JOY UNIVERSITY

Established vide Tamil Nadu State Pvt. Universities Act 2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

Outcome Based Curriculum Framework with

CBCS

for

BACHELOR OF TECHNOLOGY (AERONAUTICAL ENGINEERING)

(B. Tech Aeronautical Engineering)

Students admitted from 2024 -25 onwards

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VISION

♣ To create and nurture a multidisciplinary global university with highest academics, research and ethical standards in a creative and innovative environment.

MISSION

♣ To be a premier University of choice for all stakeholders and contribute for academic demographic dividend. To inculcate quality, integrity, team work, compassion, ethics in new generation students for catering to various needs of society.

QUALITY OBJECTIVES

- To disseminate knowledge with skills through teaching, training, seminars, workshops, conferences and symposia in Engineering and Technology, Art and Design, Management and Commerce, Allied Health Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences, Law and Agricultural Sciences to enable students to meet the current needs and trends of industries, business and society.
- To provide technical and scientific solutions to real time problems posed by industries, business and society in all Schools of Joy University.
- To inculcate quality, integrity, team work, compassion, ethics in new generation students for catering to various needs of society.
- To promote the spirit of entrepreneurship in the young generation to help and create more career opportunities in the society by incubating a nurturing technology product idea backed by Technology Business Incubation.
- To identify and nurture leadership and innovate skills in students to become future leaders to enrich society.
- To develop collaborations and partnerships with International global and reputed Universities, research establishments, Government and NGO's, industries and businesses. To support both faculties and students for international exposure.

SCHOOL OF ENGINEERING AND TECHNOLOGY

VISION

To emerge as a premier center for engineering excellence and innovation, cultivating globally competent professionals committed to driving sustainable development and transformative technological advancements for the betterment of society.

MISSION

- Deliver excellence in engineering education by integrating theoretical knowledge, practical skills, and innovation to equip students for addressing global challenges.
- Foster an environment that encourages curiosity, innovation, and cross-disciplinary research to tackle evolving technological and societal challenges.
- Engage with industry, academic institutions, and communities to enrich education, foster entrepreneurship, and support holistic professional development.
- Cultivate ethical responsibility, leadership qualities, and a dedication to sustainability and continuous learning in all graduates.
- Advance societal progress through the application of inclusive, sustainable, and efficient engineering solutions.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: Graduates will establish a strong foundation in mathematics, physics, and engineering principles, enabling them to analyze and solve aeronautical and aerospace engineering problems.

PEO2: Graduates will successfully pursue careers in aeronautical engineering or related fields, such as aviation, defence, space research, or continue their education through postgraduate studies or professional certifications.

PEO3: Graduates will engage in innovation, research, and design of advanced aeronautical systems, applying their skills to create efficient, safe, and sustainable aerospace solutions.

PEO4: Graduates will demonstrate professionalism, ethical behaviour, and leadership

skills in their careers, contributing effectively to teams and adhering to industry standards and societal expectations.

PEO5: Graduates will engage in lifelong learning, adapting to evolving technologies and the global aerospace environment through continuing education, research, and professional development.

PEO6: Graduates will exhibit strong problem-solving and critical thinking skills, applying their knowledge of aeronautical engineering to overcome technical challenges and develop innovative solutions.

PEO7: Graduates will understand the broader impact of aeronautical engineering solutions in a global context, considering environmental, economic, and societal challenges.

GRADUATE ATTRIBUTES

The Graduate Attributes of B. Tech (Aeronautical Engineering) are:

GA1: Apply appropriate knowledge in Aeronautical Engineering to identify, formulate, analyze, and solve complex engineering problems in order to reach substantive conclusions.

GA2: Self-learn and engage in use of advanced computing tools.

GA3: Develop sustainable computing solutions in broader economic, societal and environmental contexts.

GA4: Think critically, creatively and analytically as a aeronautical scientist, whilst being able to work effectively, independently and collaboratively as part of a team in research, technology development and entrepreneurial ventures.

GA5: Apply evolving ethics and privacy laws across various domains and territories.

GA6: Effectively communicate engineering concepts and ideas to peers in written or oral forms.

GA7: Be motivated to engage in independent and life-long learning in the broadest context of evolving technological challenges.

PROGRAMME OUTCOMES

On completion of the **B. Tech (Aeronautical Engineering) Programme,** students should be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO1: Graduates will be able to design, analyze, and develop various components and systems of an aircraft, such as the structure, propulsion, avionics, and control systems, while adhering to aviation industry standards.

PSO2: Graduates will apply knowledge of aerodynamics, flight dynamics, and fluid mechanics to analyze and optimize the performance, stability, and control of aircraft and aerospace vehicles.

PSO3: Graduates will have the ability to understand, analyze, and design propulsion systems, including jet engines, rockets, and other aerospace propulsion technologies, focusing on improving efficiency, sustainability, and performance.

PSO4: Graduates will understand the properties of advanced materials used in aerospace applications and apply modern manufacturing techniques in the production and maintenance of

aircraft components, ensuring durability and safety.

PSO5: Graduates will be proficient in the development, integration, and maintenance of avionics systems, including navigation, communication, and control technologies essential for aircraft and spacecraft operations.

PSO6: Graduates will have the expertise to plan and conduct flight tests and utilize simulation tools for performance evaluation, troubleshooting, and validation of aircraft designs and modifications.

PSO7: Graduates will be equipped with the knowledge to contribute to space missions, focusing on satellite development, space exploration vehicles, and space environment challenges, while leveraging emerging space technologies.

Summary of Credits

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Credits	23	23	25	23	23	24	22	20	188
Contact Hrs./Week	27	26	30	26	28	29	12	12	198

SEMESTER WISE CREDIT STRUCTURE

Sl. No.	Category of Courses	1st Year		2nd Year		3rd Year		4th Year		Total
		Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Sem VII	Sem VIII	
1.	Departmental Core	04	04	17	19	17	18	03	-	82
2.	Discipline Specific Electives (DSE)	–	–			06	06	03	03	18
3.	Open Electives	–						03	06	09
4.	Applied Sciences	08	13	04						25
5.	Seminar/ Summer Internships/ Independent Study and Seminar	–	–					06	--	06
6.	Project	–	–					04	08	12
7.	Skill Enhancement Course	08	04	04	04		-			20
8.	Ability Enhancement Courses (AECC)	03	–					03		06
9.	Value-Added Course		02						03	05
Total		**23**	**23**	**25**	**23**	**23**	**24**	**22**	**20**	**183**

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School Of Engineering and Technology

B. Tech (Aeronautical Engineering)

Semester – I

(Total Credits: 23)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN111	**Applied Sciences** Mathematics – I	3	1	0	4	4
2.	24BTAN112	**Applied Sciences** Physics – I	3	1	0	4	4
3.	24AEEN811	**Ability Enhancement Compulsory Course (AECC)** Effective Communication	3	0	0	3	3
4.	24BTAN114	**Skill Enhancement Course** Fundamentals of Computing	3	0	0	3	3
5.	24BTAN115	**Skill Enhancement Course** Introduction to Programming	3	0	0	3	3
6.	24BTAN116	**Core Course** Engineering Drawing	2	0	4	6	4
7.	24BTAN211	**Skill Enhancement Course** Fundamentals of Computing Lab	0	0	2	2	1
8.	24BTAN212	**Skill Enhancement Course** Introduction to Programming Lab	0	0	2	2	1
		Total	**17**	**2**	**8**	**27**	**23**

Semester – II

(Total Credits: 23)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN121	**Applied Science** Mathematics – II	3	1	0	4	4
2.	24BTAN122	**Applied Science** Physics II	3	1	0	4	4
3.	24EVST921	**Value Added Course** Environmental Science	2	0	0	2	2
4.	24BTAN123	**Core Course** Engineering Mechanics	2	1	0	3	3
5	24BTAN124	**Skill Enhancement Course** Fundamentals of Electrical & Electronics Engineering	3	0	0	3	3
6.	24BTAN125	**Applied Science** Probability, Statistics and Stochastic processes	3	1	0	4	4
7.	24BTAN221	**Core Course** Basic Workshop Practical	0	0	2	2	1
8.	24BTAN222	**Applied Science** Physics Laboratory	0	0	2	2	1
9.	24BTAN223	**Skill Enhancement Course** Basic Electrical and Electronics Laboratory	0	0	2	2	**1**
		TOTAL	**16**	**4**	**6**	**26**	**23**

Semester – III

(Total Credits: 25)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN131	**Applied Science** Mathematics – III	3	1	0	4	4
2.	24BTAN132	**Skill Enhancement Course** Data Structures and Algorithms	3	0	0	3	3
3.	24BTAN133	**Core Course** Manufacturing Processes	3	0	0	3	3
4.	24BTAN134	**Core Course** Thermodynamics	3	1	0	4	4
5.	24BTAN135	**Core Course** Strength of Materials	3	0	0	3	3
6.	24BTAN136	**Core Course** Fluid Mechanics and Machinery	3	0	0	3	3
7.	24BTAN231	**Skill Enhancement Course** Data Structure and Algorithm Laboratory	0	0	2	2	1
8.	24BTAN232	**Core Course** Strength of Materials Laboratory	0	0	4	4	2
9.	24BTAN233	**Core Course** Fluid Mechanics and Machinery Laboratory	0	0	4	4	2
		Total	**18**	**2**	**10**	**30**	**25**

Semester – IV

(Total Credits: 23)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN141	**Core Course** Theory of Machines	3	1	0	4	4
2.	24BTAN142	**Skill Enhancement Course** Fundamentals of Machine Learning	3	0	0	3	3
3.	24BTAN143	**Core Course** Aircraft Systems and Instruments	3	0	0	3	3
4.	24BTAN144	**Core Course** Aerodynamics - I	2	1	0	3	3
5.	24BTAN145	**Core Course** Aircraft Structures -I	2	1	0	3	3
6	24BTAN146	**Core Course** Design of Machine Elements	3	1	0	4	4
7	24BTAN241	**Skill Enhancement Course** Fundamentals of Machine Learning Laboratory	0	0	2	2	1
8.	24BTAN242	**Core Course** Aircraft Systems and Instruments Laboratory	0	0	2	2	1
9.	24BTAN243	**Core Course** Computer Aided Machine Drawing	0	0	2	2	1
		Total	**16**	**04**	**06**	**26**	**23**

Semester – V

(Total Credits: 23)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN151	**Core Course** Aerodynamics - II	2	1	0	3	3
2.	24BTAN152	**Core Course** Aircraft Structures -II	2	1	0	3	3
3.	24BTAN153	**Core Course** Avionics	3	0	0	3	3
4.	24BTAN154	**Core Course** Aerospace Propulsion	2	1	0	3	3
5.	24BTAN051 24BTAN052	**Discipline Specific Elective (DSE) I** Sensors and Transducers in Engineering Cryogenics	3	0	0	3	3
6.	24BTAN053 24BTAN054	**Discipline Specific Elective (DSE) II** Mechanics of Composite materials Vibration Engineering	3	0	0	3	3
7.	24BTAN251	**Core Course** Aerodynamics Laboratory	0	0	3	3	1.5
8.	24BTAN252	**Core Course** Propulsion Laboratory	0	0	2	2	1
9.	24BTAN253	**Core Course** Avionics Laboratory	0	0	2	2	1
10.	24BTAN254	**Core Course** Aircraft Structures Laboratory	0	0	3	3	1.5
		Total	**15**	**03**	**10**	**28**	**23**

Semester – VI

(Total Credits: 24)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN161	**Core Course** Computational Fluid Mechanics	2	1	0	3	3
2.	24BTAN162	**Core Course** Heat and Mass transfer	3	1	0	4	4
3.	24BTAN163	**Core Course** Aircraft Design	2	1	0	3	3
4.	24BTAN164	**Core Course** Flight Dynamics and Control	2	1	0	3	3
5.	24BTAN061 24BTAN062	**Discipline Specific Elective III** Refrigeration and Air conditioning Engineering Failure Analysis	3	0	0	3	3
6	24BTAN063 24BTAN064	**Discipline Specific Elective IV** Additive Manufacturing Reliability Engineering	3	0	0	3	3
7	24BTAN261	**Core Course** Aero Engine Laboratory	0	0	2	2	1
8.	24BTAN262	**Core Course** Computational Fluid Mechanics Lab	0	0	2	2	1
9.	24BTAN263	**Core Course** Aircraft Design Laboratory	0	0	3	3	1.5
10.	24BTAN264	**Core Course** Flight Training / Flight Simulation Laboratory	0	0	3	3	1.5
		Total	**15**	**04**	**10**	**29**	**24**

Semester – VII

(Total Credits: 22)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN171	**Core Course** Drone Technology	3	0	0	3	3
2.	24BTAN172	**Ability Enhancement Courses** Operations Research	3	0	0	3	3
3.	24BTAN071 24BTAN072	**Discipline Specific Elective V** Non-Traditional Manufacturing Processes Tool Design	3	0	0	3	3
4.	24BTAN371 24BTAN372	**Open Elective I** Finite Element Methods Soft Computing	3	0	0	3	3
5.	24BTAN571	**Project** Project- Phase I	0	0	0	0	4
6	24BTAN471	**Internships/ Field Visits** Industrial/ Research Internship	0	0	0	0	3
7	24BTAN472	**Seminar** Seminar	0	0	0	0	3
		Total	**12**	**0**	**0**	**12**	**22**

Semester – VIII

(Total Credits: 20)

SI.No	Course Code	Course Title	L	T	P	Contact Hrs / Wk	Credits
1.	24BTAN181	**Value Added Course** Professional Ethics	3	0	0	3	3
2.	24BTAN081 24BTAN082	**Discipline Specific Elective VI** Radar and Remote Sensing Unmanned Aircraft Systems	3	0	0	3	3
3.	24BTAN381 24BTAN382	**Open Elective II** Condition Monitoring and Fault Diagnostics Electromagnetic Compatibility	3	0	0	3	3
4.	24BTAN383 24BTAN384	**Open Elective III** Project Management Energy Conservation and Management	3	0	0	3	3
5.	24BTAN581	**Project** Project- Phase II	0	0	0	0	8
		Total	**12**	**0**	**0**	**12**	**20**