

Z.H. College of Engineering Technology, Aligarh Muslim University Aligarh

COURSE STRUCTURE: B.Tech. Automobile Engineering (Electric and Hybrid Vehicles)

Valid for students admitted from the year 2023 onwards

Semester 1/2:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|---------------------------------------|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | BS | AMS1112 | Applied Mathematics-I | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 2 | BS | APS1112 | Applied Physics | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 3 | ESA | ELA1112 | Principles of Electronics Engineering | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 4 | ESA | MEA1122 | Engineering Mechanics | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 5 | HM | EZH1112 | English | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 6 | BS | APS1912 | Applied Physics Lab | 0 | 0 | 3 | 1.5 | 60 | | 40 | 100 |
| 7 | ESA | MEA1922 | Engineering Workshop | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 8 | HM | EZH1912 | Communication Skills Lab | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |

TOTAL CREDITS: 22.5

Semester 2/1:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|--------------------------------------|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | BS | AMS1122 | Higher Mathematics-II | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 2 | BS | ACS1112 | Applied Chemistry | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 3 | ESA | EEA1112 | Principles of Electrical Engineering | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 4 | ESA | MEA1112 | Thermal Sciences | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 5 | BS | ACS1912 | Applied Chemistry Lab | 0 | 0 | 3 | 1.5 | 60 | | 40 | 100 |
| 6 | ESA | COA1912 | Computer Programming Lab | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 7 | ESA | MEA1912 | Engineering Graphics Lab | 1 | 0 | 2 | 2 | 60 | | 40 | 100 |
| 8 | AU | CEU1112 | Environmental Studies (Audit Course) | 3 | 0 | 0 | 0 | 15 | 25 | 60 | 100 |

TOTAL CREDITS: 20.5

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Semester 3:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|---------------------------------------|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | BS | AMS2312 | Higher Mathematics | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 2 | ESA | AEA2422 | Experimental Methods & Analysis | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 3 | PC | AEC2112 | Mechanics of Solids | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 4 | PC | AEC2322 | Fluid Mechanics | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 5 | PC | AEC2432 | Automotive Materials | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 6 | PC | AEC2752 | Lean Methods for Automobile Engineers | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 7 | PC | AEC2912 | Machine Drawing Lab | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 8 | PC | AEC2932 | Manufacturing Technology Lab-I | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 9 | PC | AEC2952 | Fluids Mechanics Lab | 0 | 0 | 3 | 1.5 | 60 | | 40 | 100 |

TOTAL CREDITS: 26.5

Semester 4:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|---|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | PC | AEC2222 | Applied Thermodynamics & Heat Transfer | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 2 | PC | AEC2412 | Manufacturing Technology | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 3 | PC | AEC2452 | Vehicle Body Design | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 4 | PC | AEC2762 | Additive Manufacturing | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 5 | BS | AMS2322 | Numerical Methods & Optimization | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 6 | ESA | EEA2042 | Automotive Electrical & Electronic System | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 7 | ESA | AEA2972 | Automotive Electrical & Electronic Lab | 0 | 0 | 3 | 1.5 | 60 | | 40 | 100 |
| 8 | PC | AEC2962 | Thermal System Lab-I | 0 | 0 | 3 | 1.5 | 60 | | 40 | 100 |
| 9 | AU | | Audit Course-2 | | | | 0 | 15 | 25 | 60 | 100 |

TOTAL CREDITS: 26

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Semester 5:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|---|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | PC | AEC3112 | Design of Vehicle Components | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 2 | PC | AEC3132 | Automotive Drives & Transmission | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 3 | PC | AEC3242 | Fuels, Lubricants & Coolants | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 4 | PC | AEC3292 | Electric & Hybrid Vehicles | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 5 | PE | | Programme Elective-1 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 6 | HM | | Elective Course under Humanities category | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 7 | PC | AEC3962 | Modeling & Simulation of Thermofluid System | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 8 | AU | | Audit Course-3 | | | | 0 | 15 | 25 | 60 | 100 |

TOTAL CREDITS: 23

Semester 6:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|--|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | PC | AEC3122 | Machinery Dynamics | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 2 | PC | AEC3222 | I.C. Engines | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 3 | PC | AEC3252 | Automotive Emission & Control | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 4 | PC | AEC3342 | Automotive Hydraulic Pneumatic Systems | 3 | 1 | 0 | 4 | 15 | 25 | 60 | 100 |
| 5 | HM | MEH3452 | Engineering Economy & Management | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 6 | PC | AEC3932 | Manufacturing Technology Lab-II | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 7 | PC | AEC3942 | Solid Modeling & Analysis Lab | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 8 | PC | AEC3952 | Kinematics & Stress Analysis Lab | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 9 | PC | AEC3972 | Fuel Testing Lab | 0 | 0 | 3 | 1.5 | 60 | | 40 | 100 |

TOTAL CREDITS: 25.5

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Semester 7:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|-------------------------------|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | PC | AEC4212 | Automotive System | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 2 | PE | | Programme Elective-2 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 3 | OE | | Open Elective-1 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 4 | PC | AEC4952 | Energy Conversion Systems Lab | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 5 | PC | AEC4962 | Thermal System Lab II | 0 | 1 | 2 | 2 | 60 | | 40 | 100 |
| 6 | PSI | AEP4812 | Colloquium | 0 | 2 | 0 | 2 | 60 | | 40 | 100 |
| 7 | PSI | AEP4912 | Project (Phase I) | 0 | 3 | 0 | 3 | 60 | | 40 | 100 |

TOTAL CREDITS: 18

Semester 8:

| S.No. | Course Catag | Course No. | Course title | Contact Periods | | | Credits | Marks | | | Total |
|-------|--------------|------------|--------------------------------|-----------------|---|---|---------|-------------|-----------|---------|-------|
| | | | | L | T | P | | Course-Work | Intl-Exam | End-Sem | |
| 1 | PE | | Programme Elective-3 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 2 | PE | | Programme Elective-4 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 3 | PE | | Programme Elective-5 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 4 | OE | | Open Elective-2 | 2 | 1 | 0 | 3 | 15 | 25 | 60 | 100 |
| 5 | PSI | AEP4922 | Project (Phase II) | 0 | 4 | 0 | 4 | 60 | | 40 | 100 |
| 6 | PSI | AEP4802 | Industrial Training/Internship | | | | 2 | | | 100 | 100 |

TOTAL CREDITS: 18

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Course Structure: B.Tech. (Automobile Engineering (Electric and Hybrid Vehicles))
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List of Programme Elective (PE) Courses: See List of Programme Elective (PE) Courses in the syllabus section

| S.No. | Crs. No. | Course title | S.N | Crs. No. | Course title |
|-------|----------|--------------|-----|----------|--------------|
|-------|----------|--------------|-----|----------|--------------|

SUMMARY:

| Category Code | Category Name | II-IV Year | First Year Credits | Total Credits |
|---------------|------------------------------|------------|--------------------|---------------|
| PC | Programme Core | 83.5 | 0 | 83.5 |
| PE | Programme Elective | 15 | 0 | 15 |
| BS | Basic Sciences | 7 | 19 | 26 |
| ESA | Engg. Science and Arts | 8.5 | 19 | 27.5 |
| OE | Open Elective | 6 | 0 | 6 |
| HM | Humanities | 6 | 5 | 11 |
| PSI | Project, Seminar, Internship | 11 | 0 | 11 |
| TOTAL | | 137 | 43 | 180 |