

课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	MAE5003 高等应用数学 Advanced Methods in Applied Mathematics
2.	课程性质 Compulsory/Elective	专业核心课 Graduate core course
3.	课程学分/学时 Course Credit/Hours	3/48
4.	授课语言 Teaching Language	英文 English
5.	授课教师 Instructor(s)	杨东 助理教授 力学与航空航天工程系 yangd3@sustech.edu.cn YANG Dong, Assistant Professor Department of Mechanics and Aerospace Engineering yangd3@sustech.edu.cn
6.	是否面向本科生开放 Open to undergraduates or not	否 NO
7.	先修要求 Pre-requisites	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)
8.	教学目标 Course Objectives	
		This class teaches advanced methods in applied mathematics, with emphasis on practical applications in science and engineering. Thus, while mathematical derivations will be given when appropriate, most methods will be introduced and taught by practical examples in fluid mechanics, vibrations, and acoustics. It covers the following topics: generalized functions, convolution algebra, complex variables, Fourier transform, evaluation of integrals, Green's function, and integral equation. The class includes regular lectures and a research project, with the former teaching the basic skills in applied mathematics, and the latter applying these skills to research.
9.	教学方法 Teaching Methods	
		讲授 Lectures
10.	教学内容 Course Contents	
	Section 1	Generalized functions (6)
	Section 2	Convolution algebra (8)
	Section 3	Complex variables (8)
	Section 4	Fourier transform (4)
	Section 5	Evaluation of integrals (8)

Section 6	Greens function (6)
Section 7	Integral equation (4)
Section 8	Research project (4)
11. 课程考核 Course Assessment	
<p>(①考核形式 Form of examination; ②. 分数构成 grading policy; ③如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>1.final exam</p> <p>2.分数构成 grading policy</p> <ul style="list-style-type: none"> ➤ Homework (30%) Homework will be assigned for each topic, and will be due at the end of each month.Homework grading will be based on both completeness and correctness. ➤ Research project (30%) The research project will be an application of the methods covered in the lectures to a practical problem. The problem will be assigned with instructions in November. The report will be presented in the format of a technical paper. ➤ Final exam (40%) The final exam will be a two-hour, close-book test. The exam will be scheduled at the completion of the lectures. The final grades may be subject to curving. 	
12. 教材及其它参考资料 Textbook and Supplementary Readings	
<ul style="list-style-type: none"> ➤ This course will provide a complete set of lecture notes. The following can be used as additional reading material. M. J. Lighthill “Fourier Analysis and Generalized Functions” Cambridge University Press, 1958 ➤ D. G. Crighton, A. P. Dowling, J. E. Ffowcs Williams, M. Heckl & F. G. Leppington “Modern Methods in Analytical Acoustics” Spring-Verlag 1992 ➤ A. P. Dowling & J. E. Ffowcs Williams “Sound and Sources of Sound” Ellis Horwood Limited 1983 ➤ G. R. Carrier, M. Krook & C. E. Pearson “Functions of a Complex Variable: Theory and Techniques” McGrawHill 1966 	