This *Handout* is Paul Goldbart's list of reference books which you may find useful both for this course, and also beyond in your graduate careers.

[1] Conventional textbooks (with a level of rigour roughly comparable with this course):

(r) K. F. Riley, S. J. Bence and M. P. Hobson, *Mathematical methods for physics and engineering*, published by *Cambridge University Press*.

(r) H. W. Wyld, *Mathematical Methods for Physics*, published by *Addison-Wesley*.

(r) C. Fox, *An Introduction to the Calculus of Variations*, published by *Dover*.

(r) J. Mathews and R. L. Walker, *Mathematical Methods of Physics*; based on lectures by Richard Feynman at Cornell University.

(r) G. Arfken, *Mathematical Methods for Physicists*; lengthy, but clear.

(r) R. B. Guenther and J. W. Lee, *Partial Differential Equations of Mathematical Physics and Integral Equations*; clear and interesting, especially on boundary integral methods.

I. Sokolnikoff and R. Redheffer, *Mathematics of Physics and Modern Engineering*.

E. C. Zachmanoglou and D. W. Thoe, *Introduction to Partial Differential Equations with Applications*; published by *Dover*, and thus relatively cheap.

P. R. Wallace, *Mathematical Analysis of Physical Problems*; also published by *Dover*.

G. Stephenson, *Introduction to Partial Differential Equations for Science Students*; a brief, to-the-point introduction.

(r) F. G. Tricomi, *Integral Equations*;

E. Butkov, *Mathematical Physics*.

A. Sommerfeld, *Partial Differential Equations in Physics*.

(r) C. M. Bender and S. A. Orszag, *Advanced Mathematical Methods for Scientists and Engineers*; a beautiful, readable and somewhat more advanced book, emphasising approximate methods but, unfortunately, not covering partial differential equations.

N. Bleistein, *Mathematical Methods for Wave Phenomena*.

I. Stakgold, *Boundary Value Problems of Mathematical Physics*, and *Green's Functions and Boundary Value Problems*.

[2] More advanced texts (with more emphasis on theory and less on application):

(r) P. Dennery and A. Krzywicki, *Mathematics for Physicists*; remarkably clear and well-organised, but light on examples involving partial differential equations.

(r) F. W. Byron and R. Fuller, *Mathematics of Classical and Quantum Physics*, now published by *Dover*.

E. DiBenedetto, *Partial Differential Equations*; rigorous yet readable.

H. Jeffreys and B. Jeffreys, *Methods of Mathematical Physics*; a readable classic.

[3] Scholarly treatises (at a level rather more rigorous than this course); particularly useful as reference books, but not so easy to learn from:

R. Courant and D. Hilbert, *Methods of Mathematical Physics*, 2 vols; standard reference, along with Morse-Feshbach.

P. M. Morse and H. Feshbach, *Methods of Theoretical Physics*, 2 vols.

H. Bateman, *Partial Differential Equations of Mathematical Physics*; venerable.

E. L. Ince, *Ordinary Differential Equations*; published by *Dover*.

W. Miller, *Symmetry and Separation of Variables* (Encyclopedia of Mathematics and its Applications, vol. 4); interesting perspective, showing how different special functions arise from separation of variables using complete sets of commuting operators.

H. S. Carslaw and J. C. Jaeger, *Conduction of Heat in Solids*.

[4] Handbooks of special functions and techniques; at least a passing acquaintance with these is books will be very useful as you embark on your research careers:

N. M. Temme, *Special functions: An introduction to the classical functions of mathematical physics*; a rich and stimulating account, despite the title.

M. Abramowitz and I. Stegun, *Handbook of Mathematical Functions*.

A. Erdélyi *et al.*, *Bateman Manuscript Project: Higher Transcendental Functions*, vols. 1-3.

W. Magnus *et al.*, *Formulas and Theorems for the Special Functions of Mathematical Physics*.

D. Zwillinger, *Handbook of Differential Equations*, and *Handbook of Integration*; modern, clear and altogether delightful books – my first stop when I encounter unfamiliar differential equations or integrals.

W. H. Press *et al.*, *Numerical Recipes*; my first stop for numerical techniques – very clear and stimulating, but we probably won't have much time for such methods.

[5] Miscellaneous books:

I have, from time to time, found the following three *Schaum Outline* books useful, especially for finding additional practice problems:
M. R. Spiegel, *Vector Analysis*;
F. Ayres, *Differential Equations*; and
P. Du Chateau and D. W. Zachmann, *Partial Differential Equations*.

H. A. Priestley, *Introduction to Complex Analysis*; and
S. D. Fisher, *Complex Variables*; those wishing to sharpen their skills with complex variables may wish to look at these excellent and compact presentations.

T. Needham, *Visual Complex Analysis*;
M. J. Ablowitz and A. S. Fokas, *Complex Variables: Introduction and Applications*;
G. F. Carrier, M. Krook and C. E. Pearson, *Functions of a Complex Variable*; and
L. V. Ahlfors, *Complex Analysis*; also provide excellent treatments of the subject of complex variables, and include more advanced topics.

J. D. Jackson, *Classical Electrodynamics*; clear and readable, both for issues of physics and for examples of special functions and boundary value problems.

N. Bleistein and R. A. Handelsman, *Asymptotic Expansion of Integrals*, published by *Dover*; an excellent guide through the subject.