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Economics

The School of Analytics, Finance, and Economics offers graduate programs in economics that lead to both master's and doctoral degrees. The master's degrees are designed to be 12-16 month programs in which the student takes courses in theory as well as an applied specialization. The doctoral program is built around a core of courses in microeconomics, macroeconomics and econometrics, and allows the student to specialize in two fields. The coursework towards the doctoral degree is expected to take three years and the writing of a dissertation one year.

Admission

The overall scholastic record and potential of the applicant for admission is more important than prior preparation in specific areas of economics. While undergraduate programs in economics are desirable, the program is open to students whose undergraduate program was in other fields, especially quantitative fields like math or statistics. However, if a student has not taken intermediate level microeconomics, macroeconomics, and statistics, remedial work may be required before the student can take the required courses for the graduate degree.

Application is done online: gradschool.siu.edu/apply/.

This program requires a nonrefundable \$65 application fee that must be submitted with the application for admission to graduate study in economics. Applicants must pay this fee by credit card.

Although the Graduate Record Examination (GRE) is not officially required for admission, the economics program uses the GRE in funding decisions. Students who seek funding from the program should take the GRE exam. Information on testing dates and locations may be obtained at ets.org. Scores should be sent to Southern Illinois University Carbondale marked "Attention: School of Analytics, Finance, and Economics." All exam scores must be received before admission.

Evaluations of applicants are based on information from the application form, three letters of recommendation, transcripts, and other information.

Applicants not admitted to the graduate programs in economics who meet the Graduate School requirements may register for remedial courses as nondeclared students. Such persons may be considered for admission to the program at a later date, based on their performance in such remedial courses. This option is not available to international students.

Foreign applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL) or another equivalent test. The graduate programs in economics require that the applicant achieve a 550 paper score or a 220 computer score or an 80 Internet-based score or above for admission to the graduate program. The TOEFL must be taken no more than 24 months prior to the date for which admission is sought. For information concerning TOEFL testing dates and locations, visit ets.org.

Entry into Ph.D. in Economics Program

A student with a master's degree must meet Graduate School admission requirements with a graduate grade point average of 3.25 (A = 4.0) or better. A student with a bachelor's degree must meet Graduate School admission requirements with an undergraduate grade point average of 2.7 or better. After meeting these requirements the bachelor's degree student will be initially admitted as a master's in Economics student. Upon passing the qualifying exam, taken after the first year of graduate study, the student will be given entry into the doctoral program. Application for entry to the Ph.D. in Economics program should be made at the Graduate School website, gradschool.siu.edu.

Entry into the Master's Degree Program

The master's degree in Economics program is intended to serve as a terminal degree. A student with a bachelor's degree must meet Graduate School admissions requirements with a grade point average of 2.7. Application for entry to the master's degree in Economics program should be made at the Graduate School website, gradschool.siu.edu.

Master of Arts (M.A.) or Master of Science (M.S.) in Economics

The master's degree in Economics prepares students for positions in government and business and for teaching at the junior college level. The general requirements for the Master's degree in Economics may be conveniently classified under two broad headings, course-hour requirements and research requirements.

Course and Hour Requirements

Those students who plan to receive the Master's degree in Economics as a terminal degree are required to have the following courses:

- ECON 465*: Mathematical Economics I
- ECON 463*: Applied Econometrics
- ECON 540A: Microeconomic Theory I
- ECON 541A: Macroeconomic Theory I

*For graduate credit

Each master's in Economics student must accumulate a minimum total of 30 graduate-level credit hours approved by the director of graduate studies. Each master's in Economics student must take at least one graduate director approved, two-course specialization. Twenty-one credit hours must be in Economics courses, excluding ECON 440, ECON 441, and ECON 507, 50% must be in 500-level courses.

Any student who earns six credit hours of C or below in Economics courses taken for graduate credit is subject to dismissal from the graduate program in economics. A minimum grade point average of 3.0 (A = 4.0) in 400- and 500-level economics courses is required, excluding ECON 440, ECON 441, and ECON 501. Only 400- and 500-level courses may count toward the master's in Economics degree. Graduate students in economics cannot take ECON 440 or ECON 441 for credit toward a graduate degree in economics.

Research Requirements

Master of Arts in Economics

A **Master of Arts in Economics** degree will be awarded upon completion of a research paper and the course and hour requirements. The research paper is counted as three credit hours as ECON 598. For electronic submission requirements, please go to gradschool.siu.edu/current-students/thesis-dissertation-researchpaper/etd-overview.php. Here you will find detailed information concerning the electronic submission requirements. One copy is to be submitted to the School of Analytics, Finance, and Economics prior to graduation. Under this option, the student must take an additional graduate level course for three credit hours, as the research paper only constitutes three of the necessary 30 credit hours.

Master of Science in Economics

A **Master of Science in Economics** degree will be awarded upon completion of a master's thesis and the course and hour requirements. The thesis shall be supervised by a committee of at least three members of the graduate faculty and will be counted for six credit hours as ECON 599. (Thus the thesis constitutes six of the required 30 credit hours). The student is required to submit the thesis electronically to the Graduate School. For electronic submission requirements, please go to gradschool.siu.edu/current-students/thesis-dissertation-researchpaper/etd-overview.php. Here you will find detailed information

concerning the electronic submission requirements. One copy of the thesis is to be submitted to the School of Analytics, Finance, and Economics prior to graduation.

Accelerated Master's Program

Undergraduate economics or econometrics and quantitative economics majors at SIU can enter an accelerated master's program in which specific courses will satisfy requirements in both degrees allowing for completion of the master's degree in Economics after bachelor's degree, but at a shortened, accelerated pace. To enter this program, students apply during their junior year and must have at least a 3.25 GPA in all coursework. Before the end of their senior year, students in this program take ECON 465 (Mathematical Economics), ECON 463 (Applied Econometrics), and one other 400-level Economics course, and Calculus I.

Up to seven credit hours from these 400-level ECON courses can be applied to both the bachelor's degree and the master's degree in Economics. Because the master's in Economics requires 30 credit hours of coursework, students in the accelerated master's in Economics program only need 21 credit hours after their senior year, thereby making it possible and likely to complete the master's in Economics degree in only one year.

Please see the Director of Graduate Studies in the School of Analytics, Finance, and Economics for more information.

Doctor of Philosophy (Ph.D.) in Economics

The Ph.D. in Economics degree prepares students for teaching and research positions in the academic world, for positions such as senior economist in private industry and consulting firms, and for government positions requiring advanced economic training.

Course Requirements and Qualifying Exam

In the student's first year (Fall/Spring) of graduate work, they will be required to take the following courses:

- ECON 465: Mathematical Economics I
- ECON 540A: Microeconomic Theory I
- ECON 540B: Microeconomic Theory II
- ECON 541A: Macroeconomic Theory I
- ECON 541B: Macroeconomic Theory II
- ECON 567A: Econometrics I

At the end of the first year (June), the student will take qualifying examinations over microeconomic theory and macroeconomic theory. A student will be allowed at most two attempts at passing each qualifying exam.

Fields of Specialization

A student is required to take two specialized fields in economics. In addition, the student is required to pass a written examination (after completion of the appropriate course work for credit) in one specialized field at the end of the second year. The School of Analytics, Finance, and Economics offers the following fields of specialization: economic development, international economics, monetary theory and policy, and finance. A student will be allowed to take a field exam at most two times.

Other Required Courses

Students are required to pass the following courses:

- ECON 540C: Microeconomic Theory III
- ECON 541C: Macroeconomic Theory III
- ECON 567B: Econometrics II

- ECON 567C: Econometrics III

Dissertation

Upon successful completion of the coursework and passing of the qualifying and field examinations, a student will then be admitted to candidacy for the Ph.D. in Economics degree. This will normally occur after the third year of work. Following this, the candidate, in consultation with their dissertation chairperson, will form a dissertation committee and develop a proposal. After the proposal is approved, the student must complete a dissertation based on original research and successfully defend the dissertation before the faculty.

The student is required to submit their dissertation electronically to the Graduate School. For electronic submission of dissertations, please go to gradschool.siu.edu/thesisdissertation-research_paper/etd-guidelines. Here the student will find frequently asked questions, as well as information from UMI (University Microfilm International) regarding electronic submission requirements. One copy of the dissertation is to be submitted to the School of Analytics, Finance, and Economics prior to graduation.

Differential Tuition

The College of Business and Analytics has a differential tuition surcharge of 15 percent of applicable tuition for graduate College of Business and Analytics majors. The differential tuition surcharge will be assessed at the in-state tuition rate and will be capped at 15 credit hours per semester.

Economics Courses

ECON416 - Financial Economics Study the role of money within the financial system, and the role of the financial system itself in providing risk-sharing, liquidity and information services. An examination of the bond market, interest rates and the concepts of risk, liquidity, information costs, taxation and investment maturity. A detailed examination of financial markets, e.g., the markets for stocks, foreign exchange, and market for financial derivatives. Finally, a more detailed account of why and how financial institutions and instruments evolve. This course includes a research project in which students formulate a research question, review literature related to the question, gather relevant data, and provide a research conclusion using tools learned in this and other courses. The student will communicate their research findings via a written paper and, if possible, via an oral presentation. Prerequisite: ECON 315 or 341 or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 3

ECON429 - International Trade and Finance Analysis of the pattern and volume of world trade and capital flows; effects of trade and payments on the domestic economy; problems and methods of adjusting to change in the balance of payments. This course includes a research project in which students formulate a research question, review literature related to the question, gather relevant data, and provide a research conclusion using tools learned in this and other courses. The student will communicate their research findings via a written paper and, if possible, via an oral presentation. Prerequisite: ECON 340 and 341 or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 3

ECON440 - Price, Output, and Allocation Theories A systematic survey of theories of product prices, wage rates, rates of production and resource utilization under conditions of competition, monopolistic competition, oligopoly and monopoly markets. Emphasis is on developing analytical tools useful in the social sciences. Not open to students who have had Economics 340. Prerequisite: ECON 240 or consent of instructor. Restrictions: College of Business and Analytics majors. Credit Hours: 3

ECON441 - Contemporary Macroeconomic Theory An examination in the causes of inflation, unemployment, and fluctuations in aggregate economic activity, factors affecting consumption and investment, and the sources of economic growth. Emphasis is on understanding contemporary United States macroeconomic problems and the options for fiscal, monetary and income policies facing the

United States government. Not open to students who have had 341. Prerequisite: ECON 241 or consent of instructor. Restrictions: College of Business and Analytics majors. Credit Hours: 3

ECON450 - History of Economic Thought An analytical study of the development of economic ideas, with special reference to historical and societal context, central thrust, and impact. Such benchmark figures as Smith, Marx, Marshall, Veblen, and Keynes are highlighted and major schools of economic thought are identified. Prerequisite: ECON 240 and 241; or 113; or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 3

ECON463 - Introduction to Applied Econometrics Applications of statistical tools to specific economic problems. Numerous examples will be examined in order to achieve this goal. Emphasis will be given to model misspecification, non-classical estimation techniques, data analysis, and simultaneous equations. This course includes a research project in which students formulate a research question, review literature related to the question, gather relevant data, and provide a research conclusion using tools learned in this and other courses. The student will communicate their research findings via a written paper and, if possible, via an oral presentation. Prerequisite: ECON 208 or equivalent or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 3

ECON465 - Mathematical Economics I A systematic survey of the fundamental mathematical tools for economic analysis. Topics include functions and their properties, including derivatives and integrals. The focus is on calculus techniques for optimization and comparative statics analysis. Prerequisite: ECON 340 or 440, and MATH 140 or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 4

ECON474 - Economic Strategies for Business This course will be concerned with broad principles of microeconomics that underlie all business decision-making. The main topics discussed may include the firm's costs, pricing and research and development decisions under different market structures, price discrimination, strategies of different business practices, information, advertising, decision-making over time, and decision-making under symmetric information. Prerequisite: ECON 240 or its equivalent or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 3

ECON479 - Problems in Business and Economics Application of economic theory and tools of analysis to practical business problems. Cost and demand functions, and forecasting are analyzed from a policy standpoint. Prerequisite: ECON 208 and ECON 240 or consent of instructor. Restrictions: College of Business and Analytics majors or minors, or see a College of Business and Analytics advisor. Credit Hours: 3

ECON500 - Economics Seminar A study of a common, general topic in the field of economics with individual reports on special topics. Special approval needed from the instructor. Credit Hours: 3

ECON501 - Economics Readings Readings from books and periodicals in economics. Master's degree students limited to a total of six hours. Special approval needed from the instructor and chair. Credit Hours: 1-21

ECON507 - Practicum in Undergraduate Teaching Emphasizes teaching methods, source materials, and preparation of classroom materials. All teaching assistants must enroll. One hour of credit per semester. Graded S/U only. Credit Hours: 1

ECON510 - Research in Economics: Design, Methodology and Presentation Systematic approach to economic research. Includes research planning and design, exploration of the various sources of data and most frequently used methodology. The last part of the course is concentrated on techniques for communicating the results of research. Special approval needed from the instructor. Credit Hours: 2

ECON511 - Advanced Mathematical Economics A continuation of topics in 465 with more emphasis on proofs. Topics include economic applications of integration, differential equations and real analysis. Prerequisite: ECON 465 or consent of instructor. Credit Hours: 3

ECON517 - Monetary Economics I A graduate-level introduction to the field of monetary economics. Students will focus on the core theoretical models to describe and explain the role of money in modern economies. The course emphasizes empirical methods in macroeconomics and reviews current empirical research and evidence on the channels through which money influences economic activity. Students will relate monetary variables to the rates of interest, inflation and unemployment, to deficits and the national debt, and to savings, investment, and output. Prerequisite: ECON 541A or B and 463 or equivalent. Credit Hours: 3

ECON518 - Monetary Economics II An advanced graduate-level course in monetary economics. Students will use contemporary macroeconomic models to analyze monetary policy. The course emphasizes macroeconomic theory and the role of underlying frictions in monetary economies. Students will focus on recent developments and controversies in monetary theory and policy as well as on optimal monetary policy under discretion or commitment, monetary policy operating procedures, and the interaction of monetary and fiscal policy. Prerequisite: ECON 541B and 517. Credit Hours: 3

ECON520A - Development Theory and Policy The two parts deal with the macroeconomic and microeconomic aspects of development economics, respectively. 520A topics include theories of development, structural change, income inequality, natural resources, open economy shocks, and the political economy of development. Credit Hours: 3

ECON520B - Economic Development Theory and Policy The two parts deal with the macroeconomic and microeconomic aspects of development economics, respectively. 520B topics include theories and case studies of famine and famine prevention, gender and development, economics of child labor, and informal credit markets and microfinance. Prerequisite: ECON 465 and ECON 540A or their equivalent or consent of instructor. Credit Hours: 3

ECON530 - Foreign Trade This course covers the determinants of the pattern of trade and possible gains from trade, under both perfect and imperfect competition. It also examines trade policy issues such as optimal tariffs and the relative merits of alternative trade policies. A number of specific topics are also covered, for example: foreign direct investment, trade and the environment, and fair trade. Prerequisite: ECON 465 and ECON 540A or their equivalent or consent of instructor. Credit Hours: 3

ECON531 - International Finance Application of theory to current international economic transactions. Emphasis is placed on topics at the frontier of research in international macroeconomics, with empirical studies. Prerequisite: ECON 465 and ECON 541A or consent of instructor. Credit Hours: 3

ECON533 - Public Finance Theory and Practice Historical development of public finance theories with analysis of their policy implications. Prerequisite: ECON 330 or consent of instructor. Credit Hours: 3

ECON534 - Economics of Taxation This course examines from a theoretical and applied point-of-view, various economic aspects of taxation. Other government revenue sources may also be analyzed such as inter-governmental grants and debt. Emphasis is on application of microeconomic theory to problems in taxation. Usual topics include: equity in taxation, shifting and incidence of taxes, excess burden of taxes, other economic effects of taxes, tax reform, debt. Prerequisite: ECON 330 and ECON 340, or ECON 440, or consent of instructor. Credit Hours: 3

ECON540A - Microeconomic Theory I The course provides the basic theoretical knowledge necessary for microeconomic research in business and government. Prerequisite: ECON 340 or ECON 440 or consent of instructor AND MATH 150 or its equivalent or consent from the Director of Graduate Studies in the Economics Department. Credit Hours: 3

ECON540B - Microeconomic Theory II A contemporary course in partial equilibrium analysis. Topics include the theory of the firm, market structure and the theory of the consumer. The course frequently takes an axiomatic approach; consequently there are many formal statements and proofs of theorems. Prerequisite: ECON 465 and ECON 540A or consent of instructor. Credit Hours: 3

ECON540C - Microeconomic Theory III A contemporary course in game theory as applied to economics. Topics include static games of complete and incomplete information with applications to Cournot oligopoly, tragedy of the commons, and auctions; as well as dynamic games of complete and incomplete information with applications to Stackelberg oligopoly, sequential bargaining, imperfect

international competition, and job market signaling. Prerequisites: ECON 540A and ECON 540B or consent of instructor. Credit Hours: 3

ECON541A - Macroeconomic Theory I The rigorous development of general equilibrium macroeconomic models to analyze the determination of national income in the context of Classical, Keynesian, Neoclassical and Monetarist economic systems. Also included is the study of key sectoral demand functions. Prerequisite: ECON 340 or ECON 440 or consent of instructor AND MATH 150 or its equivalent or consent from the Director of Graduate Studies in the Economics Department. Credit Hours: 3

ECON541B - Macroeconomic Theory II Continuation of 541A. Analyzes the ideas of New Classical and New Keynesians on the determination of national income. Focuses on the impact of rational expectations and the natural rate hypotheses on the effectiveness of macroeconomic policy. Also included are recent developments in the area of business cycles. Prerequisite: ECON 541A. Credit Hours: 3

ECON541C - Macroeconomic Theory III Recent developments and major issues in contemporary macroeconomic theory. Focuses on incorporating uncertainty, stochastic tools and dynamic analysis into macroeconomic theory. Prerequisite: ECON 541B. Credit Hours: 3

ECON542A - Industrial Organization I A study of the variety of forms of competition among firms. Topics include theories of the firm, oligopoly theory, theories of entry, product differentiation and innovation. Prerequisite: ECON 440 and ECON 441. Credit Hours: 3

ECON542B - Industrial Organization II A survey of government policy toward industry. Topics include antitrust: mergers, concentration and unfair trade practices, regulation of public utilities, peak load pricing, product, safety and environmental regulation. Prerequisite: ECON 440 and ECON 441. Credit Hours: 3

ECON545 - Resource Economics A survey of theoretical and institutional aspects of energy production, distribution, consumption and regulation. Topics covered include cartel theory, history of energy use, theory of resource exhaustion, models of energy demand and supply, past and current policy issues, and environmental protection. Prerequisite: ECON 440 or consent of instructor. Credit Hours: 3

ECON566 - Mathematical Economics II Linear economic models. Linear programming. Input-output analysis and general equilibrium models Prerequisite: ECON 340 or ECON 440 or ECON 465 or consent of instructor. Credit Hours: 3

ECON567A - Econometrics I This is a course in modern mathematical statistics applied to economics and allied fields. Students will use calculus and linear algebra to apply probability and statistical models to data, via parameter estimation and hypothesis testing. Key topics include probability models, features of probability distributions, sampling distributions, estimation via maximum likelihood, inference via likelihood ratio, score and Wald tests; and asymptotic theory. Applications center on the simple linear regression model and its variants, and students will apply models to data using econometric software. Prerequisite: ECON 465 or consent of instructor. Credit Hours: 3

ECON567B - Econometrics II Further topics in the theory and application of single equation econometric models including model specification, data problems, large sample results, non-spherical disturbances, heteroscedasticity and autocorrelation. Topics in time series analysis include unit root tests and ARIMA model building. Prerequisite: ECON 465 and ECON 567A or consent of instructor. Credit Hours: 3

ECON567C - Econometrics III Topics covered are systems of regression equations; models for panel data; simultaneous equations models; time series models; VAR; causality, cointegration, error correction model among others; and estimation and inference in models with discrete and limited dependent variables, i.e., Probit and Logit models, censored regression models and Tobit analysis. Prerequisite: ECON 567B or consent of instructor. Credit Hours: 3

ECON570 - Seminar in Contemporary Microeconomic Theory An investigation of recent developments and current controversies in economic theory with emphasis on microeconomic problems. Prerequisite: ECON 540B. Credit Hours: 3

ECON571 - Seminar in Contemporary Macroeconomic Theory An investigation of recent developments and current controversies in economic theory with emphasis on macroeconomic problems. Prerequisite: ECON 541B or consent of instructor. Credit Hours: 3

ECON575A - Econometric Theory I Topics include: probability theory; asymptotic theory; linear regression; likelihood ratio, Lagrange multiplier, and Wald tests; stochastic processes; ARIMA models; unit root tests, cointegration, spurious regression, and spurious trend; ARCH models; VAR models; and other topics to be determined by the instructor. Prerequisite: ECON 567B or consent of instructor. Credit Hours: 3

ECON575B - Econometric Theory II Topics include: density estimation methods, nonparametric regression, stochastic frontiers, nonlinear regression models, nonlinear time series models, information matrix tests, generalized method of moments, non-nested hypothesis testing, Bayesian methods, bootstrapping, and other topics to be determined by the instructor. Prerequisite: ECON 575A or consent of instructor. Credit Hours: 3

ECON598 - Research Paper Preparation of a research paper for a Master's degree. Special approval needed from the instructor. Credit Hours: 1-3

ECON599 - Thesis Minimum of four hours to be counted toward a Master's degree. Graded S/U only. Credit Hours: 1-6

ECON600 - Doctoral Dissertation Hours and credit to be arranged by director of graduate studies. Graded S/U only. Credit Hours: 1-16

ECON601 - Continuing Enrollment For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis, or research paper. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded S/U or DEF only. Credit Hours: 1

ECON699 - Postdoctoral Research Must be a Postdoctoral Fellow. Concurrent enrollment in any other course is not permitted. Credit Hours: 1

Economics Faculty

Becsi, Zsolt, Associate Professor, Ph.D., University of Wisconsin-Madison, 1991; 2003. Public finance, macroeconomics.

Dai, Chifeng, Associate Professor, Ph.D., University of Florida, 2003; 2005. Industrial organization, public economics, law and economics, and applied econometrics.

Gilbert, Scott, Associate Professor, Ph.D., University of California-San Diego, 1996; 1999. Econometrics, applied macroeconomics.

Kebede, Hundanol, Assistant Professor, Ph.D., University of Virginia, 2020; 2021. International economics, development economics.

Lahiri, Sajal, Professor and Vandever Chair of Economics, Ph.D., Indian Statistical Institute, 1976; 2002. International trade, developmental economics, environmental economics.

Mehrabani, Ali, Assistant Professor, Ph.D., University of California – Riverside, 2021; 2021. Econometrics.

Morshed, A.K.M. Mahbub, Professor, Ph.D., University of Washington, 2001; 2004. Macroeconomic theory, international economics, economic growth.

Sylwester, Kevin, Professor and Director, School of Analytics, Finance, and Economics, Ph.D. University of Wisconsin-Madison, 1997; 1998. Macroeconomics, data analytics.

Watts, Alison, Professor, Ph.D., Duke University, 1993; 2001. Microeconomics, game theory, industrial organization, law and economics.

Emeriti Faculty

Färe, Rolf, Professor, Emeritus, Docent, University of Lund, Sweden, 1976; 1978.

Grabowski, Richard, Professor, Emeritus, Ph.D., University of Utah, 1977; 1979.

Mitchell, Thomas M., Associate Professor, Emeritus, Ph.D., Brown University, 1984; 1983.

Myers, John G., Professor, Emeritus, Ph.D., Columbia University, 1961; 1977.

Primont, Daniel, Professor, Emeritus, Ph.D., University of California, Santa Barbara, 1970; 1978.

Sharma, Subhash C., Professor, Emeritus, Ph.D., University of Kentucky, 1983; 1983.

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