

|  |   |  |   |  |             |                          |                               |  |   |  |            |            |                     |
|--|---|--|---|--|-------------|--------------------------|-------------------------------|--|---|--|------------|------------|---------------------|
| <b>RGPV (Diploma Wing ) Bhopal</b>                           |   | <b>SCHEME FOR LEARNING<br/>OUTCOME</b>   |   |  | Branch Code |                          |                               | Course Code  |   |  | CO<br>Code | LO<br>Code | Format No. <b>4</b> |
|  |   |  |   |  | A           | 0                        | 3                             | 5  | 0 | 1  | 1          | 1          |                     |
| <b>COURSE NAME</b>   | <b>Auto Design &amp; Drafting</b>   |  |   |  |             |                          |                               |  |   |  |            |            |                     |
| <b>CO Description</b>  | <b>Student will be able to apply design related basic concepts in the given design problem situation</b>  |  |   |  |             |                          |                               |  |   |  |            |            |                     |
| <b>LO Description</b>  | <b>Student will be able to explain the various design related basic concepts with suitable examples</b>   |  |   |  |             |                          |                               |  |   |  |            |            |                     |
| <b>SCHEME OF STUDY</b>                                       |   |  |   |  |             |                          |                               |  |   |  |            |            |                     |
| <b>S. No.</b>  | <b>Learning Content</b>   | <b>Teaching –Learning<br/>Method</b>   | <b>Description of T-L Process</b>   |  |             | <b>Teach<br/>Hrs.</b>    | <b>Pract.<br/>/Tut Hrs.</b>   | <b>LRs<br/>Required</b>                                    |   | <b>Remarks</b>   |            |            |                     |
| 1.   | Types of designs, design considerations, morphology of design, design optimization, factor of safety, factors governing FS, critical dimension, impact load and fatigue considerations, Interchangeability, standardization, limits, fits, tolerances, legal aspects of design. | Traditional lecture method   | Teacher will explain different concepts and formulas related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will assess their ability and provide necessary remedial and tutorials |  |             | 07                       | 02                            | Book:-<br>Machine Design by R. S. Khurmi Or Its equivalent |   | Teacher will suggest more video links, LRs to assist in learning |            |            |                     |
| <b>SCHEME OF ASSESSMENT</b>                                  |   |  |   |  |             |                          |                               |  |   |  |            |            |                     |
| <b>S. No.</b>  | <b>Method of<br/>Assessment</b>   | <b>Description of Assessment</b>   |   |  |             | <b>Maximum<br/>Marks</b> | <b>Resources<br/>Required</b> | <b>External /<br/>Internal</b>                             |   |  |            |            |                     |
| 1.   | Theory exam   | One question will be asked in exam paper to explain the asked design related concepts with suitable examples |   |  |             | 10                       | Framed question               | External   |   |  |            |            |                     |
| <b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b> |   |  |   |  |             |                          |                               |  |   |  |            |            |                     |
| NIL  |   |  |   |  |             |                          |                               |  |   |  |            |            |                     |

| RGPV (Diploma Wing ) Bhopal                           |  | SCHEME FOR LEARNING<br>OUTCOME   |   |                    | Branch Code         |  |  | Course Code |   |   | CO<br>Code | LO<br>Code | Format No. <b>4</b> |
|---|--|--|---|--------------------|---------------------|--|--|-------------|---|---|------------|------------|---------------------|
|   |  |  |   |                    | A                   | 0  | 3  | 5           | 0 | 1 | 1          | 2          |                     |
| <b>COURSE NAME</b>                                    | Auto Design & Drafting   |  |   |                    |                     |  |  |             |   |   |            |            |                     |
| <b>CO Description</b>                                 | Student will be able to apply design related basic concepts in the given design problem situation  |  |   |                    |                     |  |  |             |   |   |            |            |                     |
| <b>LO Description</b>                                 | Student will be able to conceptualize the design for the given simple machine element using the basic engineering design process   |  |   |                    |                     |  |  |             |   |   |            |            |                     |
| SCHEME OF STUDY                                       |  |  |   |                    |                     |  |  |             |   |   |            |            |                     |
| S. No.  | Learning Content   | Teaching – Learning Method   | Description of T-L Process  | Teach Hrs.         | Pract. /Tut Hrs.    | LRs Required   | Remarks  |             |   |   |            |            |                     |
| 1.  | Engineering design process, design need identification, analysis of design need, standards of performance and constraints, product design specifications, searching for design approach, conceptualizing design, assessing the conceptualized design for physical reliability, economic feasibility and utility. Design of keys, cotter, pins, bolts ,rivets, simple shaft, levers | Traditional lecture method   | Teacher will explain different concepts and formulas related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will assess their ability and provide necessary remedial and tutorials | 08                 | 03                  | Book:-<br>Machine Design by R. S. Khurmi<br>Or<br>Its equivalent | Teacher will suggest more video links, LRs to assist in learning |             |   |   |            |            |                     |
| SCHEME OF ASSESSMENT                                  |  |  |   |                    |                     |  |  |             |   |   |            |            |                     |
| S. No.  | Method of Assessment   | Description of Assessment  | Maximum Marks   | Resources Required | External / Internal |  |  |             |   |   |            |            |                     |
| 1.  | Theory exam  | One question will be asked in exam paper in which student will design the simple machine component using design process, on basis of given standards of performance and location constraints | 10  | Framed question    | External            |  |  |             |   |   |            |            |                     |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) |  |  |   |                    |                     |  |  |             |   |   |            |            |                     |
| A. Engineering design process:-                       |  |  |   |                    |                     |  |  |             |   |   |            |            |                     |

1. Describe the function of the element
2. Determine the shape of the element
3. Determine the forces on the element
4. Select the appropriate material
5. Determine the failure criteria
6. Determine geometric dimensions of the element
7. Design modification for manufacturing considerations
8. Preparing working drawing of element

B. Additional LR required is 'Machine Design Data-book' by Kamal Kumar and S. K. Dhagat , Khanna Publications

|                                    |  |             |   |   |             |   |   |            |            |                     |
|------------------------------------|--|-------------|---|---|-------------|---|---|------------|------------|---------------------|
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|                                    |  | A           | 0 | 3 | 5           | 0 | 1 | 2          | 1          |                     |

|                       |  |
|-----------------------|--|
| <b>COURSE NAME</b>    | <b>Auto Design &amp; Drafting</b>  |
| <b>CO Description</b> | <b>Student will be able to apply appropriate design approach to design the given machine element</b> |
| <b>LO Description</b> | <b>Student will be able to functionally design the given simple machine element</b>                  |

**SCHEME OF STUDY**

| S. No. | Learning Content   | Teaching –Learning Method  | Description of T-L Process   | Teach Hrs. | Pract. /Tut Hrs. | LRs Required   | Remarks  |
|--------|--|----------------------------|--|------------|------------------|--|--|
| 1.     | Concept of design for function, functional requirements and constraints for any machine component, deciding shape, size, material selection and surface finish on basis of functional requirements | Traditional lecture method | Teacher will explain different concepts related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will assess their ability and provide necessary remedial and tutorials | 05         | 03               | Book:-<br>Machine Design by R. S. Khurmi<br>Or<br>Its equivalent | Teacher will suggest more video links, LRs to assist in learning |

**SCHEME OF ASSESSMENT**

| S. No. | Method of Assessment | Description of Assessment   | Maximum Marks | Resources Required                   | External / Internal |
|--------|----------------------|---|---------------|--------------------------------------|---------------------|
| 1.     | Theory assignment    | One assignment will be given in which student will functionally design the given machine/ automobile component on basis of given description of its function and location constrains, along with sketches, reasons and justifications | 10            | Assignment Question and rating scale | Internal            |

**ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)**

**Functional design:-** Every machine element is expected to perform certain task or function under certain location situation. Every new machine element is first designed for its functional design. Functional design basically deals with visualizing the shape, approx. surface finish and rough size of the element. Shape is the main aspect to be thought of. The designed shape should be justified. Functional design description includes

free hand sketches, rough dimensions and location situation drawings visualizing how the machine element working will work in the given situation.

**Examples of functional design:-** Design of tools, piston, connecting rod, flywheel, crank shaft, fasteners, engine head, engine block etc.

Why piston has particular cylindrical shape?

Why flywheel has disc like shape?

Why tools and fasteners have their unique shapes and sizes?

**Procedure for functional design:-**

1. Consider the part's purpose
2. Consider the part's function
3. Consider in which situation it will work (surroundings)
4. Consider how it will be used
5. Consider who will use it
6. Consider how does it handles mistakes ( wrong use should not be harmful and there should be provision for resorting)
7. Creation, review and approval

|                                    |  |             |   |   |             |   |   |            |            |                     |
|------------------------------------|--|-------------|---|---|-------------|---|---|------------|------------|---------------------|
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|                                    |  | A           | 0 | 3 | 5           | 0 | 1 | 2          | 2          |                     |

|                       |   |
|-----------------------|---|
| <b>COURSE NAME</b>    | <b>Auto Design &amp; Drafting</b>   |
| <b>CO Description</b> | <b>Student will be able to apply appropriate design approach to design the given machine element</b>                                      |
| <b>LO Description</b> | <b>Student will be able to design the given simple machine element for its strength using IS Codes/Design data book/ design handbooks</b> |

#### SCHEME OF STUDY

| S. No. | Learning Content  | Teaching – Learning Method | Description of T-L Process  | Teach Hrs. | Pract. /Tut Hrs. | LRs Required   | Remarks  |
|--------|---|----------------------------|---|------------|------------------|--|--|
| 1.     | Concept of design for strength, strength requirements, and constrains for the component, different types of loading conditions, stress calculations at different portions / sections, critical dimension, factor of safety, material selection on basis of strength requirements, design of C-clamp, bell crank lever, overhang crank, arm of pulley, flange coupling | Traditional lecture method | Teacher will explain different concepts and formulas related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will assess their ability and provide necessary remedial and tutorials | 07         | 03               | Book:-<br>Machine Design<br>by R. S. Khurmi<br>Or<br>Its<br>equivalent | Teacher will suggest more video links, LRs to assist in learning |

#### SCHEME OF ASSESSMENT

| S. No. | Method of Assessment | Description of Assessment   | Maximum Marks | Resources Required | External / Internal |
|--------|----------------------|---|---------------|--------------------|---------------------|
| 1.     | Theory exam          | One question will be asked in which student will design the given machine component for strength on basis of given description of loading/ forces/ torque/ moments etc. | 10            | Question paper     | External            |

#### ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Additional LR required is 'Machine Design Data-book' by Kamal Kumar and S. K. Dhagat , Khanna Publications

|                                    |  |             |   |   |             |   |   |            |            |                     |
|------------------------------------|--|-------------|---|---|-------------|---|---|------------|------------|---------------------|
| <b>RGPV (Diploma Wing ) Bhopal</b> | <b>SCHEME FOR LEARNING<br/>OUTCOME</b> | Branch Code |   |   | Course Code |   |   | CO<br>Code | LO<br>Code | Format No. <b>4</b> |
|                                    |  | A           | 0 | 3 | 5           | 0 | 1 | 2          | 3          |                     |

|                       |  |
|-----------------------|--|
| <b>COURSE NAME</b>    | <b>Auto Design &amp; Drafting</b>  |
| <b>CO Description</b> | <b>Student will be able to apply appropriate design approach to design the given machine element</b> |
| <b>LO Description</b> | <b>Student will be able to design the given simple machine element using empirical relationships</b> |

#### SCHEME OF STUDY

| S. No. | Learning Content  | Teaching – Learning Method | Description of T-L Process  | Teach Hrs. | Pract. /Tut Hrs. | LRs Required  | Remarks   |
|--------|---|----------------------------|---|------------|------------------|---|---|
| 1.     | Concept of empirical design, empirical design relationships, procedure of developing empirical design relationships, sources of empirical design relationships, procedure for designing the component using empirical relationships, calculation of dimensions using empirical relationships for water jacket, cylinder head studs or bolts, crank shaft crank web, crank shaft sleeve bearing, design of knuckle and cotter joints | Traditional lecture method | Teacher will explain different concepts and formulas related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will assess their ability and provide necessary remedial and tutorials | 06         | 02               | Book:- Machine Design by R. S. Khurmi Or Its equivalent | Teacher will suggest more video links, LR's to assist in learning |

#### SCHEME OF ASSESSMENT

| S. No. | Method of Assessment | Description of Assessment   | Maximum Marks | Resources Required | External / Internal |
|--------|----------------------|---|---------------|--------------------|---------------------|
| 1.     | Theory exam          | One question will be asked in which student will design the given machine component for its strength under given design conditions using empirical relationship | 10            | Question paper     | External            |

#### ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

A. Empirical is something that is based solely on observation or experiment or experience. Empirical relationship between two variables is the relationship which is developed over years of experiences and works well but has no theoretical base. Empirical design is one which depends upon

use of empirical formulae based on the practice and past experience. The basis of empirical design is previous experience, without regard for any systematic theory. Its benefit is the ability to make expedient decisions on layout and sizing (and to communicate these decisions to the rest of the design team) prior to undertaking a detailed design. Following are examples of empirical relationships and formula used in designing engine components:-

1. Various dimensions related bolt joints
2. Thickness of cylinder wall
3. Thickness of water jacket wall
4. Water space between the outer wall and inner jacket wall
5. Thickness of cylinder dry liner
6. Cylinder flange thickness
7. Nominal or major diameter of cylinder head stud or bolt
8. Pitch circle diameter of cylinder head studs
9. Diameter of cup in the top of piston head
10. Thickness of piston head ribs
11. Piston top land
12. Piston ring land
13. Gap between free ends of the piston ring
14. Axial thickness of piston rings
15. Piston barrel thickness and piston wall thickness
16. Radial and vertical thickness of piston ring grooves
17. Inside to outside diameter ration of piston pin
18. Length of crank shaft sleeve bearing
19. Thickness and width of crank web

B. Additional LR required is 'Machine Design Data-book' by Kamal Kumar and S. K. Dhagat , Khanna Publications

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|--|--|--|---|------------------------------------|---------------------|--|--|-------------|---|---|------------|------------|---------------------|
|  |  |  |   |                                    | A                   | 0                                      | 3  | 5           | 0 | 1 | 3          | 1          |                     |
| <b>COURSE NAME</b>   | Auto Design & Drafting   |  |   |                                    |                     |  |  |             |   |   |            |            |                     |
| <b>CO Description</b>  | Student will be able to follow the industrial design / drawing practice in solving the given design modification problem   |  |   |                                    |                     |  |  |             |   |   |            |            |                     |
| <b>LO Description</b>  | Student will be able to design / draw the given simple machine component using any design / drawing software   |  |   |                                    |                     |  |  |             |   |   |            |            |                     |
| SCHEME OF STUDY  |  |  |   |                                    |                     |  |  |             |   |   |            |            |                     |
| S. No.   | Learning Content   | Teaching – Learning Method   | Description of T-L Process  | Teach Hrs.                         | Pract. /Tut Hrs.    | LRs Required                           | Remarks  |             |   |   |            |            |                     |
| 1.   | Design / drawing soft-wares and their benefits, introduction to various design drawing soft-wares, their salient features, settings, commands, viewing and editing the design created, practice for designing / drawing any simple machine component using any design/ drawing software. | Traditional lecture method   | Teacher will explain different concepts related to computer based designing and drawing, demonstrate procedure of using the software; students will practice to design /draw machine elements under guidance of the teacher. Teacher will assess their ability and provide necessary remedial and tutorials | 07                                 | 05                  | Manual of concerned software operation | Teacher will suggest more video links, LRs to assist in learning |             |   |   |            |            |                     |
| SCHEME OF ASSESSMENT   |  |  |   |                                    |                     |  |  |             |   |   |            |            |                     |
| S. No.   | Method of Assessment   | Description of Assessment  | Maximum Marks   | Resources Required                 | External / Internal |  |  |             |   |   |            |            |                     |
| 1.   | Theory assignment  | An assignment will be given to students in which students have to design /draw the given simple machine component using the available design /drawing software | 05  | Assignment question & Rating scale | Internal            |  |  |             |   |   |            |            |                     |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)  |  |  |   |                                    |                     |  |  |             |   |   |            |            |                     |
| <p>A. Few suggested design soft-wares are as below:-</p> <p>20. CATIA</p> <p>21. NX (from Siemens)</p> |  |  |   |                                    |                     |  |  |             |   |   |            |            |                     |

22. Pro/Engineer

23. SOLIDWORKS

B. Few suggested drawing / sketching soft-wares are as below:-

24. AutoCAD

25. Car Sketch Tool

26. ALIAS

27. VRED

28. MAYA

|                                    |  |             |   |   |             |   |   |            |            |                     |
|------------------------------------|--|-------------|---|---|-------------|---|---|------------|------------|---------------------|
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|                                    |  | A           | 0 | 3 | 5           | 0 | 1 | 3          | 2          |                     |

|                       |   |
|-----------------------|---|
| <b>COURSE NAME</b>    | <b>Auto Design &amp; Drafting</b>   |
| <b>CO Description</b> | <b>Student will be able to follow the industrial design / drawing practice in solving the given design modification problem</b> |
| <b>LO Description</b> | <b>Student will be able to explain the industrial design modification process with the help of examples</b>                     |

#### SCHEME OF STUDY

| S. No. | Learning Content  | Teaching –Learning Method  | Description of T-L Process   | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | Remarks   |
|--------|---|----------------------------|--|------------|------------------|--------------|---|
| 2.     | Introduction to basic design modification process performed in the industry, different departments involved, examples of industrial design modification process for simple machine components, component design modification with the help of field failure data or lab research data | Traditional lecture method | Teacher will explain different learning contents with help of examples and cases. Teacher will give them assignments for practice, teacher will assess their knowledge and provide necessary remedial and tutorials for improvements | 04         | 02               | NIL          | Teacher will suggest more video links, LR's to assist in learning |

#### SCHEME OF ASSESSMENT

| S. No. | Method of Assessment | Description of Assessment   | Maximum Marks | Resources Required              | External / Internal |
|--------|----------------------|---|---------------|---------------------------------|---------------------|
| 2.     | Paper pen test       | A test will be conducted to assess the learnt knowledge of the students | 10            | Test questions and rating scale | Internal            |

#### ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

#### Product improvement cycle:-

1. Complaint / deficiency / potential improvement observed in the component
2. Formation of component evaluation group comprising of representatives from design, assembly, production, service departments and supplier

3. Brief research on complaint/deficiency/ potential improvement by the group
4. Search of possible ways to improve the component by the group
5. Discussion on issues related to design, production, service, legal and cost of improved component by the group
6. Selection and finalization of way to improve the component by the group
7. Visualizing the new form of component by the group
8. Development of detailed specifications and drawing including detailed production and testing specifications by the group
9. Official Release of new specifications and drawing to all concern departments
10. Post production follow-up and feedback regarding performance of the component

**Different departments involved:-**

1. Production department
2. Assembly department
3. Design department
4. Service department
5. Vender

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|---|--|---|--|--------------------|---------------------|--|--|-------------|---|---|------------|------------|---------------------|
|   |  |   |  |                    | A                   | 0  | 3  | 5           | 0 | 1 | 4          | 1          |                     |
| <b>COURSE NAME</b>  | Auto Design & Drafting   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| <b>CO Description</b>   | Student will be able to design various automobile components   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| <b>LO Description</b>   | Student will be able to design the given simple engine component under given design conditions   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| SCHEME OF STUDY   |  |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| S. No.  | Learning Content   | Teaching –Learning Method   | Description of T-L Process   | Teach Hrs.         | Pract. /Tut Hrs.    | LRs Required   | Remarks  |             |   |   |            |            |                     |
| 1.  | Study of important engine components regarding their working conditions and functional constraints, design for strength of cylinder head, cylinder, piston, piston pin, rocker arm | Traditional lecture method  | Teacher will explain different concepts and formulas related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will provide necessary remedial and tutorials | 07                 | 03                  | Book:-<br>Machine Design by R. S. Khurmi<br>Or<br>Its equivalent | Teacher will suggest more video links, LRs to assist in learning |             |   |   |            |            |                     |
| SCHEME OF ASSESSMENT  |  |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| S. No.  | Method of Assessment   | Description of Assessment   | Maximum Marks  | Resources Required | External / Internal |  |  |             |   |   |            |            |                     |
| 1.  | Theory exam  | One simple numerical question, based on use of formula, will be asked to design any one engine component to work under given conditions | 10   | Question paper     | External            |  |  |             |   |   |            |            |                     |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)   |  |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| 1. The design procedure will also include the designing using empirical relationships as per requirement<br>2. Additional LR required is 'Machine Design Data-book' by Kamal Kumar and S. K. Dhagat , Khanna Publications |  |   |  |                    |                     |  |  |             |   |   |            |            |                     |

| RGPV (Diploma Wing ) Bhopal   |   | SCHEME FOR LEARNING<br>OUTCOME  |  |                    | Branch Code         |  |  | Course Code |   |   | CO<br>Code | LO<br>Code | Format No. <b>4</b> |
|---|---|---|--|--------------------|---------------------|--|--|-------------|---|---|------------|------------|---------------------|
|   |   |   |  |                    | A                   | 0  | 3  | 5           | 0 | 1 | 4          | 2          |                     |
| <b>COURSE NAME</b>  | Auto Design & Drafting  |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| <b>CO Description</b>   | Student will be able to design various automobile components  |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| <b>LO Description</b>   | Student will be able to design the given simple chassis component under given design conditions   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| SCHEME OF STUDY   |   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| S. No.  | Learning Content  | Teaching –<br>Learning Method   | Description of T-L Process   | Teach<br>Hrs.      | Pract.<br>/Tut Hrs. | LRs<br>Required  | Remarks  |             |   |   |            |            |                     |
| 1.  | Study of important chassis components regarding their working conditions and functional constraints, design for strength of single plate friction clutch, flywheel, simple internal expanding brake, helical tension & compression springs, leaf spring | Traditional lecture method  | Teacher will explain different concepts and formulas related to contents, demonstrate methods of solving different problems. Students will practice to solve problems under guidance of the teacher. Teacher will provide necessary remedial and tutorials | 07                 | 03                  | Book:-<br>Machine Design by R. S. Khurmi<br>Or<br>Its equivalent | Teacher will suggest more video links, LRs to assist in learning |             |   |   |            |            |                     |
| SCHEME OF ASSESSMENT  |   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| S. No.  | Method of Assessment  | Description of Assessment   | Maximum Marks  | Resources Required | External / Internal |  |  |             |   |   |            |            |                     |
| 1.  | Theory exam   | One simple numerical question, based on use of formula, will be asked to design any one engine component to work under given conditions | 10   | Question paper     | External            |  |  |             |   |   |            |            |                     |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)   |   |   |  |                    |                     |  |  |             |   |   |            |            |                     |
| 1. The design procedure will also include the designing using empirical relationships as per requirement<br>2. Additional LR required is 'Machine Design Data-book' by Kamal Kumar and S. K. Dhagat , Khanna Publications |   |   |  |                    |                     |  |  |             |   |   |            |            |                     |

|  |  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
|--|--|--|--|--|-------------|--------------------------|-------------------------------|-----------------------------|--------------------------------------|---|--|------------|---------------------|
| <b>RGPV (Diploma Wing ) Bhopal</b>   |  | <b>SCHEME FOR LEARNING<br/>OUTCOME</b>   |  |  | Branch Code |                          |                               | Course Code                 |                                      |   | CO<br>Code   | LO<br>Code | Format No. <b>4</b> |
|  |  |  |  |  | A           | 0                        | 3                             | 5                           | 0                                    | 1 | 5  | 1          |                     |
| <b>COURSE NAME</b>   | <b>Auto Design &amp; Drafting</b>  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
| <b>CO Description</b>  | <b>Student will be able to select standard machine components and fasteners for the given design problem situation</b>   |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
| <b>LO Description</b>  | <b>Student will be able to select the appropriate bearing to be used in any automobile sub assembly</b>  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
| <b>SCHEME OF STUDY</b>   |  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
| <b>S. No.</b>  | <b>Learning Content</b>  | <b>Teaching –<br/>Learning Method</b>  | <b>Description of T-L Process</b>  |  |             |                          | <b>Teach<br/>Hrs.</b>         | <b>Pract.<br/>/Tut Hrs.</b> | <b>LRs<br/>Required</b>              |   | <b>Remarks</b>   |            |                     |
| 1.   | Standardized machine components, examples, need and function of bearings, types of bearings and their uses, ball and roller bearings, series, specifications, codes for different standard ball bearings and roller bearings, procedure for selection of ball bearing for the given design situation | Traditional lecture method   | Teacher will explain different concepts related to contents, demonstrate methods of selection of bearings through examples and cases. Students will practice to select bearings under guidance of the teacher. Teacher will provide necessary remedial and tutorials |  |             |                          | 07                            | 03                          | Commercial bearing selection manuals |   | Teacher will suggest more video links, LRs to assist in learning |            |                     |
| <b>SCHEME OF ASSESSMENT</b>  |  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
| <b>S. No.</b>  | <b>Method of<br/>Assessment</b>  | <b>Description of Assessment</b>   |  |  |             | <b>Maximum<br/>Marks</b> | <b>Resources<br/>Required</b> |                             | <b>External /<br/>Internal</b>       |   |  |            |                     |
| 1.   | Theory exam  | One simple question will be asked in which student will demonstrate selection procedure to select an appropriate ball bearing on basis of given data |  |  |             | 10                       | Question paper                |                             | External                             |   |  |            |                     |
| <b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>                                     |  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |
| 1. There are free soft copies of many commercial bearing selection manuals available on internet |  |  |  |  |             |                          |                               |                             |                                      |   |  |            |                     |

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| <b>RGPV (Diploma Wing ) Bhopal</b>  |   | <b>SCHEME FOR LEARNING<br/>OUTCOME</b>   |  |  | Branch Code |                      |                           | Course Code             |                                       |   | CO<br>Code   | LO<br>Code | Format No. <b>4</b> |
|   |   |  |  |  | A           | 0                    | 3                         | 5                       | 0                                     | 1 | 5  | 2          |                     |
| <b>COURSE NAME</b>  | <b>Auto Design &amp; Drafting</b>   |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |
| <b>CO Description</b>   | <b>Student will be able to select standard machine components and fasteners for the given design problem situation</b>  |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |
| <b>LO Description</b>   | <b>Student will be able to select the appropriate fastener to be used in any automobile sub assembly</b>  |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |
| <b>SCHEME OF STUDY</b>  |   |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |
| <b>S. No.</b>   | <b>Learning Content</b>   | <b>Teaching –Learning Method</b>   | <b>Description of T-L Process</b>  |  |             |                      | <b>Teach Hrs.</b>         | <b>Pract. /Tut Hrs.</b> | <b>LRs Required</b>                   |   | <b>Remarks</b>   |            |                     |
| 1.  | Various types of fasteners, their specific uses, examples, specifications, codes, series, general procedure for selection of common nuts, bolts and washers for the given design situation, selection of appropriate bolts, nuts and washers for the given design situation | Traditional lecture method   | Teacher will explain different concepts related to contents, demonstrate methods of selection through examples and cases. Students will practice to select fastener under guidance of the teacher. Teacher will provide necessary remedial and tutorials |  |             |                      | 07                        | 04                      | Commercial Fastener selection manuals |   | Teacher will suggest more video links, LRs to assist in learning |            |                     |
| <b>SCHEME OF ASSESSMENT</b>   |   |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |
| <b>S. No.</b>   | <b>Method of Assessment</b>   | <b>Description of Assessment</b>   |  |  |             | <b>Maximum Marks</b> | <b>Resources Required</b> |                         | <b>External / Internal</b>            |   |  |            |                     |
| 1.  | Theory assignment   | One simple question will be asked in which student will demonstrate selection procedure to select three appropriate bolts, nuts and washers on basis of given three sets of data |  |  |             | 05                   | Question & rating scale   |                         | Internal                              |   |  |            |                     |
| <b>ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)</b>                              |   |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |
| 1. There are soft copies of many fastener selection manuals freely available on internet. |   |  |  |  |             |                      |                           |                         |                                       |   |  |            |                     |