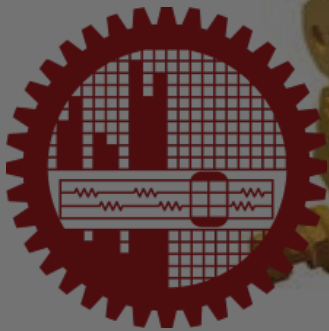


ME 260: Mechanical Engineering Drawing II

Spur Gear Profile

teacher.buet.ac.bd/amorshed/courseware_me260.htm



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Examples of Common Gear Types



Bevel Gear

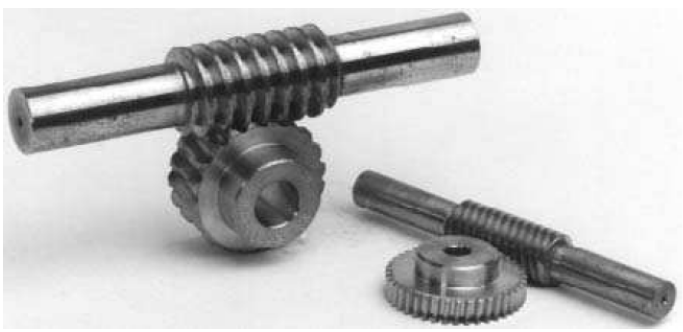


Spur Gear



Helical Gear

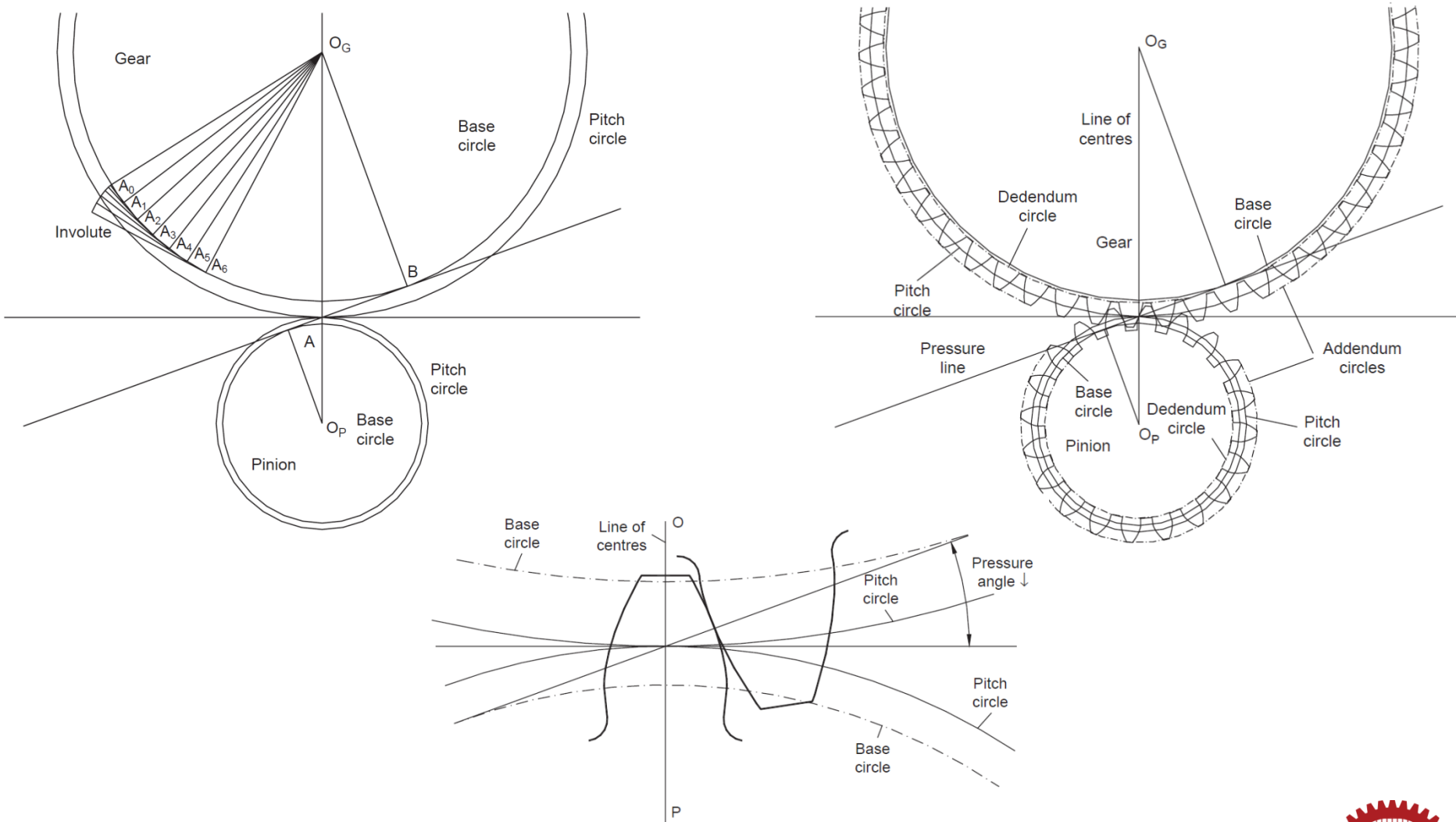
All Encompassing Gear



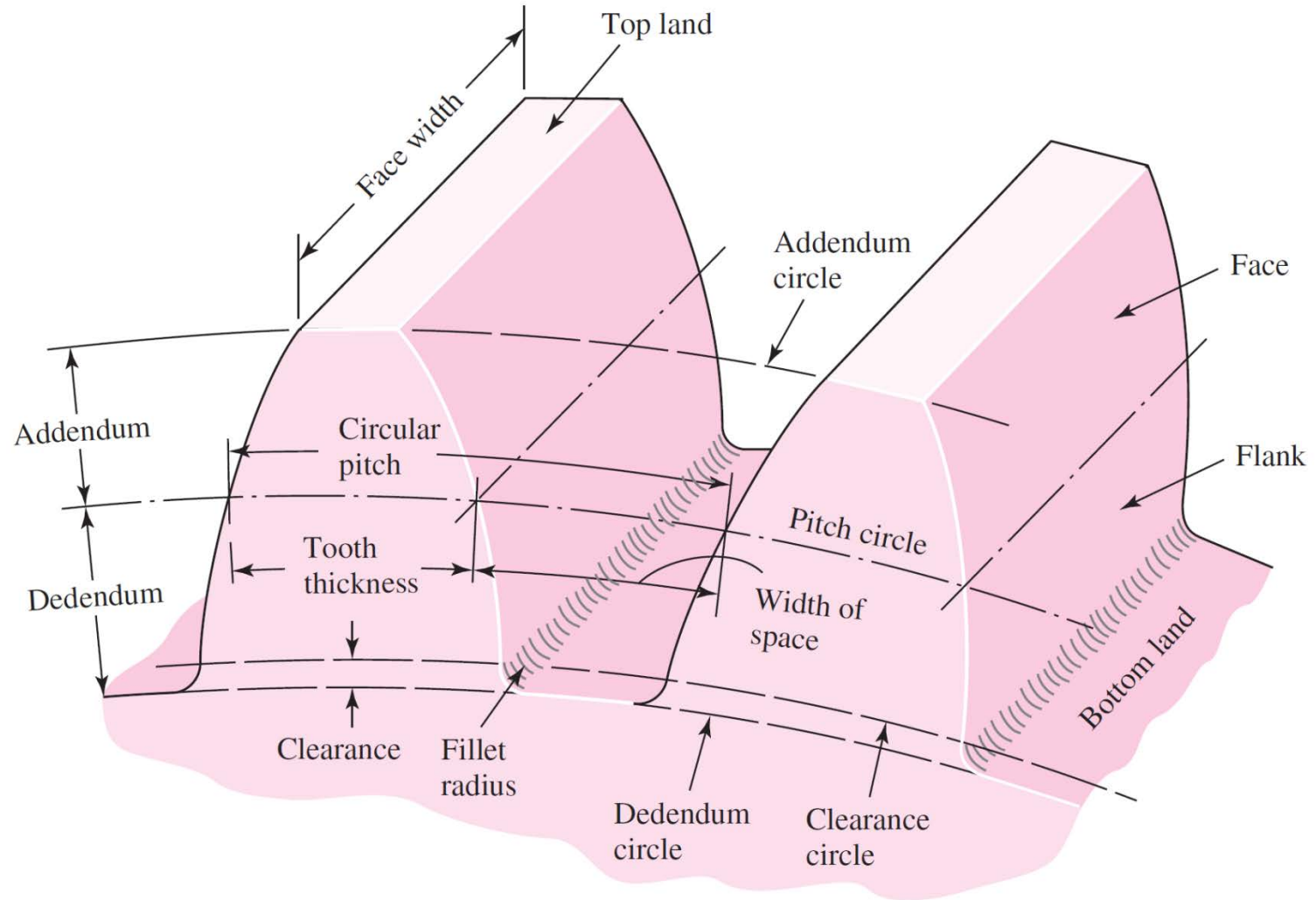
Worm Gear



Spur Gear | Basic Construction



Spur Gear | Detail Construction



Spur Gear | Terminology

The **pitch circle** is a theoretical circle upon which all calculations are usually based; its diameter, d is the **pitch diameter**. The pitch circles of a pair of mating gears are tangent to each other.

The **circular pitch**, p is the distance, measured on the pitch circle, from a point on one tooth to a corresponding point on an adjacent tooth.

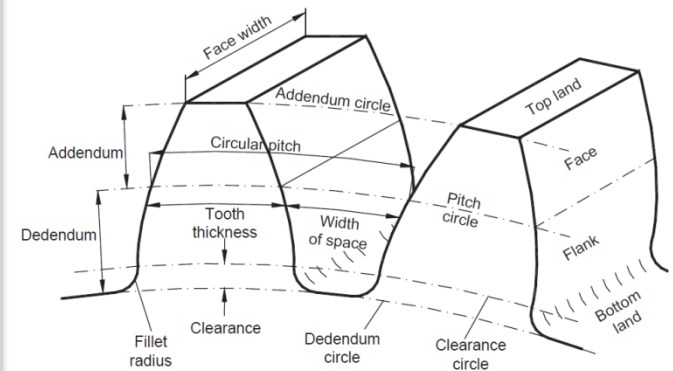
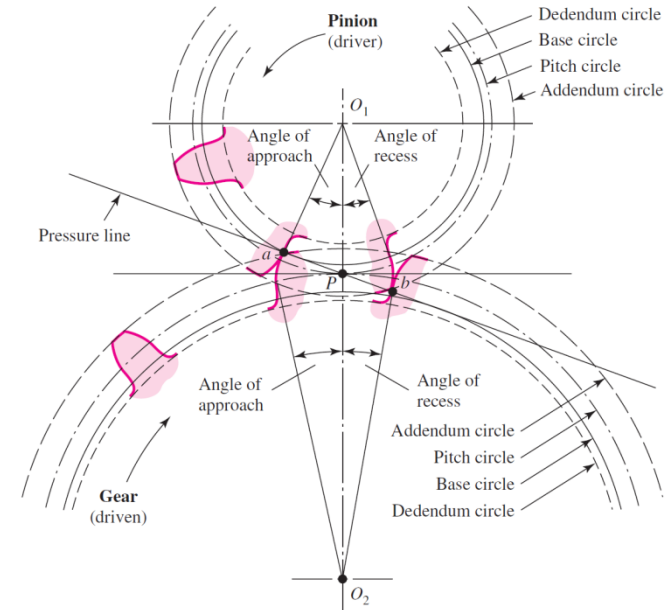
The **module**, m is the ratio of the pitch diameter to the number of teeth. The customary unit of length used is the millimeter. The module is the index of tooth size in SI.

The **diametral pitch**, P_d is the ratio of the number of teeth on the gear to the pitch diameter. Thus, it is the reciprocal of the module. Since diametral pitch is used only with U.S. units, it is expressed as teeth per inch.

The **addendum**, a is the radial distance between the top land and the pitch circle.

The **dedendum**, b is the radial distance from the bottom land to the pitch circle. The whole depth is the sum of the addendum and the dedendum.

The **clearance circle** is a circle that is tangent to the addendum circle of the mating gear. The **clearance**, c is the amount by which the dedendum in a given gear exceeds the addendum of its mating gear.



Spur Gear | Relations for basic calculations

Diametral Pitch (teeth per inch), $P_d = N/d$

Module (mm), $m = d/N$

Circular Pitch, $p = \pi d/N = \pi m = \pi / P_d$

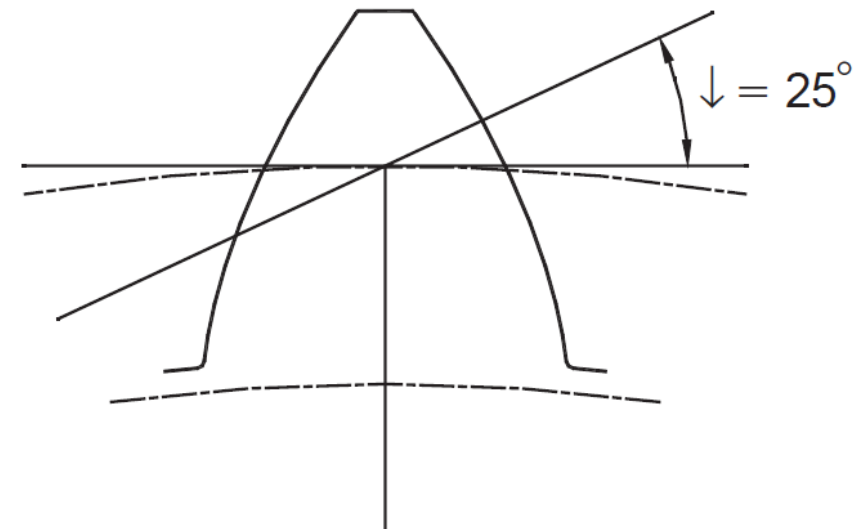
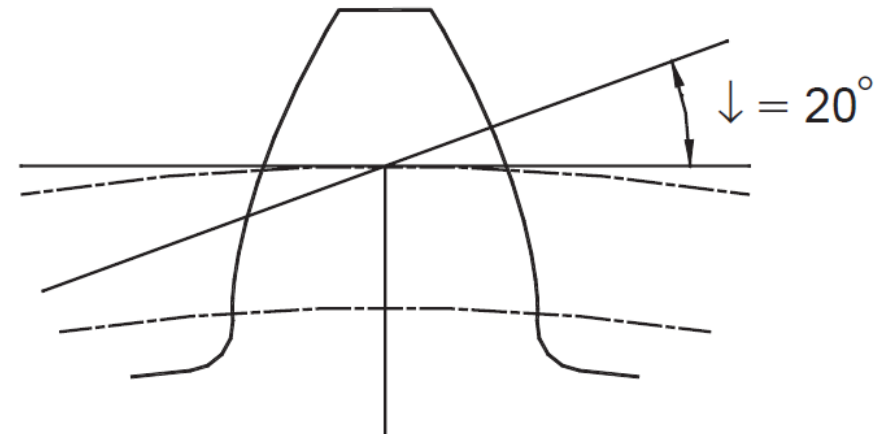
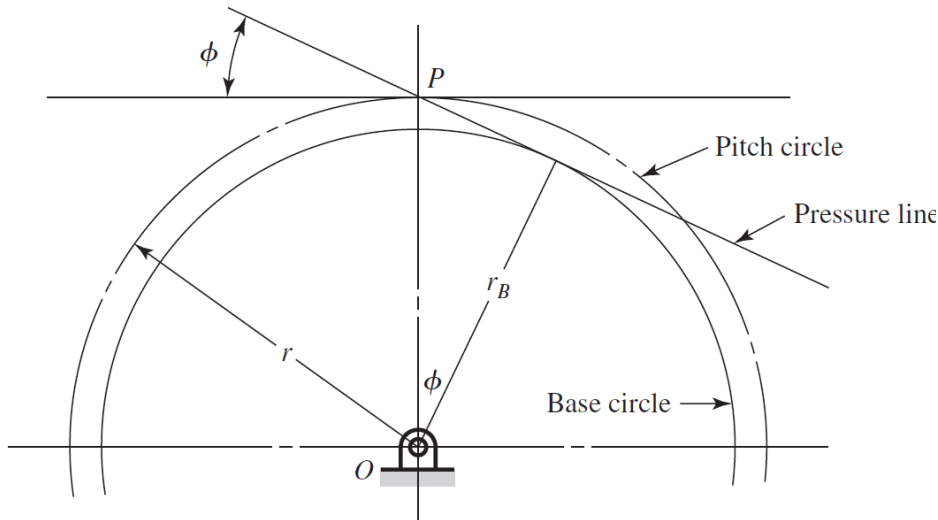
Addendum (full depth), $a = 1/P_d = 1 * m$

Dedendum (full depth), $b = 1.25/P_d = 1.25 * m$

Clearance (full depth), $c = b - a = 0.25/P_d = 0.25 * m$

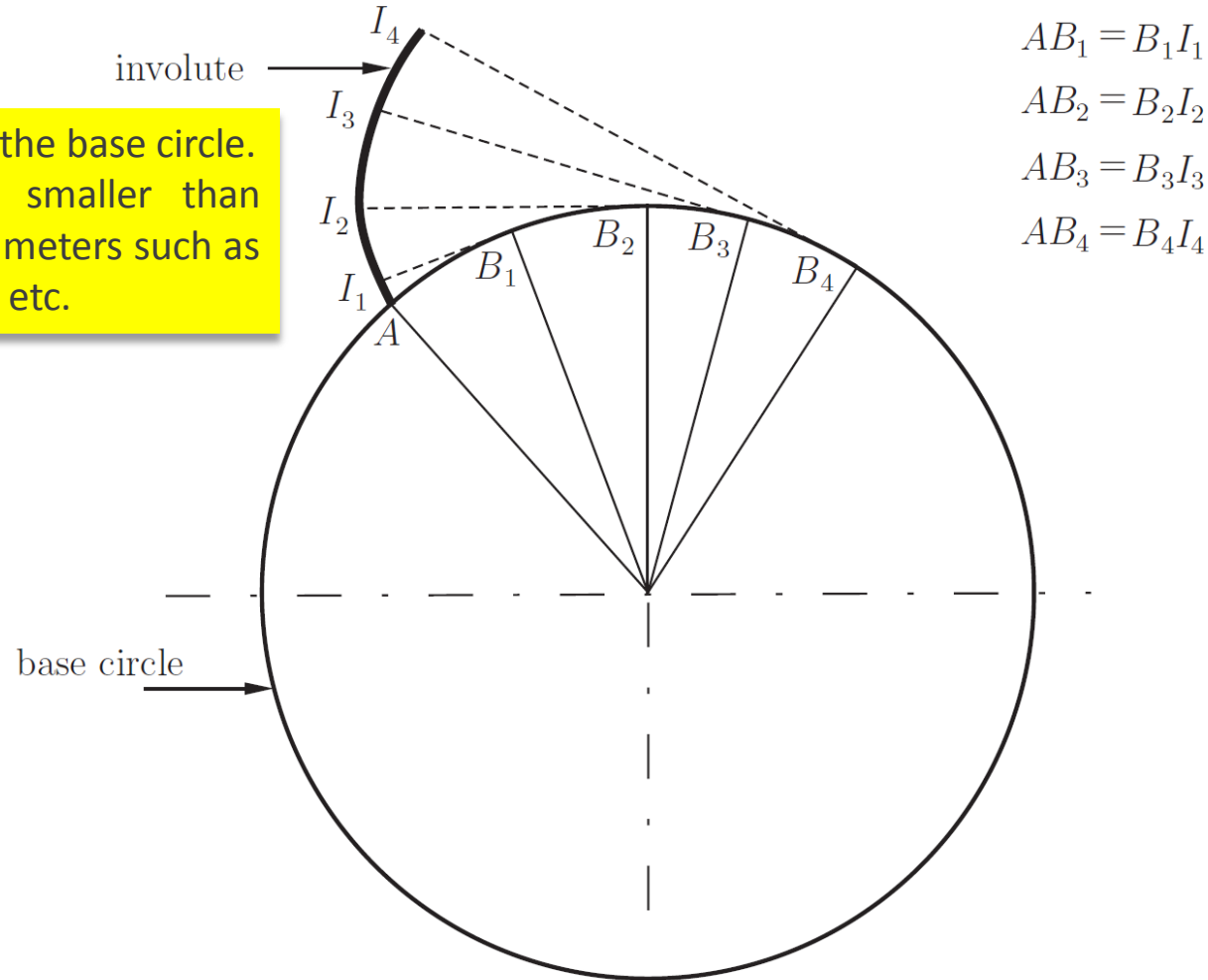
Tooth Thickness, $t = p/2 = \pi m/2$

Base Circle Radius, $r_B = r * \cos\phi$, where, r is the pitch circle radius and ϕ is the pressure angle.



Spur Gear | The Involute Profile

- Tooth profile is not involute below the base circle.
- Base circle could be larger or smaller than dedendum circle depending on parameters such as the pressure angle, number of teeth etc.



References | Dig deeper if you want

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