

## DEPARTMENT OF ENGINEERING DESIGN, IIT MADRAS

### Dual Degree (Automotive Engineering) Curriculum

#### SEMESTER-WISE CREDIT HOUR DISTRIBUTION

| Semester | I  | Win. | II | Sum. | III | IV  | V   | VI  | VII | VIII | Sum. | IX | X  | Total |
|----------|----|------|----|------|-----|-----|-----|-----|-----|------|------|----|----|-------|
| Credits  | 50 | 3    | 56 | 3    | 60  | 48* | 43* | 41* | 39* | 31   | 20   | 44 | 9* | 447*  |

\* Indicated credits are only for core programme. In addition, 108 credits of electives have to be taken in sems IV-X, of which atleast 27 credits should be from the list of professional elective courses prescribed by the Department of Engineering Design, 9 credits should be in the Maths/Science Category. The remaining 72 credits constitute free electives. The presence of the terms “Free Elective” and “Professional Elective” in the tables is meant to remind the students regarding the same.

L: Lecture,

T: Tutorial,

E: extended tutorial,

P: Lab,

O: outside class hours,

C: credits.

Cat: Category

S: Basic sciences

E: Basic Engineering

H: Humanities

P: Professional

### SEMESTER I (July-November)

| No.    | Title   | L         | T        | E        | P         | O         | C         | Cat |
|--------|---|-----------|----------|----------|-----------|-----------|-----------|-----|
| MA1101 | Functions of Several Variables                | 3         | 1        | 0        | 0         | 6         | 10        | S   |
| AM1100 | Engineering Mechanics                         | 4         | 0        | 0        | 0         | 8         | 12        | E   |
| ME1120 | Engineering Drawing                           | 1         | 0        | 0        | 3         | 3         | 7         | E   |
| ED1021 | Introduction to Computation and Visualization | 3         | 0        | 0        | 3         | 3         | 9         | E   |
| ED1031 | Creative Design                               | 0         | 0        | 0        | 3         | 0         | 3         | P   |
| ED1011 | Functional and Conceptual Design              | 2         | 0        | 0        | 3         | 4         | 9         | P   |
|        | <b>Total</b>                                  | <b>13</b> | <b>1</b> | <b>0</b> | <b>12</b> | <b>24</b> | <b>50</b> |     |
|        | NCC/ NSS/ NSO                                 | 0         | 0        | 0        | 0         | 2         | 0         |     |
|        | Life Skills                                   | 0         | 0        | 0        | 0         | 3         | 0         |     |
|        | Ecology and Environment                       | 2         | 0        | 0        | 0         | 0         | 0         |     |
| WS1010 | Workshop I                                    | 0         | 0        | 0        | 3         | 0         | 3         | E   |

### SEMESTER II (January – May)

| No.           | Title                         | L         | T        | E        | P        | O         | C         | Cat |
|---------------|-------------------------------|-----------|----------|----------|----------|-----------|-----------|-----|
| MA1102        | Series and Matrices           | 3         | 1        | 0        | 0        | 6         | 10        | S   |
| PH1020        | Physics II                    | 3         | 1        | 0        | 0        | 6         | 10        | S   |
| ED2090        | Geometric Modelling and CAD   | 3         | 0        | 0        | 3        | 6         | 12        | P   |
| ED1032        | Form and Aesthetics in Design | 3         | 0        | 0        | 3        | 6         | 12        | P   |
| EE1101        | Signals and Systems           | 3         | 1        | 0        | 0        | 8         | 12        | E   |
|               | <b>Total</b>                  | <b>15</b> | <b>3</b> | <b>0</b> | <b>6</b> | <b>32</b> | <b>56</b> |     |
|               | NCC/ NSS/ NSO                 | 0         | 0        | 0        | 0        | 3         | 0         |     |
| <b>Summer</b> |                               |           |          |          |          |           |           |     |
| WS1020        | Workshop II                   | 0         | 0        | 0        | 3        | 0         | 3         | E   |

### SEMESTER III (July-November)

| No.    | Title                          | L         | T        | E        | P         | O         | C         | Cat |
|--------|--------------------------------|-----------|----------|----------|-----------|-----------|-----------|-----|
| ED2140 | Physics of Measurement         | 3         | 0        | 0        | 3         | 6         | 12        | S   |
| ED2012 | Manufacturing Processes        | 2         | 0        | 0        | 0         | 4         | 6         | P   |
| ED2011 | Design of Mechanical Systems 1 | 4         | 0        | 0        | 3         | 8         | 15        | P   |
| MA2020 | Differential Equations         | 3         | 0        | 0        | 0         | 6         | 9         | S   |
| ED2130 | Design of Electronic Systems 1 | 4         | 0        | 0        | 6         | 8         | 18        | P   |
|        | <b>Total</b>                   | <b>16</b> | <b>0</b> | <b>0</b> | <b>12</b> | <b>32</b> | <b>60</b> |     |

### SEMESTER IV (January- May)

| No.    | Title                               | L         | T        | E        | P         | O         | C         | Cat |
|--------|-------------------------------------|-----------|----------|----------|-----------|-----------|-----------|-----|
| ED4040 | Design of Thermal and Fluid Systems | 4         | 0        | 0        | 3         | 8         | 15        | P   |
| ED4010 | Design of Electronic Systems 2      | 4         | 0        | 0        | 6         | 8         | 18        | P   |
| ED4060 | Design of Mechanical Systems 2      | 4         | 0        | 0        | 3         | 8         | 15        | P   |
|        | Free Elective                       |           |          |          |           |           |           | F   |
|        | <b>Total</b>                        | <b>12</b> | <b>0</b> | <b>0</b> | <b>12</b> | <b>24</b> | <b>48</b> |     |

### SEMESTER V\* (July-November)

| No.    | Title  | L         | T        | E        | P        | O         | C          | Cat |
|--------|--|-----------|----------|----------|----------|-----------|------------|-----|
| CY1050 | Macromolecules as Engineering Materials          | 3         | 0        | 0        | 0        | 6         | 9          | S   |
| ED3010 | Human Factors in Design                          | 3         | 0        | 0        | 0        | 6         | 9          | P   |
| ED     | Professional Elective I                          |           |          |          |          |           |            | P   |
|        | Free Elective                                    |           |          |          |          |           |            | F   |
| ED5160 | Fundamentals of Automotive Systems               | 4         | 0        | 0        | 3        | 8         | 15         | P   |
| ED5052 | Electromagnetic Compatibility for Product Design | 3         | 1        | 0        | 0        | 6         | 10         | P   |
|        | <b>Total</b>                                     | <b>13</b> | <b>1</b> | <b>0</b> | <b>3</b> | <b>26</b> | <b>43*</b> |     |

### SEMESTER VI\* (January-May)

| No.    | Title   | L         | T        | E        | P        | O         | C          | Cat |
|--------|---|-----------|----------|----------|----------|-----------|------------|-----|
| ED5015 | Computational Methods in Design                     | 3         | 1        | 0        | 0        | 6         | 10         | P   |
| ED5220 | Vehicle Dynamics                                    | 3         | 0        | 0        | 3        | 6         | 12         | P   |
| ED5013 | Analytical and Experimental Techniques in Vibration | 2         | 0        | 0        | 3        | 4         | 9          | P   |
| ED5017 | Digital Signal Processing for Engineering Design    | 3         | 1        | 0        | 0        | 6         | 10         |     |
| ED     | Professional Elective II                            |           |          |          |          |           |            | P   |
|        | <b>Total</b>  | <b>14</b> | <b>2</b> | <b>0</b> | <b>6</b> | <b>22</b> | <b>41*</b> |     |

### SEMESTER VII\* (July-November)

| No.    | Title                                       | L         | T        | E        | P        | O         | C          | Cat |
|--------|---|-----------|----------|----------|----------|-----------|------------|-----|
|        | Elective (Maths/ Science)                   |           |          |          |          |           |            | S   |
| BT1010 | Life Sciences                               | 3         | 0        | 0        | 0        | 6         | 9          | S   |
| ED     | Professional Elective III                   |           |          |          |          |           |            | P   |
|        | Free Elective                               |           |          |          |          |           |            | F   |
| ED5050 | Structural and Component Design of Vehicles | 4         | 0        | 0        | 0        | 8         | 12         | P   |
| ED5330 | Control of Automotive Systems               | 3         | 0        | 0        | 0        | 6         | 9          | P   |
| HS     | Humanities I                                | 3         | 0        | 0        | 0        | 6         | 9          | H   |
|        | <b>Total</b>                                | <b>13</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>26</b> | <b>39*</b> |     |

### SEMESTER VIII (January-May)

| No.           | Title                | L        | T        | E        | P         | O        | C         | Cat |
|---------------|----------------------|----------|----------|----------|-----------|----------|-----------|-----|
| ED            | Project I (Industry) | 0        | 0        | 0        | 31        | 0        | 31        | P   |
|               | <b>Total</b>         | <b>0</b> | <b>0</b> | <b>0</b> | <b>31</b> | <b>0</b> | <b>31</b> |     |
| <b>Summer</b> |                      |          |          |          |           |          |           |     |
| ED            | Project II           | 0        | 0        | 0        | 20        | 0        | 20        | P   |

### SEMESTER IX (July-November)

| No. | Title         | L        | T        | E        | P         | O        | C         | Cat |
|-----|---------------|----------|----------|----------|-----------|----------|-----------|-----|
| ED  | Project III   | 0        | 0        | 0        | 35        | 0        | 35        | P   |
| HS  | Humanities II | 3        | 0        | 0        | 0         | 6        | 9         | H   |
|     | <b>Total</b>  | <b>3</b> | <b>0</b> | <b>0</b> | <b>35</b> | <b>6</b> | <b>44</b> |     |

### SEMESTER X\* (January-May)

| No. | Title               | L        | T        | E        | P        | O        | C         | Cat |
|-----|---------------------|----------|----------|----------|----------|----------|-----------|-----|
| HS  | Humanities III      | 3        | 0        | 0        | 0        | 6        | 9         | H   |
|     | Free Electives      |          |          |          |          |          |           |     |
|     | <b>Total</b>        | <b>3</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>6</b> | <b>9*</b> |     |
|     | Professional Ethics | 2        | 0        | 0        | 0        | 0        | 0         |     |

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### B. TECH (HONOURS) + M. TECH PROGRAM

(Total credit requirement:  $556 + 27 = 583$ )

- **Eligibility:** minimum CGPA of 8.5 at the end of 5th sem without U or W grade in any course. They need to maintain these conditions until graduation.
- **Extra credit requirement:** 27 elective credits over and above regular program from the courses prescribed by the Department of Engineering Design. These credits **have** to be completed in VI, VII and IX semesters.