HERBERT MORRISON TECHNICAL HIGH SCHOOL
SYLLABUS OUTLINE

Grade: 12 **Subject**: BMED – Unit 1

Topic/ Sub Topics	Duration	General Objectives	Specific Objectives	Major Concept	Methods of Delivery
Conic Sections and Loci	**Two Weeks**	***On completion of this Module, students should***: 1. develop the ability to produce drawings of a two-dimensional nature; 2. develop basic Computer-Aided Drafting (CAD) skills.	***Students should be able to:*** 1. define standard engineering curves; 2. construct standard engineering curves;	(i) Standard engineering curves: ellipse, parabola, hyperbola, Archimedean spiral and involute. (ii) Construction of ellipse, parabola and hyperbola using true methods. (ii) Construction of Archimedean spiral, involute and cycloid. (iii) Construction of tangents to these curves.	**PowerPoint Presentation, Worksheets & Demonstration**
Centroids	**Three Weeks**		***Students should be able to:*** 1. determine centroids of plane figures by graphical methods; 2. use graphical methods of integration of areas and first and second moment of areas;	***Graphical methods:*** (i) integration of area; (ii) first and second moments.	

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Cams	**Three Weeks**	***On completion of this Module, students should***: 1. develop the ability to produce drawings of a two-dimensional nature; 2. develop basic Computer-Aided Drafting (CAD) skills.	***Students should be able to:*** 1. develop displacement diagrams for edge, face and cylindrical Cams; 2. develop Cam profiles;	(i) Construction of Cam profiles and displacement diagrams to produce: (a) dwell; (b) uniform velocity; (c) uniform acceleration or retardation; (d) simple harmonic motion. (ii) Construction of Cam profiles and displacement diagrams with various types of followers, namely: (a) knife-edge; (b) roller; (c) flat; (d) spherical. (iii) Construction of Cam profiles and displacement diagrams with different follower paths: (a) straight line; (b) circular arc; (c) on-centre; (d) off-centre	**PowerPoint Presentation, Worksheets & Demonstration**

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Pictorial Projections	**One Week**	**On completion of this Module, students should:** 1. develop the ability to produce three dimensional drawings; 2. develop Computer-Aided Drafting (CAD) skills.	***Students should be able to:*** 1. represent solids in pictorial projections; 2. apply the isometric scale in constructing drawings in isometric projection; 3. construct circles and curves in pictorial drawings;	(i) Projection of solids in: (a) oblique; (b) planometric; (c) isometric; (d) two-point angular. (ii) The application of the isometric scale to the construction of drawings in isometric projection. (iii) The construction of circles and curves in pictorial drawings.	**PowerPoint Presentation, Worksheets & Demonstration**
Orthographic Projections	**One Week**		***Students should be able to:*** 1. project solids in orthographic projection; 2. project sections of solids cut by inclined planes;	(i) First angle projection. (ii) Third angle projection.	
Auxiliary Views	**Two Weeks**		***Students should be able to:*** 1. draw true shapes of sections; 2. project auxiliary views; 3. draw lines of intersection between solids; 4. develop surfaces of right or skewed objects.	(i) The projection of sections of solids cut by inclined planes. (ii) True shapes of sections. (iii) First and second auxiliary views.	

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Intersection of Solids	**Two Weeks**		***Students should be able to:*** 1. develop surfaces composed of multiple geometric shapes;	Intersection and interpenetration of solids.	**PowerPoint Presentation, Worksheets & Demonstration**
Surface Development	**Two Weeks**		***Students should be able to:*** 1. arrange the development of surfaces to use material optimally; 2. develop surfaces composed of multiple geometric shapes;	(i) Surfaces of right or skewed three-dimensional objects. (ii) Surfaces composed of multiple geometric shapes. (iii) Transition pieces (square-to-round, round-to-round).	
Helix	**Two Weeks**		***Students should be able to:*** 1. construct helix for appropriate applications;	(i) Application of helix to screw threads and springs. (ii) Construction of helix on cylindrical and conical forms.	

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Assembly Drawings	**Three Weeks**	***On completion of this Module, students should:*** 1. develop the ability to prepare machine drawings; 2. develop the ability to produce drawings, freehand sketches and designs of machine components for manufacture.	***Students should be able to:*** 1. prepare drawings with sectional views; 2. produce assembly drawings;	(i) Assembly drawings of machine parts and components. (ii) Detailed drawings of components from: assembly drawings, freehand sketches and actual machine parts.	**PowerPoint Presentation, Worksheets, Demonstration**
Working Drawings	**One Week**		***Students should be able to:*** 1. produce working drawings; 2. produce and dimension drawings of engineering components for manufacturing;	(i) Working drawings of machine parts and components. (ii) Use of welding and machine graphical symbols.	
Detailed Drawings	**One Week**		***Students should be able to:*** 1. produce detail working drawings;	(i) Dimensional drawings: (a) manufacturing; (b) general; (c) geometric and positional tolerance: finishes, limits and fits (BS 4500). (ii) Balloon referencing and part listings: (a) cross-reference; (b) item list and materials specification.	
Freehand Sketching	**Two Weeks**		***Students should be able to:*** 1. prepare detailed freehand sketches of machine parts and components;	Orthographic and pictorial views of machine parts and components.	

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Design	**Three Weeks**	***On completion of this Module, students should:*** 1. develop the ability to prepare machine drawings; 2. develop the ability to produce drawings, freehand sketches and designs of machine components for manufacture.	***Students should be able to:*** 1. synthesize solutions to simple engineering problems;	Synthesize designs using components selected from the suggested list below. (i) ***accessories*****:** gauges, small tools and clamping devices; (ii) ***mechanisms:*** slide crank and pin, rack and pinion, ratchet; (iii) ***fasteners:*** bolts and nuts, screws, studs, keys, pins, rivets and locking devices; *(iv)* ***Hydraulic Systems:*** (a) pumps: centrifugal and reciprocating; (b) valves: non-return, isolating, expansion, safety, gate and globe; piping and joints: flanged and hydraulic; seals: dynamic and static. (v). ***Machine tools:*** Parts of the following machines: drilling; grinding; lathe; milling and shaping.	**PowerPoint Presentation, Worksheets, Demonstration, Research & Discussion**

Assessment Type

- Test
- Internal Assessment