

## Graduate

Teaching Philosophy and Mentoring  
Yogendra P. Kakad

When I joined the faculty of UNC-Charlotte in 1976, the college of engineering only had undergraduate programs. As my career has evolved over the past 34 years, the college has grown in terms of the total number of students and also in terms of number of advanced graduate programs. This extraordinary growth has provided me the opportunity to contribute to both the undergraduate programs and the graduate programs. I was also part of the original faculty who initiated and taught the first graduate courses and directed the first Master's thesis in the college.

I had developed the original 12 graduate level courses in the department and which formed the nucleus of our current graduate program. I was a member of all three doctoral committees to develop proposals for the first doctoral programs at UNC-Charlotte. I was the Electrical and Computer Engineering department's first graduate coordinator, and the first chair of the College Graduate Committee and college representative in the University Graduate Council.

I consider mentoring students an important aspect of my job. I served as the director of graduate studies in the department for several years. This provided me with the opportunity to counsel all the students in the department. Although I do not serve in this capacity any more, a large number of students still seek my advice regarding academic counseling, career opportunities, summer internships, co-op openings etc. I maintain contacts with employers, federal research laboratories, our alumni, and academicians at other universities. I make sure my research contacts benefit my students in more ways than the obvious benefit to my professional growth. I visit industries, my colleagues at other universities, and scientists and engineers at NASA centers to keep up with developments in my field. This allows me to cultivate a network of contacts for my students. If I am able to find a summer internship for my student, I make it a point to visit him/her a few times during the summer.

My research has also provided opportunities for my students to become involved in innovations in engineering. I consider my research an integral part of my teaching in terms of student learning. This makes it possible for me to excite students to pursue current-state-of-the-art research topics, get them to participate in advanced research work with me, and interact with the national and international research scholars accompanying me to research laboratories and conferences. I have been fortunate to have received externally funded grants every year since 1984 and have been a CO-PI on several other grants. This has enabled me to mentor, expose students to current research areas, and provide financial assistance to several graduate students over the years. I have coauthored a number of papers in national and international conferences as well as technical journals with my graduate students based on their research work. I encourage them to present their research work at the conferences as this is an invaluable experience in their graduate education and gives them a sense of belonging to the academy of research scholars. During the initial stage of my funded research from NASA Langley Research Center, a lot of my research work involved experimental work and I spent a great deal of time with my graduate students at NASA laboratories doing hands-on work. The graduate students found this experience very exciting while working side by side with NASA scientists and technicians. Most of them have graduated with graduate degrees and moved into aerospace professional careers. I maintain contacts with these alumni, as they continue to be excellent resources for current students as links to job opportunities and as mentors.

I have been fortunate to have been able to direct over 40 Master's thesis and 6 doctoral dissertations. Also, I have served on over 200 Master's Thesis and 13 doctoral dissertation committees.

Y. P. Kakad

My basic teaching philosophy for graduate education is to provide complete mentoring of a graduate student during the time he or she spends at UNC Charlotte. I like to integrate my graduate teaching, my research, and my externally funded research grants to educate a student to succeed after either Master's degree or doctoral degree.

Teaching:

I am strongly committed to providing a solid academic background to all graduate students in my courses...I strive to offer a graduate course every semester and the courses are heavily populated by graduate students from Electrical Engineering, Computer Engineering, and Mechanical Engineering. My courses were developed by me and are continuously updated. They are highly interdisciplinary and they provide excellent foundation for doing research in different areas of engineering. The teaching evaluations as well as the student comments (wherever students have included them with the evaluations) are included. I have graduated 6 Ph. D candidates during past 6 years. This number is one of the highest in the college if not the highest. I have also directed four Master's students with thesis option during this period. The following are the names and dates of graduation of these doctoral students.

- Surya Kumar Ashok Kumar - May 2005
- Hazem B. Alassaly - December 2005
- Ronald Steven Black - December 2007
- Vikram Karwal - August 2009
- Douglas Isenberg - December 2009
- Kamal Sundersan - May 2010

I am currently directing three dissertations and these doctoral candidates are at an advanced stage. Two have the following tentative dates of graduation.

- Keisha Leach to graduate in December 2011
- Arvind Kumar to graduate in December 2011

In addition to working and mentoring my own doctoral students in the past five years, I have been active in serving on 9 other doctoral committees at UNC-Charlotte and 1 doctoral committee at the University of West Indies. These are the names of these graduates, their affiliations on campus and the years when they graduated.

- Eric R. Larsen (Department of Mechanical Engineering) - 2005
- Jeffery Scott Recquet (Department of Mechanical Engineering) - 2005
- Derek James Overcash (Department of Mechanical Engineering) - 2006
- Terence John Fagan (Department of Mechanical Engineering) - 2005
- Simon Obeid ( Department of Electrical and Computer Engineering) - 2008
- Keisha Josephine Thomas (Department of Electrical and Computer Engineering) – 2009
- Leroy Alfred Calder III (Department of Electrical and Computer Engineering) - 2010
- Muhammed Adel Zaffar (Department of Management Information Systems) - 2010
- Roya Hakim Zadeh (Department of Electrical and Computer Engineering) - 2010
- Ms. Nadine Sangster (Department of Mechanical Engineering, The University of West Indies, Trinidad) - 2008

I have also served on over 20 other Master's committees in various departments during the last 5 year period.

#### Research;

I believe a professor's fundamental duty is to educate next generation of researchers and I take this very seriously. I not only work very closely with my graduate students on research problems, but I like to mentor them in developing necessary skills in interacting with researchers from other universities and research laboratories. I help them in developing necessary oral and written communication skills by requiring regular progress reports and group presentations. I also encourage them to write technical papers to present them at national and international conferences and I provide funding for attending these conferences from my grants. This provides them an opportunity to hone their communication skills and to meet very well known researchers in the field. I strongly encourage them and mentor them in publishing both journal papers and conference papers. I am heavily involved in reviewing manuscripts for technical journals and I involve my graduate students in this review process to benchmark their work and remain at the cutting edge of the research field. In summary, I have created and nurtured a community of scholars to provide an avenue for them to excel individually and as a group.

#### Grants:

In order to sustain my research activity, I had and continue to have a cadre of excellent graduate students. To retain a group of excellent graduate students, it is of paramount importance to fund them at adequate levels during the entire period of their study. I have been fortunate to have had research grants from NASA directly and through the NC Space Grant Consortium. Instead of using the grant money for my summer salary, I have funded several of my graduate students and some of them for their entire doctorate degree programs. I mentor some senior students with my grant money to work on my research in terms of their required senior projects. I have found this to be an effective tool in recruiting outstanding undergraduates to pursue graduate studies.

#### Mentoring:

I firmly believe that I have the responsibility to make it a priority that my graduate students attain professional success after graduation. I am proactive in finding appropriate jobs for them using my contacts or by identifying and funding research internships during their studies. I also find summer internships for my graduate students during their course of graduate education to help them find permanent jobs. For example, this year I have made arrangements for my new graduate student Yawo to work at Lord Corporation in RTP during summer. I had helped him to apply and receive funding from NC Space Grant Consortium to work at NASA Johnson Space Center last summer as an undergraduate student. I had arranged for my current doctoral student Keisha Leach a graduate fellowship to work at NASA Johnson Space Center after completing her qualifying examination and this has resulted into a permanent job with ODESSY (An aerospace Consulting Company). My previous doctoral student Surya Kumar had one year internship with Intel Corporation after his qualifying examination and received an offer of permanent job after completing his doctorate degree. Another student Kamal who completed all the requirements for his doctoral degree last month has a permanent job at Texas instruments. Steve Black had also received an offer of a permanent position at AREVA Corporation before completing his doctoral degrees.

#### Summary:

In recognition of my teaching and mentoring accomplishments of past five years, I was recognized and awarded the prestigious IEEE Region 3 - Joseph M. Biedenbach Outstanding Engineering Educator Award in March 2010 at their annual conference. IEEE Region 3 includes all Southeastern Universities in the U.S.A.

## RESUME in Support of Mentoring

Yogendra P. Kakad

### PRESENT TITLE:

Professor of Electrical and Computer Engineering.

### EDUCATION:

University of Florida, Ph.D., 1975, Mech. Engr. (major) Electrical Engr. (minor)

### PROFESSIONAL EXPERIENCE:

August 1976 to present: University of North Carolina at Charlotte : Professor

### HONORS AND AWARDS

Award of NASA-ASEE Summer Research Fellowship, 1982

Award of NASA-ASEE Summer Research Fellowship, 1983

Award of UNC-Charlotte Major Summer Research Grant, 1984

Award of NASA-ASEE Summer Research Fellowship, 1984

Alcoa Award for Outstanding Graduate Professor, College of Engineering, 1997.

Bank of America Outstanding Teacher Award Finalist 2007.

IEEE Region 3 - Joseph M. Biedebach Outstanding Engineering Educator Award 2010.

### PUBLICATIONS (Only Selected Publications with students)

13. "External Measurements of Dynamic Pressure in Piping Systems," Proceedings of the Sixth World Congress on the Theory of Machines and Mechanisms, December, 1983. ( coauthored with undergraduate student Mr. Allen Tampleton )
14. "Optimal Control of Once-Through Boiler," Proceedings of 15th Annual Southeastern Symposium on System Theory, University of Alabama in Huntsville, March 1983. ( coauthored with Chinese visiting scholar Dr. Xu )
15. "Optimal Control Design for Once-Through Boiler Turbine Unit, Part 1," ASME publication, April 1985. ( coauthored with Chinese visiting scholar Dr. Xu )
16. "Optimal Control Design for Once-Through Boiler Turbine Unit, Part II, ASME publication, April 1985. ( coauthored with Chinese visiting scholar Dr. Xu )
17. "System Identification of Sputter Deposition Phenomenon," Proceedings of 18th Annual Southeastern Symposium on System Theory, University of Tennessee, April 6-8, 1986. ( coauthored with graduate student Mr. Ranganathan T.)
19. "Computer-Aided Design Package for Automatic Control Systems," ASME Publication on Engineering Applications of Microcomputers, PVP-VOL. 102, CED-VOL 2, July 1986. ( coauthored with undergraduate Student Ms. Rizzo, Sandra )
24. "Representing Structurally Adaptive Systems with State Variables and Logic Programs," Proceedings of 21st Annual Southeastern Symposium on System Theory, Florida State University, March 1989 pp. 178-182. ( coauthored with Graduate student Mr. Black, Ronald Steven )
25. "Identification and Control of Large Flexible Spacecraft," Proceedings of the 21st Annual Southeastern Symposium on System Theory, Florida State University, March 1989, pp. 284-288. ( coauthored with graduate student Ms. Harris, Clara Sue)
28. "Decentralized Slew Maneuver Control of Large Flexible Spacecrafts," Proceeding of IEEE SOUTHEASTCON '90, Vol 1, New Orleans, April 1990, pp. 114-118. ( coauthored with graduate student Crofts, Bradley D. )
34. "Output Feedback Detumbling and Reorientation Maneuvers and Vibration Damping of NASA SCOLE System," IEEE Trans. on Aerospace and Electronic Systems, January 1992, Vol. 28, No. 1, pp. 80-91
42. "Modeling and Simulation of Paper Feeding Mechanics in a Printer," Proceedings of the 10th ISPE/JFAC International Conference on CAD/CAM, Robotics and Factories of the Future CARS & FOF, August 1994, pp. 800-805. (with graduate student Mr. Krull, Nick )

43. "System Identification of Multi-body Flexible Spacecraft," ICSE '94, Coventry, U.K., September 1994, pp. 148-156. ( coauthored with graduate student Mr. Browne, Francis Christopher)
44. "Improvement of Robustness and Sensitivity Reduction for Multivariable Nonminimum Phase Systems," IEEE Proceedings of Southeastcon, April, 1995. ( coauthored with graduate student Dr.Mohammed, Jama A. )
45. "Identification of Articulated Multibody Flexible Space Structure," SDVNC, Vol. II, pp. 918-923, December, 1995. ( coauthored with graduate student Mr. Browne, Francis Christopher )
47. "Dynamic Behavior of Two Dimensional Mechanical System," Proceedings of 11th ISPE/IEE/IFAC International Conference on CAD/CAM, Robotics & Factories of the Future, August 1995, pp. 49-54. ( coauthored with graduate student Mr. Nammalwar, Giri )
49. "Robust Multivariable Controller Design for Multibody Space Systems using H-Infinity," Proceedings of COMCON5, July 1995, pp. 622-633. ( coauthored with graduate student Dr.Mohammed, Jama A. )
51. "Dynamics and Control of a Multiple Link Flexible Robot - Part I," Proceedings of 12th ISPE/IEE/IFAT International Conference on CAD/CAM, Robotics & Factories of the Future, August 1996, pp. 96-101. ( coauthored with graduate student Mr. Hakenwerth, Paul )
52. "Dynamics and Control of a Multiple Link Flexible Robot - Part II," Proceedings of 12th ISPE/IEE/IFAT International Conference on CAD/CAM, Robotics & Factories of the Future, August 1996, pp. 102-107. ( coauthored with graduate student Mr. Hakewerth, Paul )
54. "Rapid Prototyping of Viterbi Algorithm," Proceedings of COMCON 6, June 1997, pp. 161-272. ( coauthored With Mr. Chatapuram, Krishnan V. )
65. "Artificial Neural Network Based Controller Design for Advanced Aircraft," Proc. 14th International Conference on Systems Engineering, ICSE 2000, Coventry, U.K., September 2000, pp. 442-447. (coauthored With graduate student: Mu, Hong Helena)
69. "Design of Control Systems Using Neural Networks," Proceedings of 17th ISPE/IEE/IFAC International Conference on CAD/CAM, Robotics & Factories of the Future, Durban, South Africa, July 2001, pp.331-339. (coauthored with graduate student: Mu, Hong Helena)
71. "Robust Control of an Adaptive Optics Systems using  $H_{\alpha}$ ," Proceedings of 18<sup>th</sup> ISPE/IEE/IFAC International Conference on CAD/CAM, Robotics & Factories of the Future, Porto, Portugal, July 2002, pp.555-562. (coauthored with graduate student: Frazier, Benjamin W)
74. "Dynamics and Control of Robotic Hand Actuated by Shape Memory Alloy Actuator," Proceedings of International Conference on Systems Theory, Vol. II, pp. 634-639, Coventry, U.K., September, 2003.co- Authored with graduate student: Tim Shaw)
75. "Robust Control of an Adaptive Optical System," Proc. Inst. Mech. Engrs. Vol. 218, Part B; Journal of Engineering Manufacturing, U.K., pp. 353-358, April 2004. (coauthored with graduate student: Frazier, Benjamin W ).
79. "Neural Network Control of Robot Hand", The International Journal of INGENIUM, Glasgow, Scotland, vol. 1,2,3,4 ,pp. 505-513, July 2005. . (co-authored with graduate student Tim Shaw)
80. "Design and Analysis of DCT/DST Transform on ALTERA STRATIX FPGA" Proceedings of the CARs & FOF 2006 Conference, Aplpha Sciences Limited, Valur, India, pp 731-739, July 2006. . (co-authored with graduate student Vikram Karwal)
81. "Controller Design for a Rolling Mill", Proceedings of the CARs & FOF 2006 Conference, Aplpha Sciences Limited, Valur, India, pp 720-729, July 2006. (co-authored with graduate student Vikram Karwal)
82. "Neural Network Controlled Robotic Hand Actuated by Shape Memory Alloy", Proceedings of 18<sup>th</sup> International Conference on Systems Engineering , ICSE 2006, Coventry, U.K. pp. 443-448., September 2006. (co-authored with graduate students: Vikram Karwal, Douglas Isenberg, Tim Shaw)
83. Timothy Shaw, Douglas Isenberg, Vikram Karwal, Y. P. Kakad, "Space Robotic Hand Actuated by Shape Memory Alloy", Proceedings of the 23<sup>rd</sup> ISPE International Conference on CAD/CAM Robotics and Factories of Future, CARS & FOF 2007 Conference , pp 731-739, August 2007. (co-authored with graduate students: Vikram Karwal, Douglas Isenberg, Tim Shaw)
84. "Modeling a Space Robot in a Non-Uniform Gravitational Field," *Proceedings: Virginia Tech Mechanics Conference*, May, 2008. (coauthored with graduate student: Douglas Isenberg)
- 85."Computed Torque Control of a Quaternion Based Space Robot", to be published in the Proceedings of 20<sup>th</sup> International Conference on Systems Engineering ICSE 2008, Las Vegas, July 2008. (coauthored with graduate student: Douglas Isenberg)
86. "Dynamics and Control of Space Robots," *Proceedings of the 24th ISPE International Conference on CAD/CAM Robotics and Factories of the Future*, August 2008. (coauthored with graduate student: Douglas Isenberg)
87. D.R. Isenberg, Y.P. Kakad, "Computed Torque Control of a Quaternion Based Space Robot", Proceedings of the 19th International Conference on Systems Engineering, pp.59-64, Las Vegas, Nevada, 2008. (coauthored with graduate student: Douglas Isenberg)
88. D.R. Isenberg, Y.P. Kakad, "Simulating the Effects of a Non-Uniform Gravitational Field on a Space Robot", *Journal of Computers*, Vol. 4, No. 12, Dec. 2009, pp. 1255-1262. (coauthored with graduate student: Douglas Isenberg)
89. D. Isenberg, Y.P. Kakad, "Input Transformations for Lagrange's Equations of Space Vehicle Motion", IEEE SoutheastCon, pp 367-372, Atlanta, Ga.2009 (coauthored with graduate student: Douglas Isenberg)



90. D. Isenberg, Y.P. Kakad, "Input and Output Transformations for a Space Robot Modeled with Quaternions", South Eastern Symposium on System Theory , IEEE, pp. 255-260, 2009. (coauthored with graduate student: Douglas Isenberg)
91. D. Isenberg, Y.P. Kakad, "Reducing the Dynamics of a Space Robot Modeled with Quaternions", System Science: The International Journal, Vol. 35, No. 2, 2009, pp. 49-57. (coauthored with graduate student: Douglas Isenberg)
92. "Windowed DST-independent discrete cosine transforms for shifting data ", Proceedings of 20th International Conference on Systems Engineering, pp.252-257, Coventry, U.K., September, 2009. (coauthored with graduate student: Vikram Karwal)
93. " Position Control of a Space Robot Using Quaternion State Feedback ", Proceedings of 20th International Conference on Systems Engineering, pp.224-229, Coventry, U.K., September, 2009. (coauthored with graduate student: Douglas Isenberg)
94. "Independently updating the DCT and DST for shifting windowed data", Submitted to Journal of Signal Processing. (Under Review) . (coauthored with graduate student: Vikram Karwal)
95. "Quaternion Based Computed-Torque and Feed-Forward Tracking Controllers for a Space Robot", Proceedings of South Eastern Symposium on Systems Theory, IEEE, pp. 232-236, 2010. (coauthored with graduate student: Douglas Isenberg)
96. "Space Robot Tracking Control via Pulse-Width Modulation of Thrusters", Proceedings: UKACC International Conference on Control, Coventry, England, September 2010, pp.477-482. (coauthored with graduate student: Douglas Isenberg)
97. "Contact Force Measurement Noise in the Partial Feedback Linearization Control of Humanoid Robots", Proceedings: IEEE-RAS International Conference on Humanoid Robots, Nashville, TN, 2010, pp. 257-262. (coauthored with graduate students: Douglas Isenberg & M.A. Mclain)
98. "A Method of Gravity Offloading with a SCARA Manipulator", submitted and accepted for presentation and publication at the 21st International Conference on Systems Engineering, Las Vegas, NV, August 2011. (coauthored with graduate students: Douglas Isenberg & undergraduate students: S.Baek, M. Caddell, M. Mueller, D. Hill)
99. D.R. Isenberg, Y.P. Kakad, "Simulating the Effects of a Non-Uniform Gravitational Field on a Space Robot", Journal of Computers, Vol. 4, No. 12, Dec. 2009, pp. 1255-1262. (coauthored with graduate student: Douglas Isenberg)

## RESEARCH & GRANTS

NASA/ASEE Research Fellowship, Summer 1982 at NASA Langley Research Center, Virginia.

NASA/ASEE Research Fellowship, Summer 1983 at NASA Langley Research Center, Virginia.

NASA/ASEE Research Fellowship, Summer 1983 at NASA Langley Research Center, Virginia.

Dynamics and Control of Flexible Spacecraft During Slewing Maneuvers. Research proposed to NASA Langley Research Center, 1984-85. (Funded - \$30,000)

Dynamics and Control of Flexible Spacecraft During and After Slewing Maneuvers. Research proposed to NASA, Langley Research 1985-86 (Funded - \$30,000)

Dynamics and Control of Flexible Spacecraft During and After Slewing Maneuvers. Research proposed to NASA, Langley Research 1986-87 (Funded - \$40,000)

Dynamics and Control of Flexible Spacecraft During and After Slewing Maneuvers. Research proposed to NASA, Langley Research 1987-88 (Funded - \$40,000)

Control of Flexible Spacecraft During and After Slewing Maneuvers Research proposed to NASA Langley Research Center 1988-89 (Funded - \$50,000)

Control of Flexible Spacecraft During and After Slewing Maneuvers Research proposed to NASA Langley Research Center 1989-91 (Funded - \$55,000)

NSF Grant for Undergraduate Research Participation, Summer 1988. (Co-investigator, Funded \$40,000)

NSF Grant for Undergraduate Research Participation, Summer 1991. Co-investigator, Funded \$40,000)

NSF Grant for Science and Math School Teachers Research Participation, Summer 1991, Summer 1992. (Co-investigator, Funded \$240,000)

Dynamics and Control of Flexible Multibody Space Systems. Research proposed to NASA Langley Research Center, 1992-1993. (Funded - \$49,000)

Dynamics and Control of Flexible Multibody Space System. Research proposed to NASA Langley Research Center, 1993-1994. (Funded - \$50,000)

Funding from N.C. Space Grant Consortium (source: NASA) from 1993 to present, \$470,000 for UNC-Charlotte local competition awards.

CO-PI with Dr. Mohanty of Mechanical Engineering on \$250,000 grant from U.S. Department of Education on learning evaluation methods of students.

Equipment and software grants from Xilinx Corporation and Altera Corporation for Field Programmable Gate Arrays (FPGA), 1995 to present, \$100,000.

## **Mentoring of Graduate Students:**

In my opinion, mentoring of graduate students is the most important aspect of a strong graduate program. I believe in developing a strong bond between my graduate students and myself as well as other fellow graduate students. The graduate students need constant intellectual stimulus as well as an atmosphere to realize their full potential. This is why I constantly strive to work very closely with them to provide complete support for their graduate education. This requires me to remain current in my own research so I can provide my students with exciting and state-of-the-art research ideas. I have to constantly provide them with the necessary academic background on individual basis to develop the necessary preparation and ability to study the relevant research literature. My top priority is to meet with my graduate students as a group and sometimes individually on a regular basis to monitor their progress in research. In these meetings I encourage free exchange of ideas and, I also discuss my own research efforts to create the research culture which requires constant exchanges among peers. I make a special effort for them to interact with researchers from other academic institutions and research laboratories. In order to achieve this I encourage them to write joint conference papers with me and arrange for financial support for them to travel to national and on rare occasions to international conferences and present papers.

I strive to take care of all their needs including financial support from either my research grants or departmental assistantship. On rare occasions, I have to resolve some of their personal problems, especially with international graduate students in terms of visas. I work very hard for them to be successful not only during their academic studies at UNC-Charlotte, but I routinely help them to identify their career goals and provide them with the necessary contacts for job opportunities.

I work hard to mentor qualified undergraduate students to pursue graduate education at UNC-Charlotte under my supervision and I have been very successful in retaining a number of them. I have graduated 5 doctoral students so far and out of that 2 students received their undergraduate degrees at UNC-Charlotte. Two other students who completed their undergraduate degrees in our department decided to receive their Master's degree with thesis under my supervision and subsequently completed their Ph.D. degrees, one at MIT and the other at Stanford University. I have been successful in directing over 40 Master's students. I am currently directing three doctoral dissertations and one Master's thesis and serving on 12 other doctoral committees.

I am fortunate to have joined the faculty of UNC-Charlotte when it offered only undergraduate programs in engineering and my career evolved in tandem with the growth in the advanced graduate programs. This provided me with the privilege to contribute to our undergraduate programs as well as the graduate programs and be part of a large number of UNC-Charlotte engineering students' educational experience. I was offered the opportunity to shape graduate curricula and develop new graduate courses.

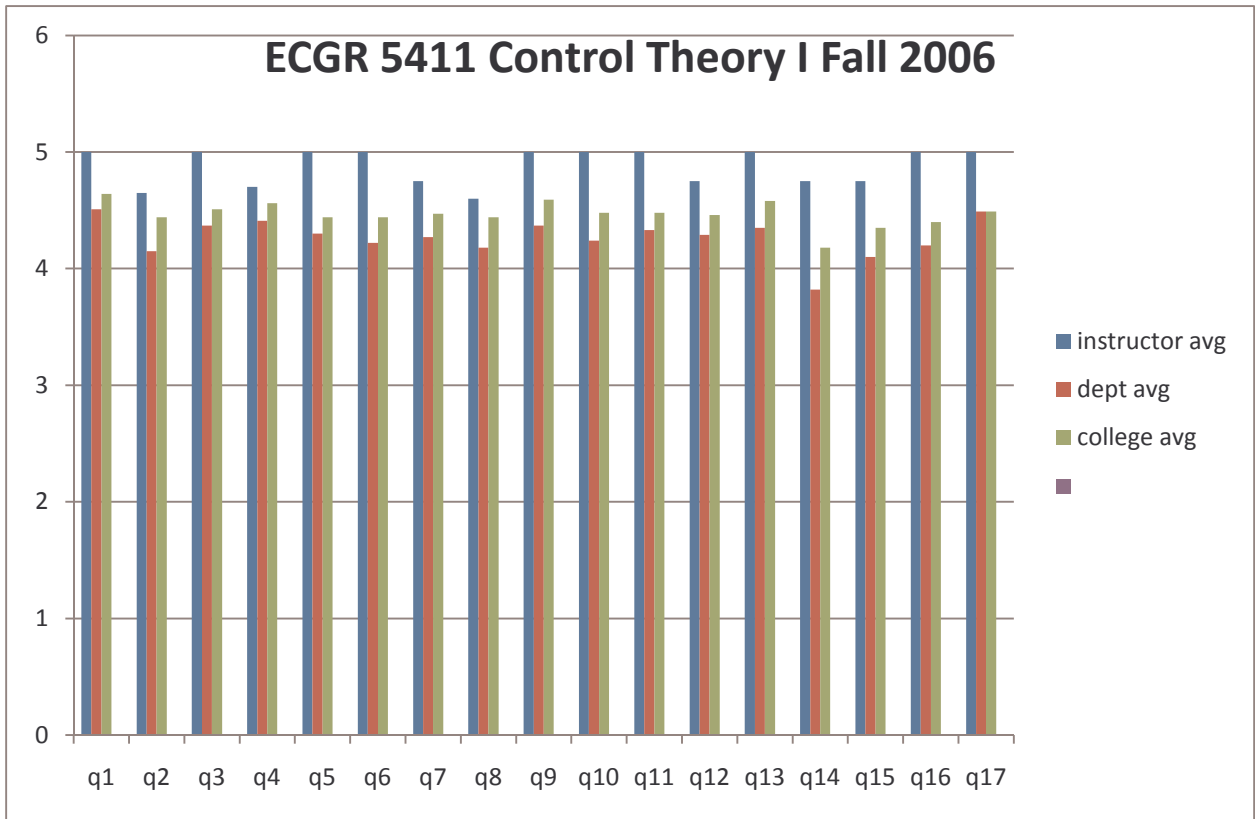
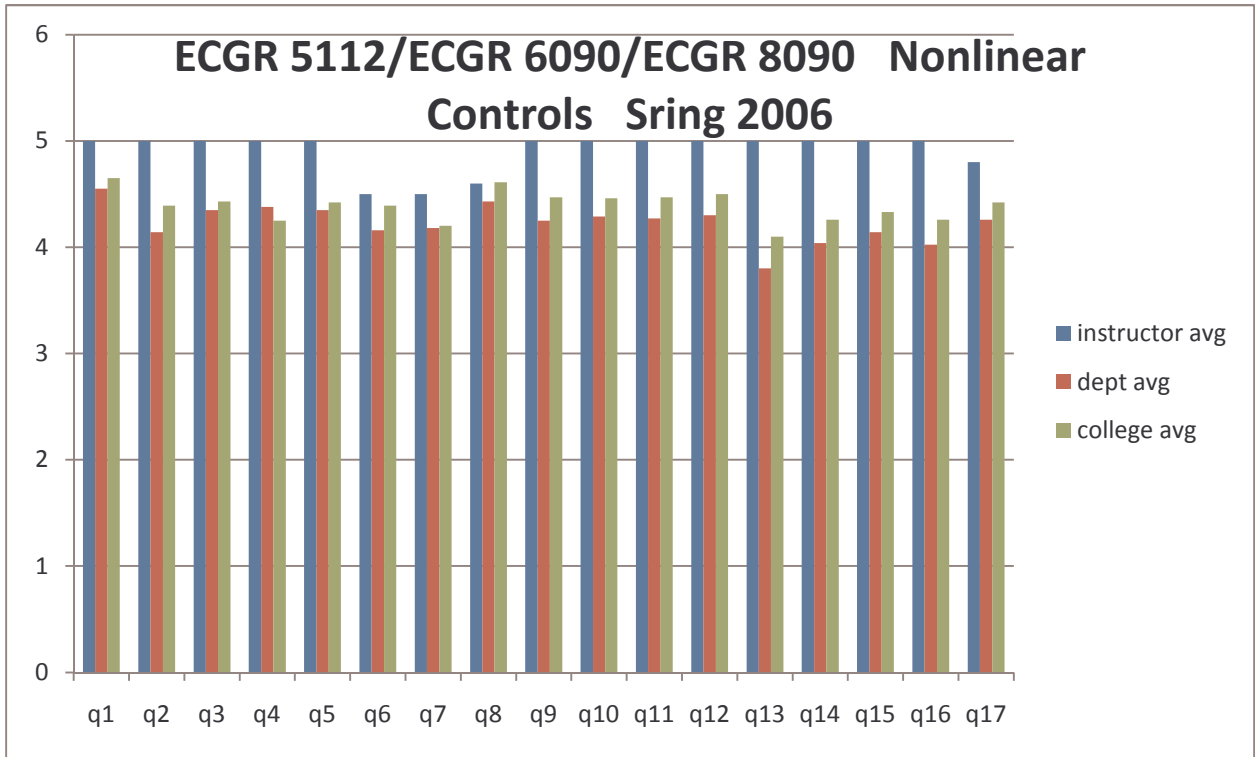
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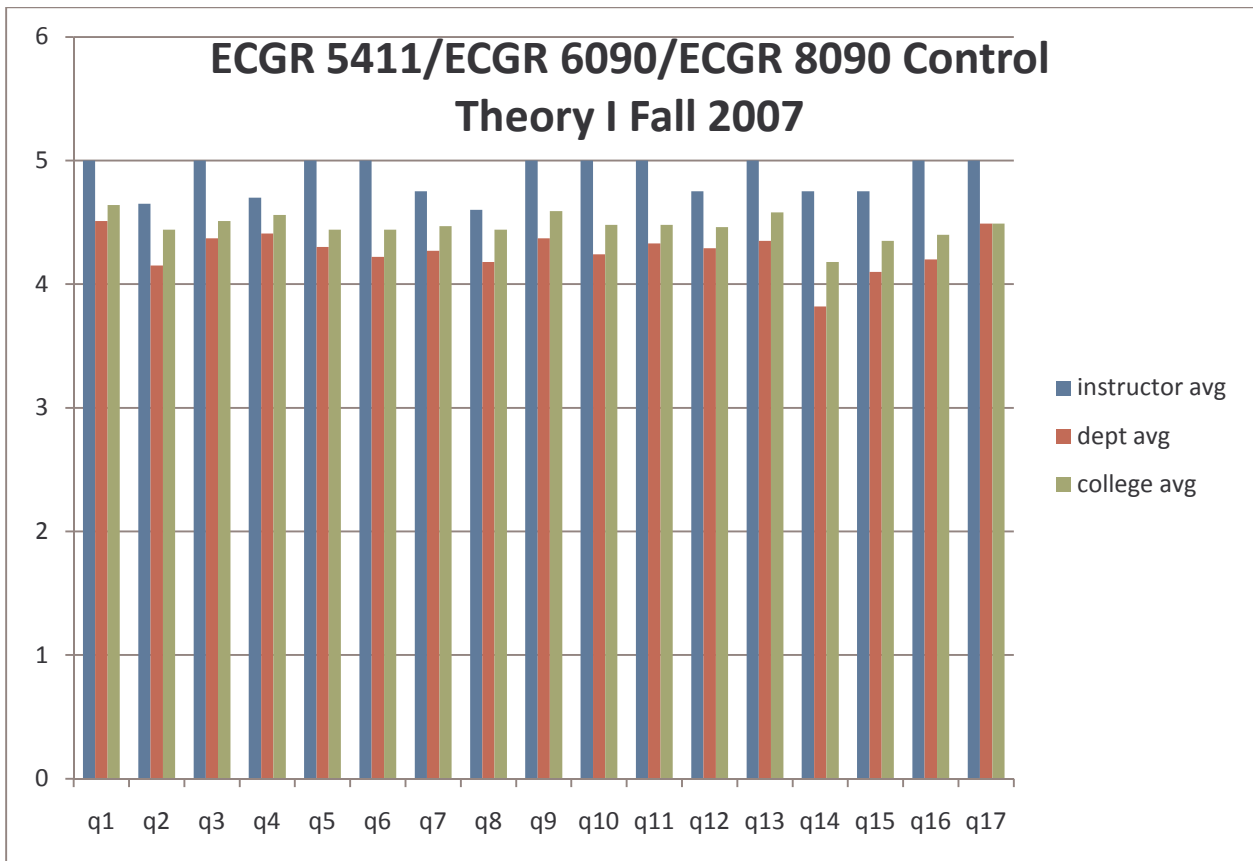
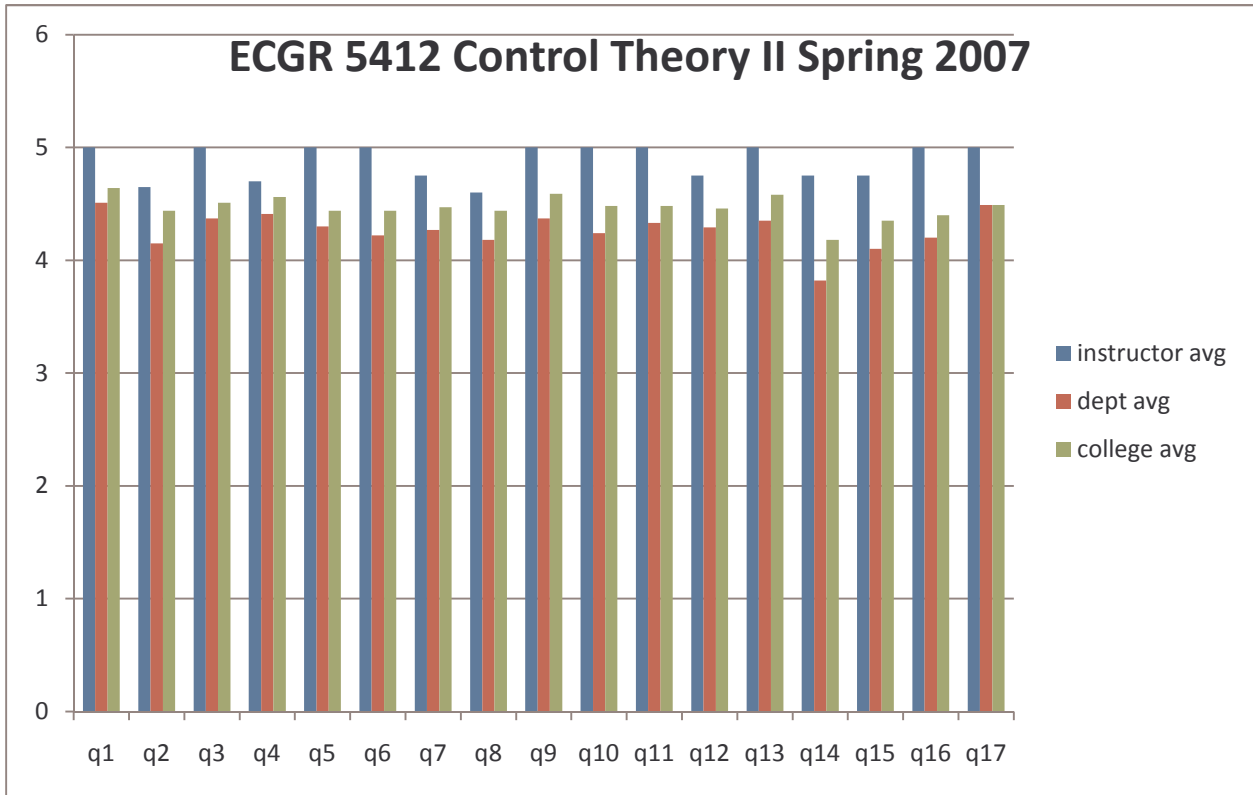
committees to develop proposals for the first three doctoral programs at UNC-Charlotte. I was the Electrical and Computer Engineering department's first graduate coordinator, and the first chair of the College Graduate Committee and college representative in the University Graduate Council. I was the first faculty member in the department to be awarded a federal research grant (from NASA Langley Research Center in 1984).

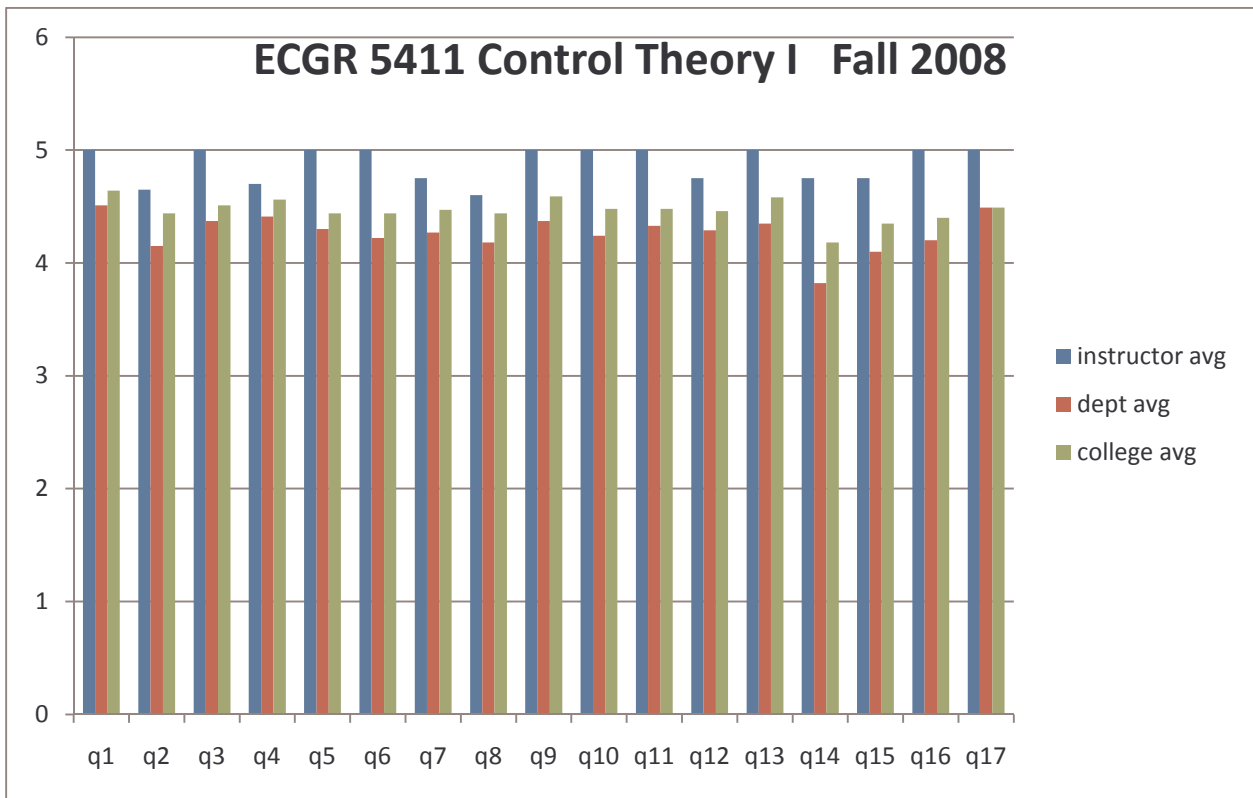
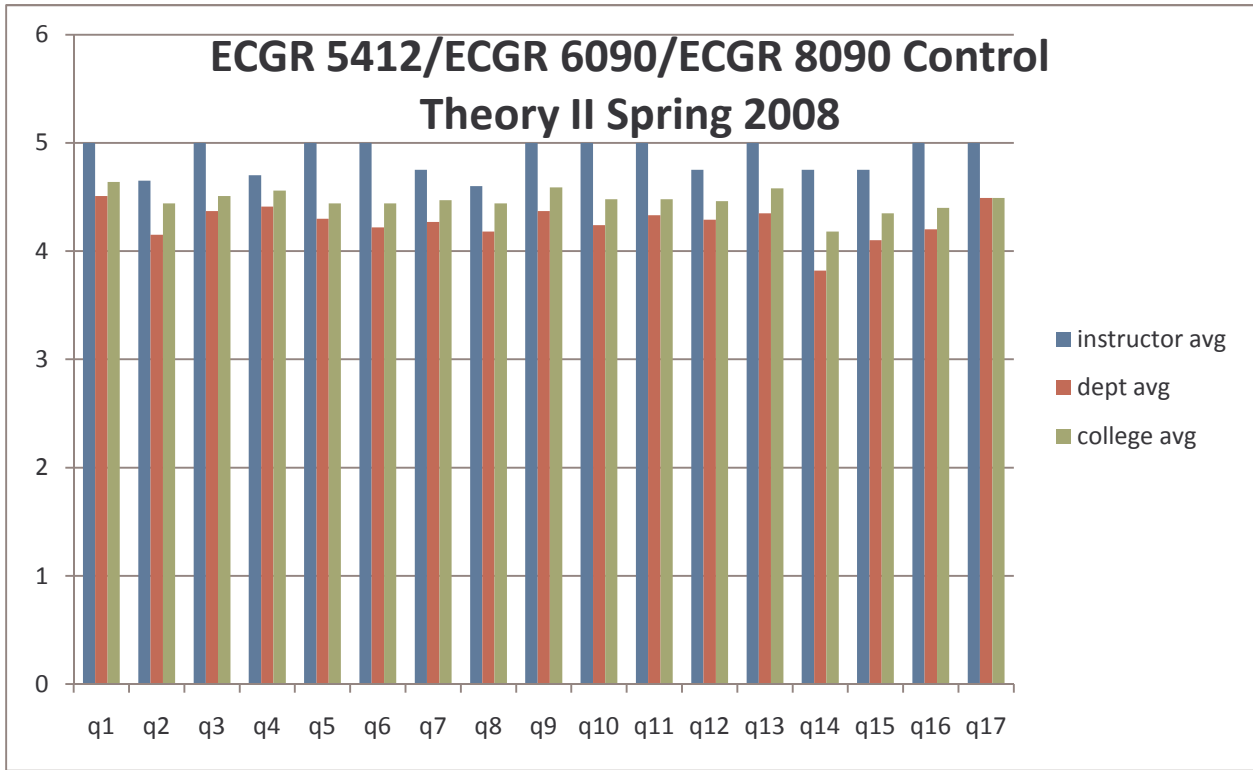
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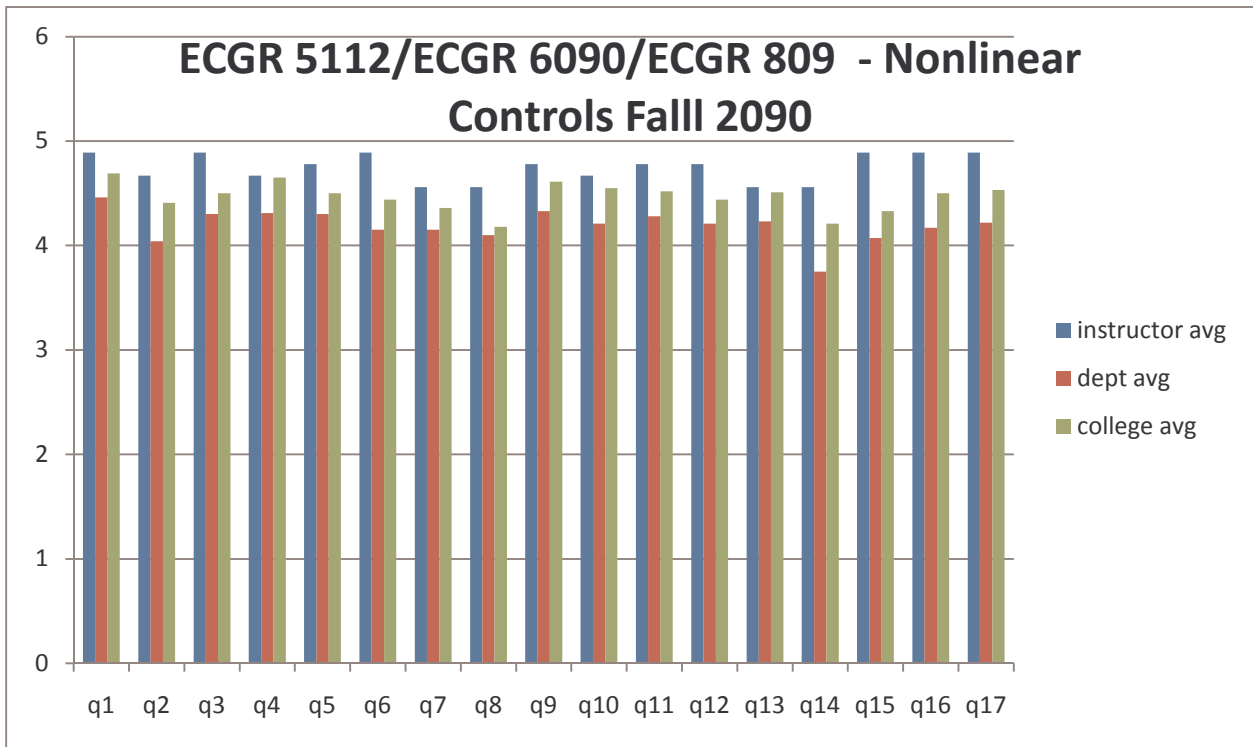
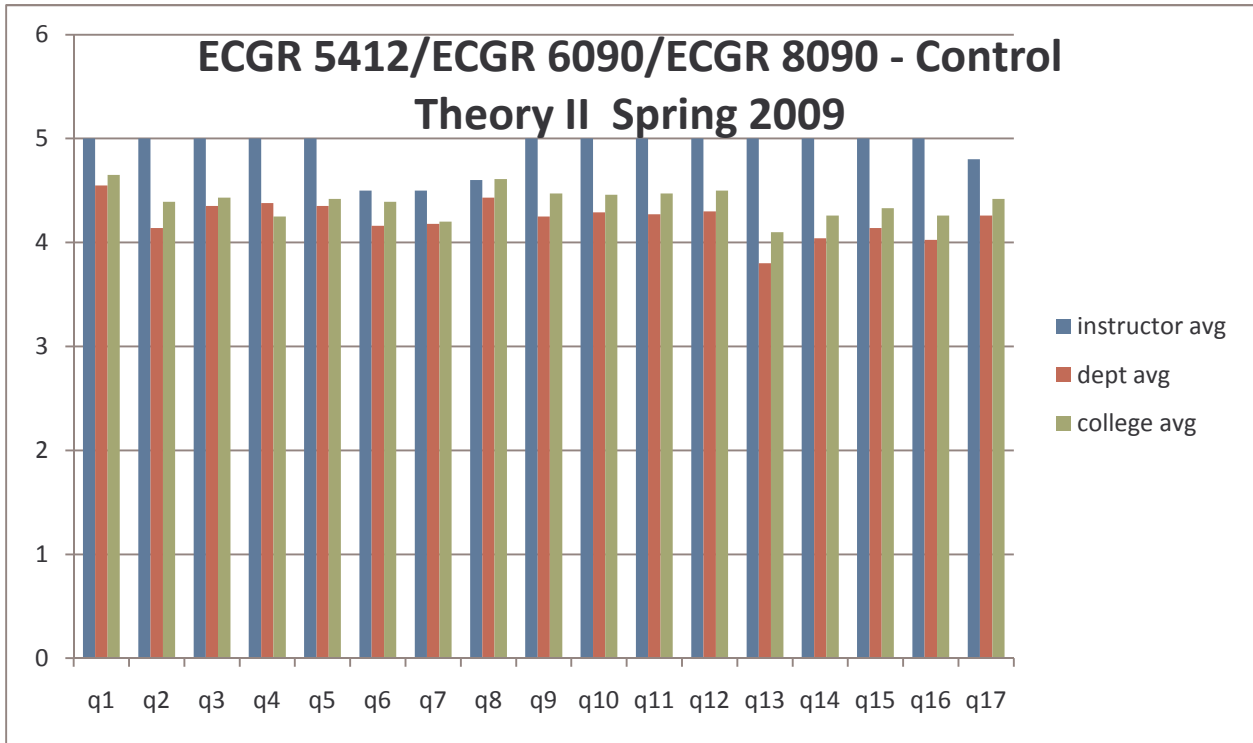
During the period when my funding from NASA was growing, I teamed up with aerospace researchers at other North Carolina Universities to form NASA sponsored N.C. Space Grant Consortium to secure an annual block grant for the member universities primarily graduate fellowships. Besides awarding fellowships, the consortium provides financial and academic support for summer internships at various NASA centers. I have been able to send one graduate intern per year at either NASA Johnson Center in Houston, Texas or NASA Goddard Center in Greenbelt, Maryland. This summer (Summer 2009), I had arranged for one African American student to participate in Undergraduate internship at NASA Johnson Center and this student is applying for graduate education to do research work under my supervision. This has helped to recruit bright undergraduate students, especially members of under represented minorities to get involved in aerospace related research and pursue graduate level work. The consortium is in its 20<sup>th</sup> year and earned the status of designated state (level 1) with the annual funding of over \$1,000,000. I believe this provides graduate students at UNC-Charlotte to interact with researchers at other North Carolina universities and experience to work at the National Research Laboratories. This also provides an opportunity for our university to educate highly qualified future work force of U.S. citizens in the area of aerospace science and engineering which has a fast decreasing pool of aerospace scientists and engineers due to retirements.











ECGR 5412-001  
Kakad – 6 enrolled  
Spring 2010

1. Excellent teacher. Please keep teaching

ECGR 5411-001  
Kakad  
Fall 2009

1. More quizzes or 1 course project will be good

ECGR 6090-001  
Kakad (7)  
Fall 2007

- The graduate course separately taught would be a better option than teaching about 60 student in a single class

Dr. Kakad  
ECGR 5412-001  
Spring 2007

1. In general I'm very pleased with Dr. Kakad's style of teaching. He is the best instructor I have had. He covers the subject in depth and makes things look very easy and simple to understand
2. The course is effective to me. I expect to take more courses in control systems (advance graduate courses) in the days to come. I request to offer such courses.
3. Very good instructor. Please offer more courses taught by him

Dr. Kakad  
ECGR 6090-001  
Fall 2006

- Good class. Excellent professor. Extremely challenged class. I learned a lot

Dr. Kakad  
ECGR 5411-001  
Fall 2006

- Large amounts of money should be offered to keep Dr. Kakad from retiring
- Please offer more courses of control systems per semester