

## **Classes in aerospace vehicle guidance and control and orbital control is being offered at UCSD.**

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The problems involved in getting a space ship to go where you want it to go, and by the proper route once it has left the ground, will come under study on the San Diego campus of the University of California this fall.

Classwork in aerospace vehicle guidance and control and in orbital mechanics is being offered at UCSD by the Department of Aerospace and Mechanical Engineering Sciences representing a new discipline for the department. Similar programs are currently offered at only a few of the leading institutions in the country.

Guidance and control is basically the study and development of the methods by which information is processed in the "little black boxes" installed in space vehicles to make sure the vehicle goes where it was intended to go. Through the use of guidance and control mechanisms, the proper spin and orientation of the vehicle is continuously under positive control. Such control includes the academic disciplines of electrical, mechanical and aeronautical engineering.

The study of orbital mechanics includes defining the proper trajectory of the vehicle. The study raises such questions as: what is the best trajectory for the greatest vehicle performance, what is the best way to get the vehicle into that trajectory, and what measurements are needed to determine when the proper trajectory has been obtained?

Under the present schedule, upper division undergraduate students will begin preparation studies in control theory next fall. At present a handful of graduate students are enrolled in the pioneering program at UCSD.

The first quarter of work for the graduate students will lay the foundations for probabilistic treatment of control and communication problems as well as for the probabilistic treatment of other diverse topics such as turbulence in fluid mechanics.

The second quarter of work will involve methods of space vehicle guidance and will include topics from orbital mechanics, inertial navigation, and currently used methods of space vehicle and missile guidance.

Later portions of the program will include work in state-space techniques, optimal control, filtering and prediction theory, nonlinear control and topics in the theory of communications.

This fall the program at UCSD is under the direction of three faculty members, two in AMES and the third in the Department of Mathematics. They are: Dr. Robert F. Pawula., Assistant Professor of Aerospace Engineering, Dr. Alan M. Schneider, Associate Professor of Aerospace and Mechanical Engineering, and Dr. Hubert Halkin, Associate Professor of Mathematics.

All three were appointed to the UCSD faculty this fall. Dr. Pawula received a Bachelor's degree in electrical engineering from the Illinois Institute of Technology in 1960, a Master's degree in electrical engineering from the Massachusetts Institute of Technology in 1961, and a Ph.D. in electrical engineering from the California Institute of Technology in 1965. Since 1962 he has served as a part-time member of the signal processing staff of the Aerospace Group at the Hughes Aircraft Company in Culver City, California.

Dr. Schneider received a degree in electrical engineering from Villanova College in 1945; his M.S. degree in physics from the University of Wisconsin in 1948; and his Sc.D. in instrumentation from the Massachusetts Institute of Technology in 1957. Prior to joining the faculty at UCSD, Dr. Schneider was Manager of Systems Analysis for RCA, Aerospace Systems Division in Massachusetts.

Dr. Halkin attended the University of Liege, Belgium, where he obtained degrees in physics, mathematics and engineering. He received his M.S. degree in 1961 and his Ph.D. degree in 1963 from Stanford University. Before joining the staff at UCSD, Dr. Halkin served as a member of the Technical Staff of the Bell Telephone Laboratories in Whippany, New Jersey, where he did research in control theory as a consultant to the Department of Analytical and Aerospace Mechanics.