

Advanced Heat Conduction

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Spring Semester 2025

Reference Books

Heat Conduction - Ozisik

Heat Conduction – Yener and Kakac

Heat Conduction - Latif Jiji

Sl No.	Date	Topics Covered	Reading
1	6/1/2025	Introduction, Mechanisms of heat transfer, Continuum concept, Fourier law, Vector form, Thermal conductivity tensor, Divergence theorem, Heat conduction equation	Ozisik – Ch 1; YK – Ch 1, Ch 2; Class notes
2	13/1/2025	Heat conduction equation, Moving solids, Boundary conditions, Nonlinear heat conduction equation, Kirchhoff transformation, Numerical example, Non-Fourier heat conduction, Single-phase lagging model	Ozisik – Ch 1; YK – Ch 1, Ch 2; Class notes
3	20/1/2025	Non-Fourier heat conduction, Single-phase lagging model, Dual-phase lagging model, Pennes' bioheat equation, Biot number, Non-dimensional heat equation, Fourier number, Example	Class notes; LJ – Ch10
4	27/1/2025	Separation of variables, Uniqueness of solution, Extended surfaces (fins), Moving fins, Fin optimization	Ozisik – Ch 1; YK – Ch 3; Class notes
5	10/2/2025	Sturm Liouville problems, Fourier series, Fourier Bessel series, Fourier Legendre series, Separation of Variables, Examples	Ozisik – Ch 3 - Ch 5; YK – Ch 5, Ch 6; Class notes
6	17/2/2025	Mid-Semester Examination (18/2/2025 – 26/2/2025)	
7	3/3/2025	Integral Transforms – Finite Fourier Transforms, Examples	Ozisik – Ch14; YK – Ch 7; Class notes
8	10/3/2025	Integral Transforms – Hankel Transforms, Spherical Coordinate Systems, Examples	Ozisik – Ch14; YK – Ch 7; Class notes

9	17/3/2025	Laplace method, Duhamel method, Integral method	Ozisik – Ch 7, Ch 13; YK – Ch 8, Ch 10; Class notes
10	24/3/2025	Integral method, Duhamel method – Treatment of discontinuity, Heat conduction with local heat sources	Ozisik – Ch 7, Ch 13; YK – Ch 10; Class notes
11	31/3/2025	Institute Holiday	
12	7/4/2025	Heat conduction with phase change, Solution by Similarity method, Solution by Integral method, Examples	Ozisik –Ch 12; YK –Ch 11; Class notes
13	14/4/2025	Institute Holiday	
14	21/4/2025	End-Semester Examination (21/4/2025 – 29/4/2025)	