SANDIP UNIVERSITY

School of Engineering and Technology

Department of Aero Engineering

# CURRICULUM STRUCTURE

# B.Tech PROGRAM

# In

# AEROSPACE ENGINEERING

## (Sem III To VIII)

## Batch 2025-2026

SANDIP UNIVERSITY

School of Engineering and Technology

Department of Aero Engineering

## Course Structure-B.Tech Aerospace Engineering
## Semester – III

| Sr. No. | Core | Course Code | Course Name | Teaching Scheme (Hrs./Week) | | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | Formative Assessment CIA | | Summative Assessment ESE | | |
| | | | | | | | | Course | Lab | Course | Lab | |
| 1 | PCC | NYAS301 | Aero Thermodynamics | 3 | 1 | 0 | 4 | 50 | - | 100 | - | 150 |
| 2 | PCC | NYAS302 | Fluid Mechanics | 3 | 0 | 0 | 3 | 50 | - | 100 | - | 150 |
| 3 | PCC | NYAS311 | Aero Thermodynamics Laboratory | 0 | 0 | 2 | 1 | - | 50 | - | 50* | 100 |
| 4 | PCC | NYAS312 | Fluid Mechanics Laboratory | 0 | 0 | 2 | 1 | - | 50 | - | 50* | 100 |
| 5 | OE | - | Open Elective-I # | 3 | 0 | 0 | 3 | 50 | - | 100 | - | 150 |
| 6 | MDM | - | Minor course 1 # | 3 | 0 | 0 | 3 | 50 | - | 100 | - | 150 |
| 7 | VEC | NLWV01 | The Constitution & Human Rights | 2 | 0 | 0 | 2 | 50 | - | 100 | - | 150 |
| 8 | AEC | NHSA11 | Key Competencies for Career Growth | 0 | 0 | 4 | 2 | - | 50 | - | 50 | 100 |
| 9 | CEP/FP | NYAS314 | Community Engagement Project*/ Field Project* | -- | -- | 4 | 2 | | 50 | | 50 | 100 |
| **TOTAL** | | | | **14** | **01** | 12 | 21 | **250** | **200** | **500** | **200** | **1150** |
| **Value Added Course** | | | | | | | | | | | | |
| 10 | VAC | | Microsoft office | - | - | 2 | - | - | - | - | - | - |

| | | Formative Assessment | | |
|---|---|---|---|---|
| **CIA**: Continuous Internal Assessment<br>**L**: Theory Lecture<br>**T**: Tutorial<br>**P**: Practical<br>**ESE**: End Semester Exam | *: Oral Examination<br>**PCC**: Program Core course<br>**OE:**Open Elective<br>**VAC:** Value Added Courses<br>**AEC :**AbilityEnhancement curses<br>**CEP/FP:**Communityencougement project/Field project<br>**VSEC:** Vocational and Skill Enhancement Course<br>**MDM:** Multidisciplinary minor course | **CIA** | **Weightage** | **Description** |
| | | CIA 1 | 10% | Home Assignment |
| | | CIA 2 | 20% | Written Exam |
| | | CIA 3 | 10% | Seminar Presentation |
| | | CIA 4 | 10% | • Behavioural Attitude + General Discipline (5%)<br>• Theory + practical attendance 5%) |
| | | **TOTAL** | **50%** | |

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## Course Structure-B.Tech Aerospace Engineering
## Semester – IV

| Sr. No. | Core | Course Code | Course Name | Teaching Scheme (Hrs./Week) | | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | Formative Assessment CIA | | Summative Assessment ESE | | |
| | | | | | | | | Course | Lab | Course | Lab | |
| 1 | PCC | NYAS401 | Strength of Materials | 3 | - | - | 3 | 50 | - | 100 | - | 150 |
| 2 | PCC | NYAS402 | Aerospace Propulsion | 3 | - | - | 3 | 50 | - | 100 | - | 150 |
| 3 | PCC | NYAS403 | Aerodynamics for space vehicle | 3 | - | - | 3 | 50 | - | 100 | - | 150 |
| 4 | PCC | NYAS411 | Aerospace Propulsion Laboratory | - | - | 2 | 1 | - | 50 | - | 50* | 100 |
| 5 | OE | - | Open Elective-II # | 3 | - | - | 3 | 50 | - | 100 | - | 150 |
| 6 | MDM | - | Minor course 2 # | 3 | 0 | 0 | 3 | 50 | - | 100 | - | 150 |
| 7 | VSEC | NYAS412 | Mechanics of solid - Laboratory | - | - | 2 | 1 | - | 50 | - | 50* | 100 |
| 8 | VSEC | NYAS413 | Space Aerodynamics-Laboratory | - | - | 2 | 1 | - | 50 | - | 50* | 100 |
| 9 | VEC | NHSA12 | Strategic Communication for professionals | 0 | 0 | 4 | 2 | - | 50 | - | 50 | 100 |
| **TOTAL** | | | | **15** | **0** | **10** | **20** | **250** | **200** | **500** | **200** | **1150** |

| | | Formative Assessment | | |
|---|---|---|---|---|
| **CIA**: Continuous Internal Assessment | *: Oral Examination | **CIA** | **Weightage** | **Description** |
| **L**: Theory Lecture | **PCC**: Program Core course | CIA 1 | 10% | Home Assignment |
| **T**: Tutorial | **OE:**Open Elective | CIA 2 | 20% | Written Exam |
| **P**: Practical | **VAC:** Value Added Courses | CIA 3 | 10% | Seminar Presentation |
| **ESE**: End Semester Exam | **AEC :**AbilityEnhancement curses | CIA 4 | 10% | • Behavioural Attitude + General Discipline (5%)<br>• Theory + practical attendance 5%) |
| | **VSEC:** Vocational and Skill Enhancement Course | **TOTAL** | **50%** | |
| | **MDM:** Multidisciplinary minor course | | | |

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## Course Structure-B.Tech Aerospace Engineering
## Semester – V

| Sr. No. | Core | Course Code | Course Name | Teaching Scheme (Hrs./Week) | | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | Formative Assessment CIA | | Summative Assessment ESE | | |
| | | | | | | | | Course | Lab | Course | Lab | |
| 1 | PCC | NYAS501 | Aerospace Structure | 3 | 1 | 0 | 4 | 50 | - | 100 | - | 150 |
| 2 | PCC | NYAS502 | Rocket Propulsion | 3 | 1 | 0 | 4 | 50 | - | 100 | - | 150 |
| 3 | PCC | NYAS511 | Aerospace Structure Laboratory | 0 | 0 | 2 | 1 | - | 50 | - | 50* | 100 |
| 4 | PCC | NYAS512 | Rocket Propulsion Laboratory | 0 | 0 | 2 | 1 | - | 50 | - | 50* | 100 |
| 5 | PEC | NYASE_ | Program Elective 1 | 3 | 1 | 0 | 4 | 50 | - | 100 | - | 150 |
| 6 | OE | - | Open Elective-III | 2 | - | - | 2 | 50 | - | 100 | - | 150 |
| 7 | MDM | - | Minor course 3 # | 4 | 0 | 0 | 4 | 50 | - | 100 | - | 150 |
| 8 | AEC | NHSA13 | Essential Aptitude Skills | 0 | 0 | 4 | 2 | - | 50 | - | 50 | 100 |
| Total | | | | 15 | 3 | 08 | 22 | 250 | 150 | 500 | 150 | 1050 |

**CIA**: Continuous Internal Assessment

**L**: Theory Lecture

**T**: Tutorial

**P**: Practical

**ESE**: End Semester Exam

*: Oral Examination

**PCC**: Program Core course

**PEC**: Programme elective Core

**OE:**Open Elective

**VAC:** Value Added Courses

**AEC :**AbilityEnhancement curses

**VSEC:** Vocational and Skill Enhancement Course

**MDM:** Multidisciplinary minor course

**Formative Assessment**

| CIA | Weightage | Description |
|---|---|---|
| CIA 1 | 10% | Home Assignment |
| CIA 2 | 20% | Written Exam |
| CIA 3 | 10% | Seminar Presentation |
| CIA 4 | 10% | • Behavioural Attitude + General Discipline (5%)<br>• Theory + practical attendance 5%) |
| **TOTAL** | **50%** | |

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## Course Structure-B.Tech Aerospace Engineering

## Semester – VI

| Sr. No. | Core | Course Code | Course Name | Teaching Scheme (Hrs./Week) | | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | Formative Assessment CIA | | Summative Assessment ESE | | |
| | | | | | | | | Course | Lab | Course | Lab | |
| 1 | PCC | NYAS601 | Heat and Mass transfer | **3** | **1** | **0** | **4** | 50 | - | 100 | - | 150 |
| 2 | PCC | NYAS602 | Space Flight Mechanics | **3** | **0** | **0** | **3** | 50 | - | 100 | - | 150 |
| 3 | PCC | NYAS611 | Simulation-Laboratory | **0** | **0** | **2** | **1** | | 50 | - | 50* | 100 |
| 4 | PEC | NYASE_ | Program Elective 2 | **3** | **1** | **0** | **4** | 50 | - | 100 | - | 150 |
| 5 | PEC | NYASE_ | Program Elective- 3 | **3** | **1** | **0** | **4** | 50 | - | 100 | - | 150 |
| 6 | MDM | - | Minor course 4 # | 2 | 0 | 0 | 2 | 50 | - | 100 | - | 150 |
| 7 | VSEC | NYAE612 | Basics of MATLAB | 1 | - | 2 | 2 | | 50 | - | 50* | 100 |
| 8 | AEC | NHSA14 | Employability Skills and Career Advancement | 0 | 0 | 4 | 2 | - | 50 | - | 50 | 100 |
| **TOTAL** | | | | 15 | 3 | 8 | 22 | 250 | 150 | 500 | 150 | 1050 |

| | | Formative Assessment | | |
|---|---|---|---|---|
| **CIA**: Continuous Internal Assessment<br>**L**: Theory Lecture<br>**T**: Tutorial<br>**P**: Practical<br>**ESE**: End Semester Exam | *: Oral Examination<br>**PCC**: Program Core course<br>**PEC**: Programme elective Core<br>**VAC:** Value Added Courses<br>**AEC :**AbilityEnhancement curses<br>**VSEC:** Vocational and Skill Enhancement Course<br>**MDM:** Multidisciplinary minor course | **CIA** | **Weightage** | **Description** |
| | | CIA 1 | 10% | Home Assignment |
| | | CIA 2 | 20% | Written Exam |
| | | CIA 3 | 10% | Seminar Presentation |
| | | CIA 4 | 10% | • Behavioural Attitude + General Discipline (5%)<br>• Theory + practical attendance 5%) |
| | | **TOTAL** | **50%** | |

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## Course Structure-B.Tech Aerospace Engineering
## Semester – VII

| Sr. No. | Core | Course Code | Course Name | Teaching Scheme (Hrs./Week) | | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | Formative Assessment CIA | | Summative Assessment ESE | | |
| | | | | | | | | Course | Lab | Course | Lab | |
| 1 | PCC | NYAS701 | Computional Fluid dynamics | **3** | **0** | **0** | **3** | 50 | - | 100 | - | 150 |
| 2 | PCC | NYAS711 | Computional Fluid dynamics Laboratory | **0** | **0** | **2** | **1** | - | 50 | - | 50* | 100 |
| 3 | PEC | NYASE_ | Program Elective 4 | 3 | - | - | 3 | 50 | - | 100 | - | 150 |
| 4 | MDM | - | Minor course 5 # | 2 | 0 | 0 | 2 | 50 | - | 100 | - | 150 |
| 6 | INT/OJT | NYAS712 | INTERNSHIP/OJT* | - | - | - | 12 | - | 50 | - | 50* | 100 |
| 7 | AEC | NHSA15 | Corporate Readiness and Entrepreneurial Excellence | 0 | 0 | 4 | 2 | - | 50 | - | 50 | 100 |
| | | | **TOTAL** | 8 | 0 | 6 | 23 | 150 | 150 | 300 | 150 | 750 |

**CIA**: Continuous Internal Assessment

**L**: Theory Lecture

**T**: Tutorial

**P**: Practical

**ESE**: End Semester Exam

*: Oral Examination

**PC**: Program Core course

**PEC**: Programme elective Core

**VAC:** Value Added Courses

**AEC :**AbilityEnhancement curses

**VSEC:** Vocational and Skill Enhancement Course

**MDM:** Multidisciplinary minor course

**Formative Assessment**

| CIA | Weightage | Description |
|---|---|---|
| CIA 1 | 10% | Home Assignment |
| CIA 2 | 20% | Written Exam |
| CIA 3 | 10% | Seminar Presentation |
| CIA 4 | 10% | • Behavioural Attitude + General Discipline (5%)<br>• Theory + practical attendance 5%) |
| **TOTAL** | **50%** | |

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## Course Structure-B.Tech Aerospace Engineering
## Semester – VIII

| Sr. No. | Core | Course Code | Course Name | Teaching Scheme (Hrs./Week) | | | | Examination Scheme | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | Formative Assessment CIA | | Summative Assessment ESE | | |
| | | | | | | | | Course | Lab | Course | Lab | |
| 1 | PCC | NYAS801 | Spacecraft Design | **3** | **1** | **0** | **4** | 50 | - | 100 | - | 150 |
| 2 | PEC | NYASE_ | Program Elective-5 | 4 | - | - | 4 | 50 | - | 100 | - | 150 |
| 3 | PEC | NYASE_ | Program Elective-6 | 4 | - | - | 4 | 50 | - | 100 | - | 150 |
| 4 | MDM | - | Minor course 6 # | 2 | 0 | 0 | 2 | 50 | - | 100 | - | 150 |
| 5 | ELC | NRDP107 | Research Methodology | 4 | - | - | 4 | 50 | - | 100 | - | 150 |
| 6 | CEP/FP | NYAS811 | Project | - | - | 8 | 4 | - | 50 | - | 100 | 150 |
| **TOTAL** | | | | 17 | - | 8 | 22 | 250 | 50 | 500 | 100 | 900 |

| | | Formative Assessment | | |
|---|---|---|---|---|
| **CIA**: Continuous Internal Assessment<br>**L**: Theory Lecture<br>**T**: Tutorial<br>**P**: Practical<br>**ESE**: End Semester Exam | **PCC**: Program Core course<br>**PEC**: Programme elective Core<br>**VAC:** Value Added Courses<br>**CEP/FP:**Communityencougement project/Field project<br>**MDM:** Multidisciplinary minor course | **CIA** | **Weightage** | **Description** |
| | | CIA 1 | 10% | Home Assignment |
| | | CIA 2 | 20% | Written Exam |
| | | CIA 3 | 10% | Seminar Presentation |
| | | CIA 4 | 10% | • Behavioural Attitude + General Discipline (5%)<br>• Theory + practical attendance 5%) |
| | | **TOTAL** | **50%** | |

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**Programme Elective Core Basket**

| Sr No | Course code | PEC-I |
|---|---|---|
| 1 | NYASE01 | Rocket System and Instrumentation |
| 2 | NYASE02 | Spacecraft Design |
| 3 | NYASE03 | Modern Machining Methods |
| 4 | NYASE04 | spacecraft Materials |

| Sr No | Course code | PEC-II |
|---|---|---|
| 1 | NYASE05 | Composite Materials and Structures |
| 2 | NYASE06 | Laminar flow Theory |
| 3 | NYASE07 | Aircraft Surveillance system |
| 4 | NYASE08 | Wind Tunnel Design and its Application |

| Sr No | Course code | PEC-III |
|---|---|---|
| 1 | NYASE09 | Compressors and Turbines |
| 2 | NYASE10 | Theory of Flames |
| 3 | NYASE11 | IOT in Aerospace and Defence Sector |
| 4 | NYASE12 | Aircraft Power plant maintenance and repair |

| Sr No | Course code | PEC-IV |
|---|---|---|
| 1 | NYASE13 | Spacecraft Design and Optimization |
| 2 | NYASE14 | Spacecraft Thermal Analysis |
| 3 | NYASE15 | Hypersonic Propulsion |
| 4 | NYASE16 | Gas Dynamics and Jet Propulsion |

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| Sr No | Course code | PEC-V |
|---|---|---|
| 1 | NYASE17 | satellite Communication System |
| 2 | NYASE18 | Design of tactical Missile |
| 3 | NYASE19 | Space Vehicle Dynamics and control |
| 4 | NYASE20 | Nano Structures and Nano Materials |

| Sr No | Course code | PEC-VI |
|---|---|---|
| 1 | NYASE21 | design of small Satellite |
| 2 | NYASE22 | Design of liquid Propellant rocket Engine |
| 3 | NYASE23 | design of Geosynchronous spacecraft |
| 4 | NYASE24 | Composite Materials and structure |

**Open Elective Basket offered by the Aerospace Engineering Programm**

| Sr No | Course code | Open Elective offered by the Aerospace Engineering Department | Semester |
|---|---|---|---|
| 1 | NYASO01 | Aeronautics in Modern Age | III |
| 2 | NYASO02 | Evolution of Human Spaceflight | IV |
| 3 | NYASO03 | Introduction to 3D Printing for UAV | V |

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**Mutidisciplinary Minor offered by Aerospace Engineering Programm**

| Sr. No | Course Name | Code | Scheme | Credit | Semester |
|---|---|---|---|---|---|
| 1 | Introduction to Air Transportation | NYASM01 | 3-0-0 | 3 | 4th |
| 2 | Air Operation and Air traffic Control | NYASM02 | 3-0-0 | 3 | 5th |
| 3 | Ait transpotation Management and Route Planning | NYASM03 | 3-0-0 | 3 | 5th |
| 4 | Aviation Safety and Logistics | NYASM04 | 3-0-0 | 3 | 6th |
| 5 | Airport Planning | NYASM05 | 3-0-0 | 3 | 7th |
| 6 | Sustainable Aviation | NYASM06 | 3-0-0 | 3 | 7th |
| | | | **Total** | **18** | |

**B.Tech (Hons.) Aerospace Engineering with specialization in Aerodynamics**

| Sr. No | Course Name | Code | Scheme | Credit | Semester |
|---|---|---|---|---|---|
| 1 | Wind Tunnel Testing | NYASH01 | 3-0-0 | 3 | 4th |
| 3 | Industrial Aerodynamics | NYASH01 | 3-0-0 | 3 | 5th |
| 4 | Low Reynold's Number Aerodynamics | NYASH01 | 3-0-0 | 3 | 5th |
| 5 | Rotary wings Aerodynamics | NYASH01 | 3-0-0 | 3 | 6th |
| 6 | Hypersonic Aerodynamics | NYASH01 | 3-0-0 | 3 | 6th |
| 7 | Rarefied gas dynamics | NYASH01 | 3-0-0 | 3 | 7th |
| 8 | Aeroacoustics | NYASH01 | 3-0-0 | 3 | 7th |
| | | | **Total** | **24** | |

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Exit options under B.Tech. in Aerospace Engineering Program

| **After 1st Year (8 credits)**<br>**Certification** | | | |
|---|---|---|---|
| **Sr. No.** | **Courses Name** | **Courses Code** | **Credits** |
| 1 | Unmanned Aerial Vehicles | NYASX01 | 3 |
| 2 | Basics of Flight Control Systems | NYASX02 | 3 |
| 3 | Internship | NYASX11 | 2 |
| **After 2nd Year (8 Credits)**<br>**UG diploma** | | | |
| **Sr. No.** | **Courses Name** | **Courses Code** | **Credits** |
| 1 | Aerospace Production Planning and Contro | NYASX03 | 3 |
| 2 | 3D printing Technology and Additive Manufacturing | NYASX04 | 3 |
| 3 | Internship | NYASX21 | 2 |
| **After 3rd Year (8 Credits)**<br>**B. Voc.** | | | |
| **Sr. No.** | **Courses Name** | **Courses Code** | **Credits** |
| 1 | Aircraft Maintenance Practices | NYASX05 | 3 |
| 2 | Aerospace Industry Standards | NYASX06 | 3 |
| 3 | Internship | NYASX31 | 2 |

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# Credit distribution

1

| Semester | | Total Credits as per GR | Total Credits SUN Aerospace Engineering |
|---|---|---|---|
| Basic Science Course | BSC/ESC | 14-18 | 16 |
| Engineering Science Course | | 16-12 | 12 |
| Programme Core Course ( PCC) | Program Courses | 44-56 | 47 |
| Programme Elective Course ( PEC) | | 20 | 23 |
| Multidisciplinary Minor (MD M) | Multidisciplinary Courses | 14 | 16 |
| Open Elective (OE) Other than a paricular program | | 08 | 8 |
| Vocational and Skill Enhancement Course (VSEC) | Skill Courses | 08 | 10 |
| Ability Enhancement Course (AEC -01, AEC-02) | Humanities Social Science and Management (HSSM) | 04 | 10 |
| Entrepreneurship/ Economics / Management Course | | 04 | |
| Indian knowledge System ( IKS) | | 02 | 2 |
| Value Education Course (VEC) | | 04 | 4 |
| Research Methedology | Experiential Learning Courses | 04 | 4 |
| Comm. Engg. Project (CEP ) / Field Project (FP ) | | 02 | 2 |
| Project | | 04 | 4 |
| Internship/ OJT | | 12 | 12 |
| Co-curricular Course ( CC ) | Liberal Learning Courses | 04 | 4 |
| **Total Credits ( Major )** | | **160-176** | **174** |