MAT 776-1001  Topics in Applied Mathematics
Advanced Analytical (Exact and Approximate) Methods for ODE
FALL SEMESTER (August 28 - December 9, 2017)

Instructor: Dr. A. Muleshkov, Associate Professor of Mathematics

Location: TBA   Time: Tu Th 2:00 P.M. – 3:15 P.M.
Office: CDC-1020   Office Phone: 895-0387 (Voice mail is available.)
Office Hours: Mo Tu We Th 1:00 P.M. – 1:55 P.M.

E-mail address: muleshko@unlv.nevada.edu
Web site: http://faculty.unlv.edu/muleshko/

Carl M. Bender and Steven A. Orszag.

Learning Outcomes:

1. Expanded review of some analytic and other techniques for solving ODEs from MATH 427 and MATH 428.
2. Series and asymptotic series solutions of ODE.
3. Green's functions and other solutions to BVP.
4. Regular Perturbation Methods.
5. Boundary Layer Theory.
6. WKB Method.

Prerequisites: MATH 428 and MATH 459/ MAT 659

The final grade for the course is obtained from (total of 500 points):
   -- Weekly homework (!!!) - 35%
   -- One midsemester test (80 min.) - 20%
   -- Final exam (2 hours) - 30%
   -- Instructor's discretion - 15%

In this class, the textbook is only a tool rather than a self-study text. Very often, easier and more powerful methods are going to be presented in class. This textbook was chosen by the instructor because of the good choice and order of topics
and also because of the quality and relevance of the problems. Since Differential Equations and Complex Analysis are the first and most important parts of Applied Mathematics, the main goal of this class (at least when I teach it) is going to be analytical, semi analytical (approximate), and some numerical solutions of differential equations. Issues of existence, uniqueness, stability, convergence, etc. will also be considered, but their formal treatment will be secondary in this class. Use of Fortran, C++, etc. codes and software packages such as Mathematica, Maple, MATLAB, etc. is encouraged but will not be considered in this class. As it is seen from the previous remarks, this is a very serious and time consuming class. Besides coming to class, students need to review past material, work on homework, prepare for tests, read the text, and consult the instructor. Accordingly, students should plan to allow sufficient time. Regular attendance, prompt arrival, and taking elaborate notes are strongly recommended; students who do not maintain these good habits do not usually succeed in this course. Knowledge of phone number of and keeping in touch with a classmate could be very helpful. Participation in a study group is even better.

Please keep this syllabus for future reference. If you have any questions about the issues raised here or other issues, please come to my office hours.

**Academic Misconduct** – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV’s function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: [http://studentconduct.unlv.edu/misconduct/policy.html](http://studentconduct.unlv.edu/misconduct/policy.html).

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**Disability Resource Center (DRC)** – The UNLV Disability Resource Center (SSC-A 143, [http://drc.unlv.edu/](http://drc.unlv.edu/), 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

**Religious Holidays Policy** – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the end of the first two weeks of classes, **January 29, 2016**, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: [http://catalog.unlv.edu/content.php?catoid=6&navoid=531](http://catalog.unlv.edu/content.php?catoid=6&navoid=531).

**Transparency in Learning and Teaching** – The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information: [https://www.unlv.edu/provost/teachingandlearning](https://www.unlv.edu/provost/teachingandlearning) [https://www.unlv.edu/provost/transparency](https://www.unlv.edu/provost/transparency)
**Incomplete Grades** - The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

**Tutoring and Coaching** – The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit http://www.unlv.edu/asc or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

**UNLV Writing Center** – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: http://writingcenter.unlv.edu/

**Rebelmail** – By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students’ e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

**Final Examinations** – The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: http://www.unlv.edu/registrar/calendars.