

Faculty of Engineering & Materials Science

EDPT 602 – “Engineering Design II”



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Hesham A. Hegazi



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Aim of the course

Power Transmission:

Electrical Power transmission

Hydraulic power Transmission

Mechanical Power transmission

Gears

belts

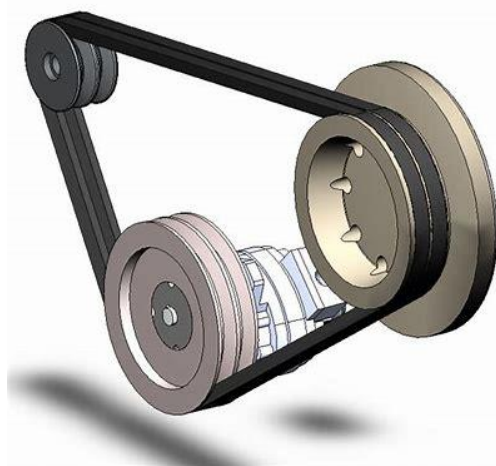
Chains

Introduction

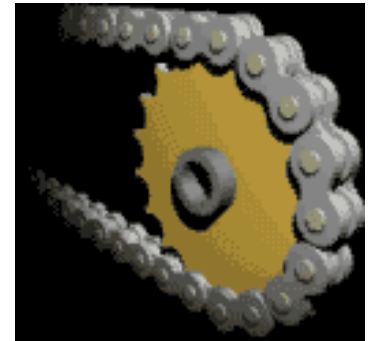
Types



Gears



Belts



Chains

Content

- Design of Power Transmission Elements such as:
 - Gears (Spur, Helical, Bevel, Worm and worm wheel)
 - Belts
 - Chains
- Selection of Anti-Friction Bearings (Ball, Cylinder, Taper,)
- Design of Journal Bearings
- Design of Clutches and Brakes

References

1. Mott, R. L., “Machine Elements in Mechanical Design”, 4th Edition, Pearson Prentice Hall, 2004.
2. Bhandari, B. V., “Design of Machine Elements”, 3rd Edition, Tata McGraw-Hill, 2000.
3. Juvinal, R. C., Marshek, K. M., “Fundamentals of Machine Component Design”, 5th Edition, John Wiley & Sons, 2012.
4. Budynas, R. G., Nisbett, J. K., “Shigley’s Mechanical Engineering Design”, 9th Edition, McGraw-Hill, 2011.
5. Khurmi, R. S., Gupta, J. K., “A Textbook of Machine Design”, Eurasia Publishing House, 2005.
6. Collins, J. A., Busby, H., Staab, G., “Mechanical Design of Machine Elements and Machines, A Failure Prevention Prespective”, 2nd Edition, John Wiley & Sons, 2010.
7. Jiang, W., “Analysis and Design of Machine Elements”, John Wiley & Sons, 2019.

Assessment


Assignments	10%
Quizzes	15%
Project	15%
Midterm	20%
Final	40%

Gears (Introduction)

- Main Advantage:

- 1- Reliable performance over a wide range of loads and speeds.
- 2- Small size and compactness.
- 3- Long service life.
- 4- High efficiency (96 to 99%).
- 5- Relatively light loads on the shafts and bearings.
- 6- Constant speed ratio.
- 7- Ease of maintenance.

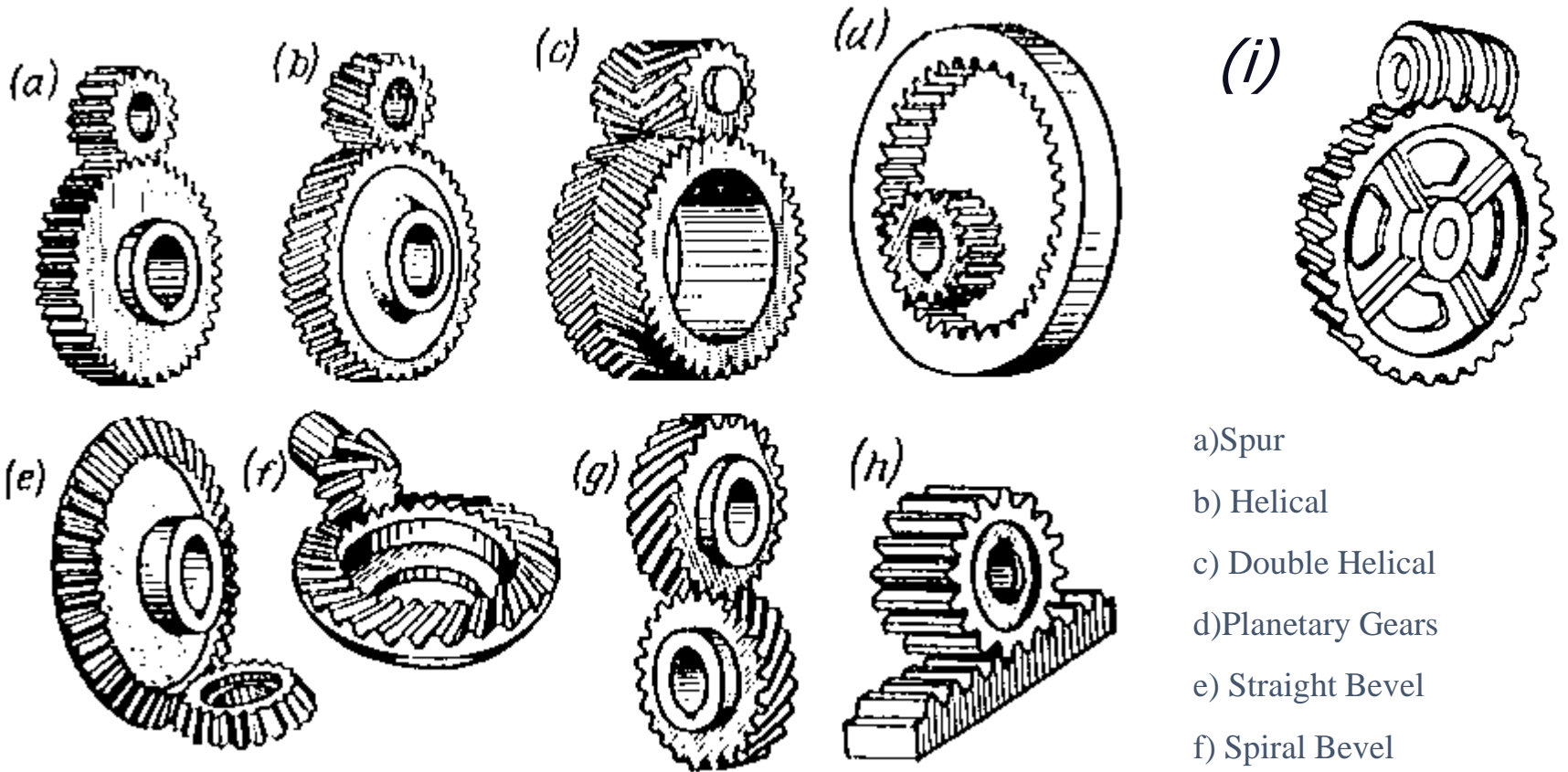
Gears (Introduction)



- Main Disadvantage:

- 1- Their manufacture requires special equipment and tools.
- 2- Errors in teeth machining may cause vibration and noise during operation.
- 3- Short center distance between the two shaft.
- 4- Change the rotation angle between the input and output.

Gears (Introduction)



a) Spur

b) Helical

c) Double Helical

d) Planetary Gears

e) Straight Bevel

f) Spiral Bevel

g) Hypoid bevel

h) Rack & Pinion

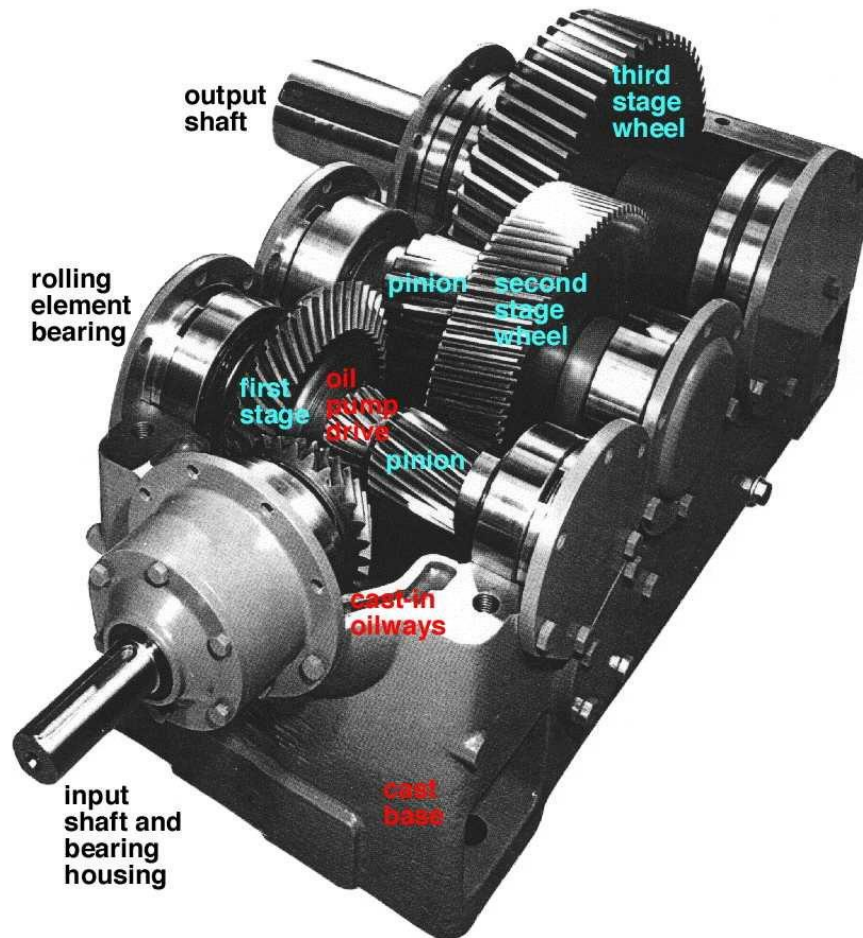
i) Worm & Worm Wheel

Gears (Applications)

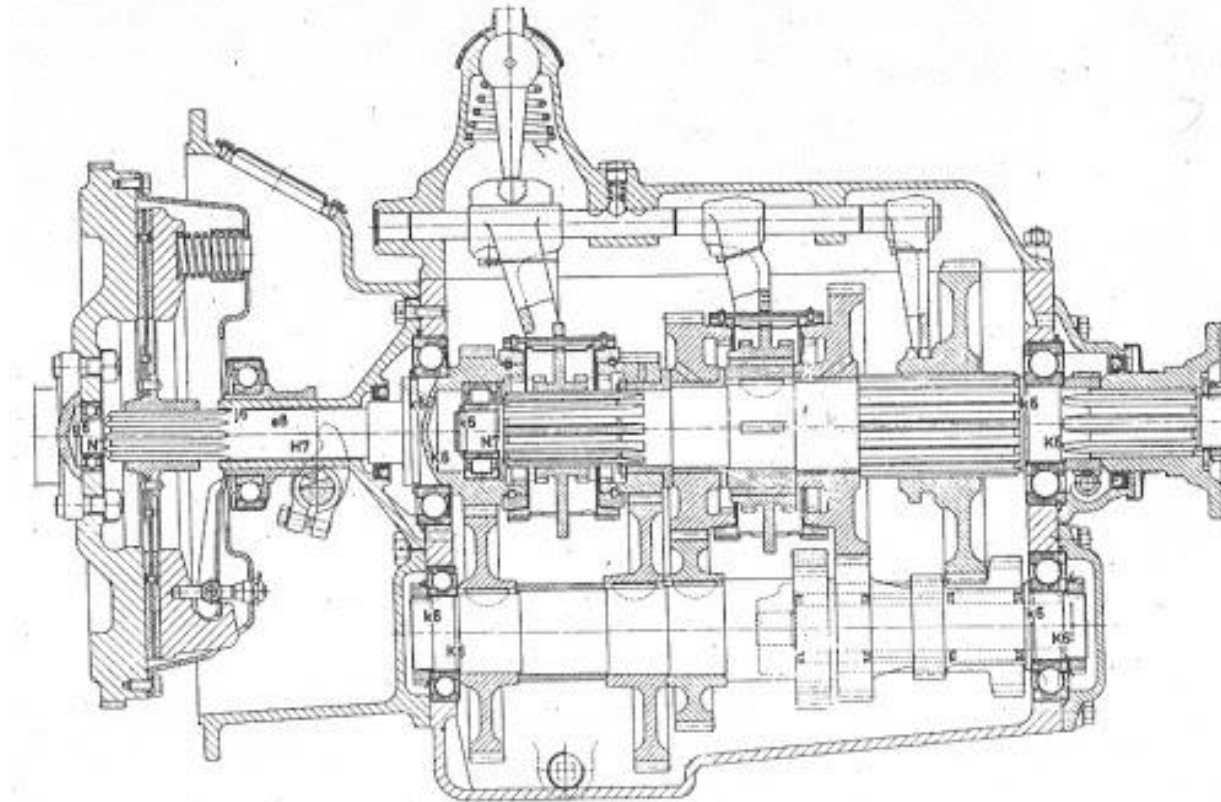


Gears (Applications)

3 Stage Gearbox



Gears (Applications)



Automotive Transmission

Gears (Applications)



3 Stage Gearbox



Double Helical Gear

Thank You