) An employee will be responsible for the wellbeing of students and their welfare while maintaining their discipline.

(h) Complete discipline and decorum shall be maintained in the campus and an employee shall not act in a manner that shall tarnish or be detrimental to the reputation of Amrita Vishwa Vidyapeetham

(i) No employee shall leave their duty station without the prior permission of the Competent Authority/Dean/Chairperson or Head of Department, during leave/vacation or otherwise. When leaving their duty station, they shall clearly inform in writing their contact details during the period of such absence.

10.1.4 Decentralization in working and grievance redressal mechanism

There is an exclusive department to address student grievances headed by a Prof. and assisted by a team of faculty. Members of the committee include:

- Prof. P N Kumar (Head, Student Affairs)
- Dr. Shailendra K (Prof. Students Welfare)
- Dr. Janci Rani P R (Student Counsellor)
- Dr. Sowndaram (Professional Counsellor)
- Ms. Rajalakshmi (Professional Counsellor)
- Dr. Tharani Devi (Faculty, Student Welfare)

The above members are assisted by the department student counsellors and advisors.

The following committees are also constituted for addressing faculty and student grievances involving sexual harassment and SC/ST grievance cell.

Anti-Ragging Committee

Dr.Sasangan Ramanathan	Chairperson	Dr. M.Saimurugan	Member
Dr. (Col). PN Kumar	Member	Ms. P Ambika	Member
CCWH	Member	Dr. B Rajathilagam	Member
Dr. Balajee Ramakrishnanda	Member	Dr. R Ramanathan	Member
Dr. R Gowtham	Member	Dr. S.Selva Kumar	Member

Disciplinary Committee

Dr. (Col). PN Kumar	Chairperson	Mr. D Unnikrishnan	Member
Dr. K.Bagavinar	Member	Dr. N.Harini	Member
Dr. P V Suneesh	Member	Dr. P Prakash	Member
Mr. N.Praveen Kumar	Member	Dr. A.Balasubramanian	Member
Dr. Udaya Bhaskar Reddy Ragula	Member	Mr. M.Ganesan	Member
Mr. T Rajesh Senthil Kumar	Member	Mr. N.Mohankumar	Member
Mr. A S Prakash	Member	Dr. K R M Vijaya Chandrakala	Member
Dr. B. Soundharajan	Member	Mr. M Pushparajan	Member

Women's Complaints & Redressal

Dr. K M.Mini	Chairperson	Ms K Shobana	Member
Dr. P. Supriya	Member	Dr. Sasangan Ramanathan	Member

Emergency Response Team Members

Dr. R Saravanan	Dr. K Bagavinar
Mr. S Adarsh	Dr. P.R.Janci Rani
Mr. C Arunkumar	Mr. V.V.SajithVariyer
Mr. Gopakumar	Ms. R.Arthi
Mr. Vijay Narayanan	Mr. M Ritwik
Mr. P Sivaraj	Mr. Kalidas

SC/ST Complaints & Redressal Cell.

Dr. S Mahadevan	Chairman
Dr. T Palanisamy	Member
Dr.S.Padmavathi	Member
Dr. Anju S Pillai	Member
Mr.K.Bakiaraj	Member

10.1.5 Delegation of financial powers

- Department chairperson verifies the accuracy and validity of request for financial commitment from the department faculty. There is no ceiling for the first line of approval by the department chairperson.
- All financial approvals/commitments, regardless of the amount are routed through the office of Dean Engineering (campus Head).
- If the requested amount is greater than Rs. 1 Lakh, a detailed discussion is held between the Dean and the chairperson before approval.
- >99% of the expense request has been approved in the past 5 years, up to a maximum of Rs. 50 Lakhs.

10.1.6. Transparency and availability of correct /unambiguous information in public domain

Yes. The following steps are taken to ensure accurate information dissemination to all the stake holders.

- At the beginning of every semester, the academic calendar, time table for all classes, faculty time table and lab schedule are made available to all stake holders. This information is available to everyone from within the campus as well as from outside the campus through virtual private network.
- Policy information, list of members of committees, upcoming events, and student grades are available in the campus intranet (link: <https://intranet.cb.amrita.edu>)
- Access to library digital content is also available via the campus intranet.

10.2.1. Adequacy of budget allocation

Table B. 10.2a: Income and expenditure summary for CFY (2018-19: unaudited), CFYm1, CFYm2 and CFYm3.

Total Income in CFY (2018-19)			Actual expenditure in CFY (2018-19)			Total No. of students in CFY: 6003
Fee (Rs. Lakh)	Govt.	Other Sources (Specify)	Recurring including Salaries (Rs. Lakh)	Non-recurring (Rs. Lakh)	Special Projects/Any other, specify	Expenditure per student (Rs. Lakh)
13126.3			8614.6	1057.3		1.61

Total Income in CFYm1 (2017-18)			Actual expenditure in CFYm1 (2017-18)			Total No. of students in CFYm1: 5925
Fee (Rs. Lakh)	Govt.	Other Sources (Specify)	Recurring including Salaries (Rs. Lakh)	Non-recurring (Rs. Lakh)	Special Projects/Any other, specify	Expenditure per student (Rs. Lakh)
11445.0			8628.6	1298.1		1.67

Total Income in CFYm2 (2016-17)			Actual expenditure in CFYm2 (2016-17)			Total No. of students in CFYm2: 5693
Fee (Rs. Lakh)	Govt.	Other Sources (Specify)	Recurring including Salaries (Rs. Lakh)	Non-recurring (Rs. Lakh)	Special Projects/Any other, specify	Expenditure per student (Rs. Lakh)
10283.7			8040.5	1325.3		1.64

Total Income in CFYm3 (2015-16)			Actual expenditure in CFYm3 (2015-16)			Total No. of students in CFYm3: 5455
Fee (Rs. Lakh)	Govt.	Other Sources (Specify)	Recurring including Salaries (Rs. Lakh)	Non-recurring (Rs. Lakh)	Special Projects/Any other, specify	Expenditure per student (Rs. Lakh)
8997.1			7927.1	295.0		1.50

Table B. 10.2b: Details of the Institute level expense for CFY (2018-19: unaudited), CFYm1, CFYm2, and CFYm3 (all figures are in Rs. Lakhs).

Items	Budgeted in CFY	Actual expenses in CFY (2018-19)	Budgeted in CFYm1	Actual expenses in CFYm1 (2017-18)	Budgeted in CFYm2	Actual expenses in CFYm2 (2016-17)	Budgeted in CFYm3	Actual expenses in CFYm3 (2015-16)
Infrastructure Built-Up	111.5	113.4	1307.5	1306.8	1174.3	1173.9	886.9	885.2
Library	556.2	555.8	68.3	67.1	172.9	172.3	210.3	209.7
Laboratory Equipment	257.2	258.7	423.0	422.5	345.3	344.6	186.7	185.3
Laboratory consumables	39.6	40.4	41.2	40.3	25.2	23.8	103.6	104.2
Teaching and non-teaching staff salary	5261.0	5262.2	5225.4	5224.3	4944.0	4943.1	4384.0	4383.4
Maintenance and spares	509.5	508.1	355.6	354.8	494.6	493.9	415.5	418.7
R&D	170.1	168.7	133.0	131.5	133.0	132.4	153.2	154.3
Training and travel	104.2	102.0	1201.1	122.4	123.4	122.8	93.4	92.9
Miscellaneous expenses*	1126.8	1125.7	1372.3	1371.5	1112.8	1111.7	1043.5	1044.0
Others, specify**	1538.3	1536.9	886.0	885.1	846.3	847.1	743.8	744.3
Total	9674.40	9671.90	11013.40	9926.30	9371.80	9365.60	8220.90	8222.00

*includes charges related to Advertisement/Publicity/Affiliation, Staff welfare expenses etc.

**includes charges related to school level software licenses, scholarship, operational and administrative expenses, vehicle, AC, security, etc.

The yearly budget is prepared based on the academic and research requirements of the departments. Budget discussion is held at the department level headed by the chairperson. A formal budget is submitted to the Dean for review. Dean will consolidate the campus level budget and submit to management for approval and sanction. Predominantly, the management approves the final budget submitted by the Dean. For the past 4 years (including the current financial year), the allocated budget and utilization have been adequate (refer to Tables B. 10.2a and 10.2b)

10.2.2 Utilization of allocated funds

Individual department chairpersons are notified regarding the sanctioned budget. Expenses for infrastructure, maintenance and house-keeping are maintained at the University/campus level, while the departments are responsible for expenses related to lab equipment, consumables, travel and training expense etc. Library expense is approved and maintained by the Dean/Principal. The sanctioned budget was effectively utilized for the past 4 years (refer to Tables B.10.2a and 10.2b).

10.2.3 Availability of the audited statements on the Institute's website

Yes

10.3. Program Specific Budget Allocation and Utilization for the Department of Aerospace Engineering:

Table B. 10.3a: Current financial year (CFY 2018-19 unaudited), CFYm1, CFYm2 and CFYm3. All figures are in Rs. Lakhs.

Total Budget in CFY: 2018-19		Actual expenditure in CFY (2018-19)		Total No. of students in CFY: 243
Non-Recurring	Recurring	Non-Recurring	Recurring	Expenditure per student
28.8	351.7	27.09	349.1	1.55

Total Budget in CFYm1: 2017-18		Actual expenditure in CFYm1: 2017-18		Total No. of students in CFYm1: 241
Non-Recurring	Recurring	Non-Recurring	Recurring	Expenditure per student
56.54	312.1	55.89	310.4	1.52

Total Budget in CFYm2: 2016-17		Actual expenditure in CFYm2: 2016-17		Total No. of students in CFYm2: 244
Non-Recurring	Recurring	Non-Recurring	Recurring	Expenditure per student
56.90	293.1	57.70	291.9	1.43

Total Budget in CFYm3: 2015-16		Actual expenditure in CFYm3: 2015-16		Total No. of students in CFYm3: 241
Non-Recurring	Recurring	Non-Recurring	Recurring	Expenditure per student
47.50	262.0	48.37	261.7	1.28

Table B. 10.3b: Current financial year (CFY 2018-19 unaudited), CFYm1, CFYm2 and CFYm3. All figures are in Rs. Lakhs.

Items	Budgeted in CFY	Actual expenses in CFY (2018-19)	Budgeted in CFYm1	Actual expenses in CFYm1 (2017-18)	Budgeted in CFYm2	Actual expenses in CFYm2 (2016-17)	Budgeted in CFYm3	Actual expenses in CFYm3 (2015-16)
Laboratory Equipment	26.50	24.95	10.00	9.01	3.10	2.70	6.00	5.72
Software	1.50	1.03		-	4.00	3.56		-
Laboratory consumables	1.60	1.63	1.58	1.64	1.15	1.02	5.00	4.60
Maintenance and spares	19.65	20.56	15.20	14.43	21.90	21.16	18.80	18.49
R&D	7.10	6.82	6.00	5.34	5.85	5.67	7.10	6.81
Training and travel	4.20	4.13	5.20	4.98	4.90	5.26	4.30	4.10
Miscellaneous expenses*	46.65	45.56	56.50	55.78	46.90	47.64	46.50	46.12
Total	107.20	104.68	94.48	91.18	87.80	87.01	87.70	85.84

*includes expenses related to department administration, staff welfare, guest lectures, affiliation etc.

10.3.1 Adequacy of budget allocation

The allocated budget was used to meet the requirements of purchase of new equipment, additional infrastructure needs, replacement and upgrade of old equipment, consumables for smooth operation of labs, and travel for conferences, workshops and faculty development programs. Spending of sanctioned amount is closely monitored by the department chairperson, Dean and accounts department. Tables B.10.3a and 10.3b show the budget allocation by management was adequate for the smooth functioning of the department in the past 4 years (including the financial year ending March 2019).

10.3.2 Utilization of allocated funds

The department chairperson is informed about the sanctioned budget prior to the beginning of the next financial year. Expenses related to the purchase of new equipment, software, laboratory consumables, repair/maintenance of lab equipment and travel are the responsibility of the department chairperson. Expense related requests are considered on a case by case basis and approved by Dean. Sanctioned budget was adequately managed over the last 4 years as seen in Tables B.10.3a and 10.3b.

10.4. Library and Internet (20)

10.4.1. Quality of learning resources (hard/soft) (10)

1. Relevance of available learning resources including e- resources

E-Resources	
e-Books	16434
e-Journals	14739
Databases	14
DVD/CD	5307
Dissertations	3797
Print Resources	
Books	67235
Periodicals	265

List of Databases

Sno	Database
1	ACM
2	ASCE
3	ASME
4	Access Engineering
5	ASTM
6	EBSCO: CMMC
7	IEEE Xplore
8	J-Gate (JET)
9	JSTOR
10	Science Direct
11	Scopus
12	Web of Science
13	Springer eJournals
14	Springer eBooks

2. Accessibility to students

- Fully Automated Library with LAN and Wi-Fi connection for accessing e-Resources and Internet
- Library is arranging orientation and Hands-on-training to all students.
- Working hours - 8 am to 10 pm
- All e-resources accessible across the campus through WiFi
- Digital Library with Ethernet, UPS connectivity, seating capacity of 170

- WEB OPAC
- Institutional Repository (Soft copy of Ph.D Theses, Dissertation, Project reports, Examination papers)
- New Arrival Bulletin

3. Support to students for self-learning activities

1. NPTEL
2. National Digital Library
3. Swayam Prabha,
4. e-PG Pathsala, Swayam,
5. South Asian Archive
6. EDX
7. UGC MOOCs
8. National Academy Repository
9. VIDYA Digital Library
10. World eBook Library

10.4.2. Internet

- Name of the Internet bandwidth with provider

1 Gbps NKN Link – BSNL
100 Mbps – BSNL
80 Mbps - Blu Ultraband

- Wi Fi availability: WiFi is available at all Academic Areas, Library and Hostels. All students can access the WiFi using their own username and password.
- Internet access in labs, classrooms, library and offices of all Departments: Internet can be accessed from all labs, library, offices, departments etc. Network connectivity is also provided in all classrooms with internet. This connectivity is through LAN cables over and above the WiFi connectivity provided. All the buildings are interlinked through high speed fibre cable with High Bandwidth connectivity.
- Security arrangements: Network security is provided using a perimeter security device and also at all end points. At the perimeter a dual firewalling solution with Basic Firewalling features, Content/Application Filtering, Bandwidth Management, Global VPN, Gateway Antivirus, Botnet Filter, Intrusion Prevention, Anti-Spyware, Geo IP Filtering and Failover Load Balancing take care of all traffic that comes into the campus and going out of the campus. At all end points, desktops are installed

PART C

Declaration by the Institution



AMRITA
VISHWA VIDYAPEETHAM

School of
Engineering

Amritapuri
Bengaluru
Coimbatore

Amritapuri P. O., Ennisatta, Coimbatore - 641 112 Tamil Nadu, INDIA. Ph: +91 422 2689804 Fax: +91 422 2686274 E-mail: ase@amrita.edu

Declaration

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: April 25, 2019

Place: Coimbatore

Signature and Name

Head of the Institution with seal

DR. SASANGAN RAMANATHAN
Dean (Engineering)
Amrita Vishwa Vidyapeetham
Amrita Nagar, Coimbatore - 641 112.

Annexure I

(A) PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **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) PROGRAM SPECIFIC OUTCOMES (PSOs)

1. Students will learn governing principles in the fundamental disciplines of Aerospace Engineering (covering aerodynamics, guidance & control, propulsion and structures) along with their applications.
2. Students will be trained in the methodology and tools that are used in the fundamental design of aircraft and rockets.
3. Students will have the ability to function in multidisciplinary teams in the Aerospace Engineering domain.

List of projects

2018-19

Topic	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
Implementation of Control configured vehicles in flight simulator	√	√	√	√	√	√	√	√			√	√	√	√	√
Technology To Recycle Plastic Bags Into Composite	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Light weight blast proof composites	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Experimental Characterization of Liquid Jets Emanating from an Effervescent Atomizer	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Characterization of Laminar- to - Turbulent Transition Utilizing Reynolds Apparatus in Combination with High-Speed Visualization	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Numerical analysis of Ballistic Impact	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Studies on Chevron Nozzle Jets	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Implementation of Autopilot and FMS in flight simulator	√	√	√	√	√	√	√	√			√	√	√	√	√
Effects of cross-sectional shapes on the aerodynamic characteristics of a bio-inspired wing	√	√	√	√	√	√	√	√			√	√	√	√	√
Computational parametric studies of parachutes used for recovering SUAVs	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Analysis of wing flutter	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Liquid drop impact onto inclined biological inspired solid surfaces	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Breakup characteristics of the liquid jet emanating from non-circular orifices	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Effect of Temperature on the aerodynamics of airfoil in low reynolds number flow	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Aerodynamics of comb like serrations on airfoil in low reynolds number flow	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

2017-18

Topic	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
Aircraft Simulator	√	√	√	√	√	√	√	√			√	√	√	√	√
Parametric study of Wind Catcher	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
Developing algorithm for particle based solvers	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Influence of dynamic inflow on coaxial helicopter trim	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Influence of blade flexibility on coaxial helicopter trim	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Computational Simulations of Low Reynolds Number Flyers	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Turn control in wings inspired by Flying Snakes	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Icing studies on aircraft aero foils	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fracture study on dynamic loading conditions.	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Analysis of ballistic impact with temperature effects.	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Influence of one-dimensional groove structure as a wall roughness on the performance characteristics of lifting surfaces in the low Re regime.	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Flame stabilization in the high subsonic combustion using metal foam	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Adhesive Bonding of Aluminum by High Temperature Resistant Polyimide Adhesive for Structural Application in Aviation and Space	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Impact Resistance of Silicone and Joining of Silicone to Thermoplastic Composite for Strategic Applications	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Experimental Characterization of Acoustically Excited Liquid Jets	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Study on the Environmental effects in Airports.	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Non-destructive evaluation of Thermoplastic composites under varying impact loads	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Development of Fire resistant coating for aerospace application	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Effusion Cooling of Aircraft Combustion Chambers: Studies on Improving Mass flow effectiveness	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Studies on Film Cooling of Rocket Nozzles	√	√	√	√	√	√	√	√	√	√	√	√	√	√

2016-17

Topic	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
A Virtual Flight Test Lab	√	√	√	√	√	√	√	√			√	√	√	√	√
Earth Air Heat Exchanger	√		√	√	√	√	√	√	√	√	√	√	√	√	√
Interaction of Shock wave boundary layer in high speed flows	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Aerodynamics of flight in nature in Low Reynolds number regime	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Stability of Wind Turbines	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Trim and stability of a coaxial helicopter rotor system	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

CFD simulations of morphing airfoils in the Reynolds number of MAV and conventional flyers.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Reynolds number effects on wings inspired by flying snakes	√	√	√	√	√	√	√	√			√	√	√	√	√
Icing effects on the performance of wind turbine airfoils.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Development of Advanced Thermo-plastic Composite Laminates.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Study and Design of Elastomeric Dampers	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Corrosion resistance using physical structure induced super hydrophobicity.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Vaporized Solvent Bonding of High Performance Polymer for Energy Saving Structure	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
State of the art Design and Fabrication of Adhesive Bonding of Aluminum for Future Generation Aerospace	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
High-speed Flow Visualization of Air-assisted Liquid Jets	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Nozzle Cooling for Rockets: Studies on Enhancement of Effectiveness	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Studies on Effusion Cooling of Aircraft Combustion Chambers	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Raju Ananth, Ph.D., P.E.

Education

Ph.D., Mechanical and Aerospace Sciences, University of Rochester
MS, Thermal Sciences, Indian Institute of Technology, India
BSME, Government College of Technology, India

Professional Associations

Registered Professional Mechanical Engineer, State of California.

Professional Experience

2006 – 2016 Senior Consultant, Structural Integrity Associates Inc., San Jose, Ca.
2003 - 2006 Consultant, Structural Integrity Associates, Inc., San Jose, CA
2001 - 2002 Consultant, General Electric, Nuclear Energy Division, San Jose, CA
2000 - 2001 Senior Principal Tribology Engineer, Halo Data Devices, Inc., San Jose, CA
1994 - 2000 Western Digital Corporation, San Jose, CA
1999 - 2000 Senior Staff Engineer, Advanced Mechanical Engineering
1994 -1999 Senior Principal Engineer, Advanced Tribology Department
1990 - 1994 Maxtor Corporation, San Jose, CA
1989 - 1990 SyQuest Technology, Advisory Engineer, Fremont, CA
1979 - 1989 Unisys, Santa Clara, CA
1985 - 1989 Manager, Head Disk Mechanics, Disk Drive Engineering
1982 - 1985 Manager, Mechanical Technology, Recording Technology Center
1979 - 1982 Staff Engineer, Recording Technology Center
1974 - 1979 Engineer, Nuclear Division, General Electric, San Jose, CA
1973 - 1974 Post - Doctoral Fellow, Avionics Lab, Wright-Patterson AFB, Dayton, Ohio.

Summary

Areas of expertise include Flow Induced Vibrations, Structural Dynamics, Finite-Element Modeling, Fluids and Heat Transfer, Statistics and Reliability, Random Data Analysis, Reliability of surfaces subjected to Friction/ Wear, Metrology using Optical Systems and Electromagnetics.

Served in an expert panel looking into the San Onofre Steam Generator tube wear issues. Involved in projects that dealt with predicting flow fields and forces due to accidents such as pipe breaks including predicting forces due to traveling acoustic wave fronts. Also involved in generating time histories from response spectra for the purpose of conducting non-linear seismic analysis.

Past projects include analyzing and measuring linear and rotational vibrations of power generating equipment's such as pumps and steam turbines. He is actively involved in understanding and solving flow induced vibration problems of reactor internals. As a consultant at GE he worked on predicting the flow-induced forces on jet-pumps and feed-water nozzle fatigue both from a classical and fracture mechanic points of view.

Significant contributions early in the professional career at General Electric (GE) were in the area of “Flow Induced Vibrations (FIV).” At GE generated a FIV Design Guide document that is widely used in the industry. Also performed analysis and tests on a number of Boiling Water Nuclear Reactor components including jet-pumps, guide tubes and fuel rods.

Contributions during career at various disk drive companies like Halo (Startup), Western Digital, Maxtor, SyQuest and Unisys were mainly in the area of Tribology (Physical and Chemical Interaction of Surfaces). Designed innovative tests and used tools including analytical chemistry to assess the reliability of the interface between the Magnetic Head and the data disk. Also was an active member of a number of task forces dealing with root cause investigations of magnetic head crashes.

Publications

“Third-Order Theory and Bang-Bang Control of Voice Coil Actuators,” IEEE Transactions on Magnetics, Vol.MAG-18, No.3, May 1982.

“Preliminary Design Handbook for Flow-Induced Vibration of Light Water Reactors,” GE Internal Report (DOE Contract), GEAP – 24158, Nov. 1978.

“Hydrodynamic Mass – A Summary,” GE Report NEDE – 24043, August 1977.

“Fuel Rod Vibration and FIV Amplitude Prediction,” GE Report NEDM-21176, January 1976.

G. Szasz, K. K. Fujikawa, R. Ananth, “Dynamic Pressure Data Acquisition via Strain Gage Measurements,” Proceedings of Proceedings of IDETC/CIE 2005 ASME 2005 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, September 24-28, 2005, Long Beach, California.

J.Molyneux, R. Ananth J. Gillis, “Decompression Pressure Wave Loads in a Boiling Water Reactir (BWR) due to Recirculation Pipe Break,” PVP 2009 Proceedings No.77781, 2009 ASME Conference, Prague, Czech Republic, July 2009.

R. Ananth, K. Fujikawa, J. Gillis, “Fluid Flow Field in the Annulus of Boiling Water (BWR) Nuclear Reactors under Normal and Accident Conditions,” PVP 2009 Proceedings No.77442, 2009 ASME Conference, Prague, Czech Republic, July 2009.

Sommerville, D.V., Ananth, R.A., “Boiling Water Reactor Jet Pump Acoustic Loads Resulting from a Recirculation Outlet Line Break Loss of Coolant Accident – Some Sensitivity Studies,” Proceedings of the 2010 ASME Pressure Vessel and Piping Division Conference, Bellevue, WA, PVP2010-25866.

R.Ananth, S. Sowah, J. Gillis, “Flow Loads on the Shroud in a Boiling Water Reactor Due to a Recirculation Outlet Line Break - A Comparative Study between Potential Flow and Computational Fluid Dynamics Methodologies,” Proceedings of the 2012 ASME Pressure Vessel and Piping Division Conference, Toronto, Canada, PVP2012 – 78116.

R. Ananth, S. Day, M. Bose, “The Rocking and Stability of Spent Fuel Casks,” Proceedings of the 2014 ASME Pressure Vessels & Piping Conference, Anaheim, California, PVP2014-28780.

R.Ananth, M. Fong, “3D Solution of the Flow field in a Boiling Water Reactor annulus due to Recirculation Outlet Line break using Heat Transfer analogy,” Proceedings of the ASME 2016 Pressure Vessels & Piping Conference, Vancouver, British Columbia, Canada, PVP2016-63091.


List of Patents

5,831,792, “Slider Having a Debris Barrier Surrounding a Transducer,” Nov 3, 1998

5,454,157, “Method of Manufacturing a Hermitically Sealed Disk Drive,” Oct 3, 1995

5,327,311, “Techniques for Providing Back Bar and Boss for Slider,” (A precursor to the Padded Slider), July 5, 1994

5,299,082, “Actuator Assembly with Compensated Outer Arms,” March 29, 1994

		AMRITA VISHWA VIDYAPEETHAM					
		SCHOOL OF ENGINEERING					
		Coimbatore					
		PERIOD: Academic Year 2017-2018					
		July 1, 2017 - June 30, 2018					
		Name:	Qualification:				
		Designation:	Date of Joining Amrita:				
		Department:	Date of Last Promotion:				
		Employee No.					
	INSTRUCTIONS FOR FILLING THE FORM:						
	1. Enter values for APPLICABLE CATEGORIES ONLY						
	2. Journals and Conference proceedings without impact factor (IF) should be entered under IF < 1.0						

	3. Extramural funding can be from either Govt or Industry							
4. Each campus can add campus specific Admin roles not covered in this form - subject to School Head and Dean's approval								
5. Publications - Copy and paste additional rows depending on the number of publications to be entered								
6. Campus specific tasks/events - School Heads can add additional rows for tasks/events specific to their campus and assign appropriate points								
7. Taks completed by faculty, but not listed in the form can be added and discussed with Chairperson and brought to the attention of the School Head								
	Points per count	Category	Count	No. of Amrita faculty as co-authors	Impact Factor (IF)	Total Points		
A		TEACHING-EVALUATION ACTIVITIES						

A1	80	UG Theory course and evaluation (4 credit course)	2			160
A2	60	UG Theory course and evaluation (3 credit course)				0
A3	40	UG Theory course and evaluation (2 credit course)				0
A4	80	PG Theory courses (4 credits)				0
A5	60	PG Theory courses (3 credits)				0
A6	30	Faculty in charge of lab (UG/PG)				0
A7	30	UG/PG Lab course (2 credits)				0
A8	15	UG Project Guide (per batch)				0
A9	15	UG Project Review committee member				0
A10	20	PG Project Guide				0
A11	15	PG Project Review committee member				0
A12	25	Ph.D. Thesis Advisor (Post-comprehensive)				0
A13	10	Doctoral Committee member				0
		SUB-TOTAL				160
B		RESEARCH & CONSULTANCY ACTIVITIES				
B.1						

B.2	40	No. of Research Proposals Submitted : PI or Co-PI				0
B.3	60	No. of extramural funded projects sanctioned (< 25 Lakhs) - PI or Co-PI				0
B.4	90	No. of extramural funded research projects sanctioned (25 - 75 Lakhs) - PI or Co-PI				0
B.5	150	No. of extramural funded research projects sanctioned (> 75 lakhs) - PI or Co-PI				0
B.6	60	Extramural Research Project Execution - < Rs. 25 Lakhs (PI or Co-PI)				0
B.7	100	Extramural Research Project Execution - > Rs. 25 Lakhs (PI or Co-PI)				0
B.8	50	No. of peer reviewed scopus indexed publications (International Journals): IF < 1.0		2	1	0
B.9	40	No. of peer reviewed scopus indexed publications (National Journals): IF < 1.0		3	1	0
B.10	30	No. of scopus indexed conference proceedings publications: IF < 1.0		4	1	0
B.11	70	No. of peer reviewed scopus indexed publications (International Journals): IF = 1.1 - 3.0		2		0

B.12	60	No. of peer reviewed scopus indexed publications (National Journals): IF = 1.1 - 3.0		2		0
B.13	50	No. of scopus indexed conference proceedings publications: IF 1.1 - 3.0		2		0
B.14	80	No. of peer reviewed scopus indexed publications (International Journals): IF = > 3.0		2		0
B.15	70	No. of peer reviewed scopus indexed publications (National Journals): IF = > 3.0		2		0
B.16	60	No. of scopus indexed conference proceedings publications: IF > 3.0		3		0
B.17	10	No. of citations of your publications with " AMRITA Affiliation " from "scopus.com" between Jan 2017 - Dec 2017				0
B.18	80	No. of Books authored/co-authored (International Publisher)				0
B.19	60	No. of Books authored/co-authored (National Publisher)				0
B.20	50	No. of Books chapters authored/co-authored (International Publsiher)				0
B.21	40	No. of Books chapters authored/co-authored (National Publsiher)				0
B.22	80	Patents Filed				0

B.23	120	Patents Granted				0
B.24	50	International Conference conducted by Amrita (Chair or Co-chair)				0
B.25	30	International Conference conducted by Amrita (Coordinator/member)				0
		SUB-TOTAL				0
C		AWARDS and RECOGNITIONS				
C.1	60	Invited Speaker/Chair in an International Conference (Outside India)				0
C.2	40	Invited Speaker/Chair in an International Conference (Within India)				0
C.3	200	International recognition by an Association/Society				0
C.4	100	National Recognition by an Association/Society				0
C.5	100	Members of faculty in-charge of a team winning National level Technical/ Cultural / Sports events				0
C.6	150	Members of faculty in-charge of a team winning International level Technical/ Cultural / Sports events				0

		SUB-TOTAL				0
D		DEPARTMENTAL ACTIVITIES				
D.1	100	Vice Chair (Dept faculty strength > 40)				0
D.2	80	Vice Chair (Dept faculty strength < 40)				0
D.3	30	Year / Batch Coordinator				0
D.4	40	Class Advisor				0
D.5	40	Class/student Counselor				0
D.6	20	Dept Timetable Coordinator				0
D.7	60	Dept NAAC / IQAC coordinator				0
D.8	80	Dept Academic Coordinator (points for handling student strength of 240)				0
D.9	20	Course Mentor				0
D.10	30	Course Chief Mentor				0
D.11	20	Dept AUMS Coordinator				0
D.12	30	FDP/workshop Organizer/Coordinator				0
D.13	30	UG admissions coordinator				0
D.14	30	PG admissions coordinator				0
D.15	30	Ph.D. admissions coordinator				0

D.16	15	Dept Placement Coordinator				0
D.17	100	Live in Labs Coordinator/member (per project)				0
D.18	100	International Collaboration (Industry/Academia)				0
D.19	60	National Collaboration (Industry/Academia)				0
D.20	20	TAG Lead				0
D.21	50	Chairman of Amrita University BoS (UG/PG)				0
D.22	30	Member of Amrita University BoS (UG/PG)				0
		SUB-TOTAL				0
E		CAMPUS/UNIV ADMINISTRATIVE ACTIVITIES				
E.1	150	Head, Student Affairs				0
E.2	100	Head, Research				0
E.3	150	Campus Academic Coordinator				0
E.4	150	Campus Dy Controller of Examination				0
E.5	60	Campus IQAC Coordinator				0

E.6	20	Campus Time Table Coordinator				0
E.7	100	Campus AUMS Coordinator				0
E.8	30	Campus/School level event Coordinator (Cultural; Technical and Sports)				0
E.9	20	Campus/School level event Member (Cultural; Technical and Sports)				0
E.10	30	Campus Level Committee Chair (e.g., mess, hostel, disciplinary etc)				0
E.11	30	Campus level Committee Member (e.g, mess, hostel, disciplinary, etc)				0
E.12	150	Univ NAAC / IQAC coordinator				0
		SUB-TOTAL				0
		GRAND TOTAL				160

