Courses numbered 095-599 are offered by Murray State University for undergraduate credit; courses numbered 600-999 are for graduate credit. The University reserves the right to make any adjustments in the *Bulletin* which are deemed necessary. Course prefix, number, title, credit hours, and description shall be in effect with the most recent catalog at the time the course was taken. **Note:** Repeated 100T *Transitions* courses (regardless of course prefixes or departmental requirements) will be treated as duplicate courses, with only one course allowed to count toward graduation requirements. The subject-matter areas and course prefixes are shown below and appear in prefix order on the following pages.

Accounting (ACC) 260
Adult Education (ADE) 261
Administration and Supervision (ADM) 261
Agricultural Education (AED) 264
Agriculture (AGR) 265
American Sign Language (ASL) 281
Anthropology (ANT) 275
Archaeology (ARC) 275
Art and Design (ART) 277
Astronomy (AST) 282
Bachelor of Integrated Studies (BIS) 292
Biology (BIO) 284
Business (BUS) 292
Business and Marketing Education (BED) 284
Career and Technical Education (CTE) 311
Chemistry (CHE) 297
Chinese (CHN) 300
Civil/Construction Engineering Technology (CET) 295
Civilizations (CIV) 302
College Student Personnel (CSP) 311
Communication Disorders (CDI) 293
Computer Information Systems (CIS) 300
Computer Science (CSC) 309
Counseling (CNS) 302
Criminal Justice (CRJ) 315
Electromechanical Engineering Technology (EMT) 325
Elementary Education (ELE) 324
Engineering (EGR) 321
Engineering Technology (ENT) 333
English (ENG) 326
Experience-Rich Activity (ERA) 333
Enhancing Student Success (ESS) 333
Exercise Science (EXS) 334
Family and Consumer Studies (FCS) 336
Finance (FIN) 336
French (FRE) 338
Freshman Transitions (FTR) 339
Freshman Year Experience (FYE) 339
Gender and Diversity Studies (GDS) 340
German (GER) 341
Gerontology (GTY) 344
Gifted and Talented Education (GTE) 343
Global Languages and Theatre Arts (GLT) 342
Graphic Communications Management (GCM) 340
Guidance (GUI) 344
Health (HEA) 346
Health and Physical Education (HPE) 357
Health Care Administration (HCA) 345
Health Information Administration (HIA) 348
History (HIS) 348
Honors Courses (HON) 355
Human Development and Leadership (HDL) 345
Humanities (HUM) 357
Industrial Technology and Design (ITD) 360
Information Studies (INF) 357
Institute of Engineering (IOE) 358
Interdisciplinary Courses (IDC) 357
International Studies (INT) 358
Japanese (JPN) 365
Journalism and Mass Communications (JMC) 363
Legal Studies (LST) 368
Letters, Arts, and Social Sciences (LAS) 366
Liberal Arts (LBA) 366
Library Science (LIB) 366
Logistics and Supply Chain Management (LSC) 367
Management (MGT) 373
Manufacturing Engineering Technology (MET) 372
Marketing (MKT) 375
Mathematics (MAT) 369
Middle School Education (MID) 374
Military Science (MIL) 375
Music (MUS) 377
National Student Exchange (NSE) 388
Nonprofit Leadership Studies (NLS) 385
Nursing (NUR) 389
Nutrition (NTN) 388
Occupational Safety and Health (OSH) 395
Occupational Therapy (OTR) 398
Office Systems (OSY) 397
Organizational Communication (COM) 304
Philosophy (PHI) 400
Physical Education (PHE) 399
Physics and Engineering (PHY) 401
Planning, Urban and Regional (PLN) 403
Political Science (POL) 403
Postsecondary Education (PSE) 406
Psychology (PSY) 407
Reading (REA) 410
Real Estate (RES) 411
Recreation (REC) 411
Religious Studies (RGS) 411
Science (SCI) 412
Secondary Education (SEC) 413
Social Work (SWK) 420
Sociology (SOC) 415
Spanish (SPA) 417
Special Education (SED) 413
Statistics (STA) 419
STEM Leadership (STM) 420
Teacher Leader (TLE) 424
Teaching English to Speakers of Other Languages (TSL) 425
Technology Teacher Education (TTE) 428

íìì dŒv•]Ÿ Course is designed to assist students in their transiton to Murray State University. Content includes orientaton to the specifc area or major(s) and minor(s) within the academic success; and extracurricular opportunites. Only one transitons course will count toward graduaton. Graded pass/fail.

îìì WŒ]v]‰o • }(&]v v An introduction to the basic X concepts and techniques of fnancial accountng, including the accountng cycle and the communicaton of fnancial informaton to external users. The course focuses on the nature and measurement of assets, liabilites, equites, dividends, revenues, and expenses. Emphasis is placed on the proper preparaton and understanding of the fnancial statements. Prerequisite: sophomore standing. (ACC majors may be second semester freshmen.)

îìí WŒ]v]‰o • }(D v PŒ] The applicatons of X accountng to business management with emphasis on planning, control of operatons, and decision-making, including study of cost behavior; the use of cost data in job order, process and standard cost s

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role as related to the site-based council policies and processes are emphasized. Prerequisite: admission to the program.

EDL 7011 Leadership for Learning Communities This course will develop competencies and skills in the allocation of resources and structuring of the organization to improve student learning within the context of best practices and related Kentucky statute and regulation. Field experience required. Prerequisite: admission to program.

EDL 7022 Research Applications for School Leaders A survey of research which has an impact on the school as it pertains to effective teaching, learning, and leadership.

EDL 7033 School Resource Management A survey of resources available to a public institution to support the mission of the institution and related programs. This is a general overview of public finance, site-based budgeting techniques, linking of resources to programs based on data and accountability. Identification and reallocation of resources will be tied to the learning mission of the unit. Resources other than financial will be included and special emphasis will be given to human resources including personnel and site-based councils.

EDL 7044 Supervision of Instruction A study of the supervision principles and practices for the aspiring supervisor or principal. Topics include the nature and functions of supervision, strategies for use in supervision and the coaching nature of supervision as well as skills in observing and analyzing along with in-service programs and staff development. Field research project required.

EDL 7055 Curriculum Development A study of the supervisory functions dealing with curricular and program evaluation and analysis and techniques for bringing about program and curricular change and improvement within the local school system. Field research project required.

EDL 7066 School Improvement Course provides educational leaders with an overview of the processes and tools for school improvement, including the standards and indicators of school improvement, professional learning communities, school improvement planning, standards for professional development, and the role of school-based decision-making in school improvement.

EDL 7077 School Policy Development Course explores policy development at the local, state, and federal levels as related to school improvement, social justice and the ethical dimensions of leadership. Contemporary issues of educational policy and ethics at the local, state, and national levels will be highlighted in the course.

EDL 7088 School Law A study of the legal aspects of education. Critical legal content from constitutional law, court decisions, state statutes, state administrative regulations, attorney general opinions, and local school district policies will be covered. Note: Course may be taken as an elective by a person not pursuing an administrative certificate.

EDL 7099 Theory and Practice A study of modern administrative theories, processes and techniques applicable to the school, grades P-12. The emphasis is on the principal's role as the instructional leader engaged in needs assessment, collection and use of data, formulation of educational goals, design and implementation of improvement strategies. Field research project required.

EDL 7100 School Finance The specific procedures in pupil accounting which are the responsibility of the director of pupil personnel. A study of systematized records management including some attention to machine data processing. Field research project required.

EDL 7200 Internship Managed field practicum experience where the student works with a building principal to develop depth of experience in areas of responsibility such as scheduling, professional development, school improvement planning, etc. At intervals, students will be convened to share and gain a broader perspective on their experiences. This course is recommended to be taken last, but may be in the last nine hours. Repeatable to six hours of credit.

EDL 7300 Advanced Graduate Study Advanced graduate students in school administration. Deals with current problems and issues and stresses independent investigation.

EDL 7400 Critical Issues in Educational Technology Critical issues in the management and administration of educational technology will be addressed. Topics covered may include administration and instruction, school and classroom management, networking, distance learning, statistical reporting, pupil scheduling, information retrieval systems, and technology policy issues.

EDL 7500 Strategic Leadership This course prepares school leaders to engage stakeholders in the strategic dialogue regarding the vision and mission of the organization, and the allocation of resources and decision-making authority accordingly. Field experience required. Prerequisite: Admission to program.

EDL 7600 Legal Issues This course addresses critical aspects of the legal system as related to school issues. Ethical dimensions of the role are explored. Prerequisite: Admission to program.

EDL 7700 Research Seminar Designed for graduate students who want to do in-depth research on special problems. Requires advanced study and analysis of literature and preparation of substantial research documents. May be repeated for up to six hours of credit.

EDL 7800 Internship Course serves as an overview to effective teaching and administrative practice in the alternative education settings. Students enrolled in the course must maintain a portfolio of course assignments and documentation of field experiences for evaluation for university credit. Field hours are required.

EDL 7900 School Safety The content of this course provides educators with the skills and information to analyze safety data, plan for both school safety interventions and procedures and to manage crises in an educational setting. Field hours are required.

EDL 8000 Seminar Course develops competencies in

D óíì À v ^ Z}}o W Œ•}vv Astudy Àand µapplŸ}v~ï•X of appropriate techniques used to evaluate the act of teaching. All ethical and legal aspects along with a sustained ar tcula ton methods, personnel records, and necessary personal skills will be covered. Study will exceed state and local evalua ton systems and requirements.

D óíï À v ^ Z}}o W Œ}P Œ Astudy Àand µapplŸ}v~ï•X of appropriate techniques used to evaluate methods, programs, and strategies used in public elementary and secondary educa ton. All legal and ethical aspects along with an accurate assessment of the results of school programs will be covered. Study will include the rela tonship of goals, objec tves, and ac tvi tes related to the learning outcomes. Extensive data will be collected, organized, analyzed and presented as a measurement of program e fec tveness.

D óíñ À v D šZ}•}(Yµ vŸš ŸÀ Z • Œ Z]v µ Ÿ}v ~ï•X A study of quan ttat ve research methods and stat stcs used in educa tonal studies. Prepara ton for quan ttat ve research and conduc tng an abbreviated inquiry, collec tng and analyzing data as well as improving professional writing skills are the focus of this class. Prerequisite: ADM 630 or comparable research course.

D óïì À v µ Ÿ}v o Z The Œ Zdge ïand skill necessary to conduct educa tonal research at an advanced level. Prepara ton to conduct research at the doctoral level is emphasized. Prerequisite: ADM 630 or equivalent.

D óïñ /v•ŸšµŸ}v o Z • Œ ZU •• ••u vš Course Œ]š Ÿ}v ~ï•X provides an overview of best prac tces of insti tu tonal research. Addi tonally, students have the opportunity to develop strategies to inves tgate relevant trends or problems within an insti tu ton. Field experience required. Prerequisites: ADM 630.

D óïõ Z}o • v Z •‰}v•]]o]Ÿ • }(šZ ^ The Z}o ^µ‰ Œ]vš v vš ~ï•X role of the school district superintendent is analyzed with reference to job responsibili tes of the posi ton, and knowledge, skill, and disposi tons necessary to serve successfully in the posi ton. Field experience required.

D óðì /v•šŒµ Ÿ}v o /u‰Œ}À u vš The µpurpose vof Ÿ}v Œ]vP ~írï•X course is to develop mentoring strategies appropriate to assist new educators in the transi ton to teaching and to improve their instruc tonal prac tce. This course is designed to support teachers and administrators engaged in mentoring, including, but not limited to, student teacher supervision, the Kentucky Principal Internship Program, and the Kentucky Teacher Internship Program. Graded pass/fail. Repeatable up to six hours. Prerequisite: permission of instructor. (Same as TLE 740.)

D óðñ dŒ v • v /vv}À Ÿ}v•]v The µpurpose ûof this Ÿ}v ~ï•X course is to inves tgate contemporary issues impac tng P-20 educa ton. Current trends and innova tons are cri tcal themes for educa tonal leaders to explore. Special topics explored in this course may include globaliza ton, advances in technology and learning, college and career readiness ini tatves, workforce development programs and best prac tces of P-20 ini tatves.

D óðõ ^ Z}}o]•šŒ] š D Course P focuses vš on-school system opera tons including fnancial management and policy, administra ton of auxiliary services, human resources planning and management, federal and state programs, facili tes planning and management, school safety and governance support. Field experience required.

D óñì WZ]o všZŒ}‰Ç v }uuµv]šÇ vP P µ vš W /v•ŸšµŸ}v o À v u vš]v µ Ÿ The µpurpose vX of this course is to refne the knowledge, skills, and disposi tons needed to plan and execute innova tve approaches to advance the educa tonal insti tu ton's mission by increasing private and public fnancial support, promo tng awareness of the insti tu ton to key publics, and involving consi tuents in the life of the insti tu ton. In this era of declining publicly appropriated funds for educa ton at all levels, the role of outside private funds from alumni, friends, corpora tons, founda tons, and other key community stakeholders is growing and increasingly important. Insti tu tonal advancement focuses on a trac tng and genera tng private support through the iden tfca ton, research, cul tva ton, asking, closing, and stewardship of donors and private gi fs.

D óñí ^µ•š]v]vP dŒ v•(}Œu Ÿ}v šZŒ}µP Z ‰]šÇ v }uu]šu vš ~ï•X The purpose of this course is to develop leadership strategies for transforming

'Z ïíî]ŒÇ ^]A study of dairy breeds, calf raising, herd replacements, milk production, nutrition and management of dairy herds. Prerequisite: AGR 100 and 300. (Spring)

'Z ïíï >]À •š} l WŒ} µ Ÿ}v D v P Study of production, management, nutrition, and breeding of farm animals. Will include on-the-farm training with livestock. Prerequisite: AGR 100.

[illegible]

[illegible]

[illegible]

'Z ïõõ WŒ}(••]}v o À o}‰u Seminar for agriculture ~í•X students focusing on the job search process, employment opportunities, and related problems. Recommended for students in the junior or senior year. Graded course.

'Z ðìì s š Œ]v ŒÇ D]Œ}ta]to[Phe veterinary diagnostc laboratory environment, including familiarizaton with basic techniques in veterinary bacteriology and mycology, veterinary virology, and clinical serology and immunology. Lecture two hours; laboratory, six hours. Prerequisites: AGR 310, 322, 332, and eight hours of chemistry with a minimum grade of *C* in all prerequisite courses.

z'nZal ðìívalu Ù]vo Œ]vP v D Acomprehensive study of the reproductve anatomy and physiology of the stallion and brood mare, as well as the care of the foal from birth to weaning. Special aten ton is given to current management concepts prevalent in the equine industry today. Prerequisite: AGR 302. (Spring)

'Z ðìî À v >]À •š} lProvides the student with guidelines for evaluaton and selecton Ş prevalent Ű c l' ų η en Ma Ɣ agen

and the food system, inheritance law, and other legal issues facing owners or operators of our nation's natural resources.

AGR 330 Changing Role of U.S. Agriculture ~ 3 hours
Changing role of U.S. agriculture in a dynamic world economy; national and international policies and institutions affecting agriculture; exchange rates, tariffs, and non-tariff barriers. Prerequisites: junior or senior; AGR 130 or equivalent.

AGR 336 Agricultural Futures Markets ~ 3 hours
Advanced course designed to provide an in-depth treatment of how the futures markets can be used to improve the agricultural commodity marketing timing decisions. The purpose of the course is to familiarize the students with the history and characteristics of the commodity future markets and understand the importance of marketing as a farm management tool. Both fundamental and technical aspects of charting and how to use these techniques as price forecasting tools. Prerequisite: AGR 336.

AGR 337 Agricultural Finance ~ 3 hours
A study of the needs and problems of financing farm and farm service businesses, including a study of credit institutions serving American agriculture. (Fall)

AGR 338 Appraisal of Real Property ~ 3 hours
A study of the methods and procedures of land and farm property valuation with attention to appraisal programs of the credit and farm service institutions. Prerequisite: AGR 130. (Fall)

AGR 339 Agricultural Systems ~ 3 hours
Course designed to enhance student's understanding of international agriculture systems and how they relate to the overall impact on world food processing and production. An emphasis is placed on systems which have the potential to impact and add-value to American agriculture, as well as those which hold key relationships to U.S. based agricultural trade and food development.

AGR 340 Agricultural Economics ~ 3 hours
Includes a general statistical analysis of U.S. agriculture with attention to major agricultural regions of the nation and types of farming areas of Kentucky. Special emphasis is given to the organization of West Kentucky and regional farms and agribusinesses. Field trips, interviews and financial analysis of successful firms. (Summer, with sufficient demand.)

AGR 341 Agricultural Mathematics ~ 3 hours
A study of the use and theory of mathematics as it applies to the fields of agriculture, finance and economics. Attention is given to the elementary uses of algebra, matrix algebra and the calculus as they apply to optimization problems in resource use efficiency. The same mathematics will be applied to time value of money topics. Prerequisites: ECO 230, 231 and MAT 140. (Spring, odd years)

AGR 342 Agribusiness Management ~ 3 hours
Course designed to enhance student's understanding of, and experience in, agricultural business systems. Emphasis will be placed on strategies of managing a successful agribusiness operation and /or farmer-owned cooperatives. Prerequisite: AGR 130.

AGR 343 Production Agriculture ~ 3 hours
Designed to enhance student's understanding of, and experience in, production agriculture systems and how they relate to a successful farming operation. An emphasis is placed on systems, which have the potential to impact and add-value to the local, regional and national agriculture economy, through classroom as well as laboratory experiences.

AGR 344 Computer Applications in Agriculture ~ 3 hours
An introductory course designed to enhance the computer skills of agriculture students and to give them the skills necessary to generate useful information and solve a variety of agriculturally specific problems. Students receive instruction on advanced word processing concepts, budget generation, statistical analysis, agribusiness related software and global positioning systems in agriculture. Prerequisite: AGR 339.

AGR 345 Clinical Practices ~ 4 hours
Clinical principles, practices and procedures involved in the field of veterinary medicine. For animal health technology students with senior standing. Prerequisites: AGR 310, 322, 324, 332, and MAT 140 or higher, with a minimum grade of *C* in all prerequisite courses.

AGR 346 Basic Principles of Crop Physiology ~ 3 hours
Basic principles of crop physiology; the effect of environment and management practice on physiological processes, growth and development of crops. (Spring, odd years)

AGR 347 Principles and Methods in Crop Improvement ~ 3 hours
Basic principles and methods used in the improvement of important agronomic and n # D

AGR 348 Integrated Pest Management ~ 3 hours
Advanced control methods and effects on the ecosystem. 4 2
aR 7t control methods and effects on the ecosystem.
economic control of insect and dis Mors that affect agric 2 D tal crop

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'Z òíí v]u o v š}uÇ v WZÇ•]}o}Pe[s with the anatomy of body systems, how these systems interrelate, and the physiology of body organs. Species covered include porcine, bovine, equine, canine and feline. Two hour laboratories twice per week. Prerequisite: AGR 310. (Spring)

'Z òíîî (©o D v P u v š A study of beef production, [illegible] Two hour lecture, one hour laboratory, [illegible] AGR 190 and CHY 101. (Fall)

'Z òíð ‹µ •šŒ]v/v•šŒµ Designed for students interested [illegible]

Z ðîñ À v Œ Z }o}P] o > }Œ vănjeEtGaindDg šZ} • ~ï•X
in the analysis of archaeological materials and writing of an archaeological study for professional presentation and publication. Prerequisites: ARC 300 and 304.

Z ðôô }}‰ Œ Ÿ À µ Ÿ}vlAvmeanEgfulZplaMned, and • X
evaluated work experience related to the career and educational objectives of each student, for which he/she may receive both academic credit and financial remuneration. May be repeated for a maximum of six hours for any 488/489 course. Graded pass/fail. Prerequisite: permission of instructor.

Z ðôõ }}‰ Œ Ÿ À µ Ÿ}vl/Cošnd tvonZ]‰RC 488:ï • X
A meaningful, planned, and evaluated work experience related to the career and educational objectives of each student, for which he/she may rece l' u ngfu ln dhè a vµl' tvµè e cyµo@ýpe ye= ő oe

Zd íîí Œš v s]•µ Survey of the various aspects of the visual and functional arts and their relationship to human life and society. A variety of art forms from different cultures and historical periods will be studied. Does not count toward art history minor. A student cannot have credit for both ART 121 and HON 161.

Zd îìí Œ Á]vP //W >figure drawing in various media. Six hours per week. Prerequisite: ART 101 or permission of instructor.

Zd îíí ^µŒÀÇ}(Œš(Œ}uvŸ<µ Survey of the history of art from Prehistory through the Baroque (17th century).

Zd îíî ^µŒÀÇ}(Œš(Œ}uš Z vo]P Survey of the history of art from the Enlightenment (18th century) to the present.

Zd îíï Œš}('o}o Survey of the history of art of non-western cultures. (Fall)

Zd îõì ^‰]o WŒ}ou•]v Independent Problems in studio art for undergraduates majoring in art under the direction of a faculty member. The student must submit and receive approval of a detailed study plan prior to registration. Prerequisites: consent of supervising faculty member and permission of department chair. May be repeated three times for credit.

Zd îõô D]r PŒ Z À]Á Assessment and enhancement of students' progress through weekly readings and discussions of issues in art and design, student writings about their own work, and a critique of their art by a jury of Art and Design faculty. Undergraduate and transfer students pursuing a baccalaureate degree in art must register for ART 298 immediately following the completion of 30 credit hours in art. This is a graded course.

Zd ïìì Œ Á]vP Conceptual study of both figurative and abstract approaches to drawing. Six hours per week. Prerequisites: ART 101 and 201 or permission of instructor.

Zd ïìï Œ Á]vE Exploration of drawing ideas with emphasis on the development of personal expression. Six hours per week. Prerequisite: ART 300 or permission of instructor.

Zd ïìð Œ Á]vC Continuation of ART 303. Six hours per week. Prerequisite: ART 303 or permission of instructor.

Zd ïìõ /všŒ}µŸ}vš}D šo•u]šZ Jewelry-making, metalsmithing, holloware, small sculpture, and object-making with an emphasis on design and craftsmanship. Six hours per week. Prerequisites: ART 101 and 112 or permission of instructor.

Zd ïíï t}}Á}Œl]vM Methods of construction and technique will be taught with an emphasis on proficiency in machine use. Six hours per week. Prerequisite: ART 310 or permission of instructor.

Zd ïíí D šo•u]šZ Introduction to several casting techniques as well as a continuation of skills learned in ART 309. Six hours per week. Prerequisite: ART 309 or permission of instructor.

Zd ïíî D šo•u]šZ Advanced problems in metalsmithing with an emphasis in ideation and conceptualization of content. Six hours per week. Prerequisite: ART 311 or permission of instructor.

Zd ïíï t}}Á}Œl]vM Methods of construction and technique will be taught with an emphasis on proficiency in machine use. Six hours per week. Prerequisite: ART 310 or permission of instructor.

Zd ïíð t}}Á}Œl]vA Advanced problems in woodworking. Introduction to increasingly complex joinery methods with an emphasis on development of personal voice. Six hours per week. Prerequisite: ART 313 or permission of instructor.

Zd ïíñ 'Œl v Z}u Topics in the history of the art and architecture of ancient Greece and Rome through the late Antique.

Zd ïío D]À o Topics in the history of art from the Early Christian through the Gothic period.

Zd ïíô Z v]••v Topics in the history of the Renaissance.

Zd ïíõ Œ}<µ Topics in the history of the art of the Baroque period, mainly in Europe.

Zd ïîô E]v š vš Z r v Survey of 19th Century Western art.
Œ}<µ ~ï•X

Zd ïîõ Œš(Œ}uíõìì History of Western art from 1900 to 1960.

Zd ïïì /všŒ}µŸ}vš} The course covers basics of color theory and materials and techniques of painting in oil. Problems stress the mastery of the medium first, and then using it to render from observation. Six hours per week. Required course for teacher certification. Prerequisites: ART 101 and 111 or permission of instructor.

Zd ïïî W]vŸ Continuation of ART 330. Six hours per week. Prerequisite: ART 330 or permission of instructor.

Zd ïïð W]vŸ Continuation of ART 333. Six hours per week. Prerequisite: ART 333 or permission of instructor.

Zd ïðí /vo µ•]À Œš µŸ}v(}Œ Course will examine the design, implementation, and assessment of visual arts instruction with the diverse learner in mind. Teacher candidates will synthesize knowledge of learning theories, technology, and evidence-based practices, including classroom management, to develop units of study and lesson plans for K-12 art instructions. The course will introduce candidates t

Zd ïõó /vš Œ} µ Ÿ}v š} }}l]v]vP Introduction to the }}l• ~ï•X techniques and basic principles of bookbinding, while expanding on the content of ones work through artist books. This class will use traditional, sculptural, and experimental structures. Formal elements, technique, craftsmanship, and content are emphasized. Six hours per week. Prerequisites: ART 101 and 111, or permission of instructor.

Zd ïõõ WŒ}(••]}v oA Survey of the resources, methods and skills employed by artists in a range of professions.

Zd ðìï ŒÁ]vS Six hours per week. Prerequisite: ART 303 or permission of instructor.

Zd ðìð ŒÁ]vS Six hours per week. Prerequisite: ART 403 or permission of instructor.

Zd ðíí Dš o•u]šZ Advanced problems in metalsmithing. Six hours per week. Prerequisite: ART 312 or permission of instructor.

Zd ðíî Dš o•u]šZ Use of metal in jewelry-making, holloware, small sculpture, and/or object-making. Six hours per week. Prerequisite: ART 411 or permission of instructor.

Zd ðíït}}Á}Œl]v Advanced construction methods will be covered with an emphasis on understanding contemporary context. Six hours per week. Prerequisite: ART 314 or permission of instructor.

Zd ðíðt}}Á}Œl]v Advanced problems in woodworking. Advanced construction methods will be covered with an emphasis on understanding contemporary context. Six hours per week. Prerequisite: ART 413 or permission of instructor.

Zd ðîì ^‰]od}‰]•]v Changing seminar topics to be determined by the instructor and student interest. May be repeated up to nine credit hours. Prerequisites: ART 121, 211, 212 or HON 161; or permission of instructor.

Zd ðîñ Œš}(A history of the art of India, Central and Southeast Asia, China, Korea, and Japan. Prerequisites: ART 121, 211, 212, 213 or HON 161; or permission of instructor. (Same as RGS 425.)

Zd ðïì }vš u‰}ŒŒÇ ŒšU íðHistory of contemporary art from 1960 to the present. Prerequisite: ART 121 or 212 or 329; or permission of instructor.

Zd ðïï W]vŸ Advanced problems. Six hours per week. Prerequisite: ART 334 or permission of instructor.

Zd ðïð W]vŸ Exploration of painting and ideas with emphasis on personal expression. Criticism and discussion. Six hours per week. Prerequisite: ART 433 or permission of instructor.

Zd ðñí 'Œ ‰Z]•]Pv /sW Advanced level design for multimedia and the Internet. Web ŁL & aŲ ž O Ľ e: ˛:t Ť er

a studio elect ve. May be repeated up to three t mes for credit. Prerequisites: consent of supervising faculty member and permission of department chair.

Z d ð õ ô X & X X W Œ Ÿ Final project for the B.F.A. candidate taking an area in art. Documenta t on (slides/video) and wri t en statement, which includes a descrip t on of the direc t on and in fuences upon the student's work, must accompany the prac t cum exhibi t on. Prerequisite: ART 298 or permission of instructor.

Z d ð õ õ X X l X ^ X W Œ Ÿ µ u Final project for the B.A. candidate B.S. candidate taking an area in art. Wri t en statement, including descrip t on of the direc t on and in fuences upon the student's work, must accompany the work exhibited in the prac t cum exhibi t on. Prerequisite: ART 298 or permission of instructor.

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dZ òñð À o µ Ÿ}v v Œ W ^Z}µo Course designed ‰ ‰ Œ Œu ~î•X
to prepare the student to prevent, evaluate, treat, and rehabilitate orthopedic injuries of the upper extremity. Specifc areas of focus include the shoulder and upper arm. Prerequisite: ATR 504, 505, 506, 520, and 521.

dZ òññ À o µ Ÿ}v v Œ W o }ÁU Course designed v U &]vP Œ• ~î•X
to prepare the student to prevent, evaluate, treat, and rehabilitate orthopedic injuries of the upper extremity. Specifc areas of focus include the elbow, wrist, hand, and fngers. Prerequisites: ATR 504, 505, 506, 520, and 521.

dZ òñò À o µ Ÿ}v v Œ W , v Course designed o ^‰]v ~î•X
to prepare the student to prevent, evaluate, treat, and rehabilitate orthopedic injuries and general medical conditons of the head and cervical spine. Prerequisites: ATR 504, 505, 506, 520, and 521.

dZ òñó À o µ Ÿ}v v Œ W dZ}Œ Course designed }u v ~î•X
to prepare students to prevent, evaluate, treat, and rehabilitate orthopedic injuries and general medical conditons of the thorax and abdomen. Prerequisites: ATR 504, 505, 506, 520, and 521.

dZ òóí u]v]•šŒ Ÿ}v v W Œ}(••]v Course designed }‰u vš ~î•X

Courses

/K ïõíhv ŒPŒ µš Z Research projects arranged individually with faculty members who agree to direct the research. A written plan of research must be filed with the chair within two weeks of the beginning of the semester. (A maximum of three credit hours total from BIO 391, 392, 483, 484, 489, 493, 494 may be used toward the minimum requirements for the biology major or minor.) (Available year round)

/K ïõîhv ŒPŒ µš Z Research projects arranged individually with faculty members who agree to direct the research. A written plan of research must be filed with the chair within two weeks of the beginning of the semester. (A maximum of three credit hours total from BIO 391, 392, 483, 484, 489, 493, 494 may be used toward the minimum requirements for the biology major or minor.)

/K ðîìs ŒšŒš u Comparative Developmental anatomy of the vertebrates with emphasis on the embryological development of humans. Two lectures and four hours laboratory per week. Prerequisite: BIO 320 and 333. BIO 321 recommended.

/K ðîís ŒšŒš , Advanced Histology Designed for the identification and comparative study of cells, tissues, and organs of representative mammals. Two lectures and four hours laboratory per week. Prerequisites: BIO 115, 216 and 221.

/K ðïô]}u]o Z • The Students will be involved in biomedical research with faculty members who agree to direct them. The student will work on a project under the direction of the research mentor. The student will write a research proposal including background information, specific aims and methods to be turned in near the end of the semester. The project will be initiated and a progress report will be submitted at the conclusion of the semester. A minimum of 8 hours per week of research is expected. Research with a mentor other than the mentor used in BIO 388 is encouraged. Credit for this course will be offered in the summer to biomedical science students who are conducting off-campus research at an affiliated research site. Prerequisites: admission into the biomedical sciences program, permission from a research mentor, and completion of BIO 290 and BIO 388.

/K ðïõ]}u]o Z • The Students will be involved in biomedical research with faculty members who agree to direct them. The student will work on a project under the direction of the research mentor. The student will continue the project initiated in BIO 438. The student will submit a research paper with an introduction, results and discussion, and methods, and make an oral presentation to the biomedical research group. A minimum of eight hours per week of research is expected. Credit for this course will be offered in the summer to biomedical science students who are conducting off-campus research at an affiliated research site. Prerequisites: admission into the biomedical sciences program, permission from a research mentor, and completion of BIO 290 and BIO 438.

/K ðñì Æ Œ]• W Students will become acquainted with general concepts in exercise physiology. Some topics to be included are cardiovascular function, neural control, musculo-skeletal responses, and respiratory function. Lab activities will be integrated. Students will collect data, compile results and complete laboratory reports. Each student will review and summarize at least one research article from approved refereed journals

a wide range of topics, including cancer, neural regeneration, wound healing, aging, gene therapy, congenital deformation, AIDS and other prevalent disease states. Three hours of lecture per week. Prerequisite: BIO 321.

/K ñìò À v &] o For students who wish to learn the identification principles and actual identification of living organisms. Course work will include a study of the ecological aspects of the various organisms and their distribution. Techniques of teaching about nature will be emphasized. Prerequisite: junior or senior standing for science education majors.

/K ñíð ^ vv]vP o šŒ}v This course is designed to teach students the theory, principles and applications of scanning electron microscopy (SEM). After a predetermined number of instructional hours, the student is expected to successfully complete a test which measures the competency of the individual in SEM operation. Subsequently, the student is required to complete a short research project utilizing SEM. Prerequisites: permission of instructor.

/K ñíí oo]}o}PÇ >An experimental approach to modern laboratory techniques in Cell Biology. An emphasis will be placed on the mastery of common cellular and molecular techniques used in clinical, industrial and research settings. Six hours of laboratory per week. Prerequisite: BIO 321.

/K ñíî W šZ}‰ Z Introduction to physiological abnormalities in disease. For advanced students in, or headed for, careers in health related fields. Four hours of lecture per week. Prerequisites: BIO 228 and 229, or BIO 322, or equivalent.

/K ñîñ]}P }PŒ ‰ Z The role of geological, climatological, and biotic factors in explaining the past and current diversity and distribution of Earth's plants and animals will be studied. Underlying processes, current theory, and applications are stressed over actual diversity and distribution patterns themselves. Prerequisite: BIO 101 or 115, plus nine additional hours of biology and/or geosciences or consent of instructor.

/K ñîô E µŒ}]} Examines vertebrate and invertebrate nervous systems at the cellular and systems levels. Topics include: (1) cellular processes of neurons and glial cells, (2) synapses and synapse formation, (3) sensory systems, (4) motor systems, and (5) learning and memory. Three hours of lecture per week. Prerequisites: BIO 321 or 322 recommended.

/K ñîõ d Z]vP ^] v dZ Œ Students will learn and apply current inquiry based instructional methods and assessment strategies to teach science. Students will also gain the basic data management and analytical skills necessary to conduct action research. The course will follow a workshop style format modeling inquiry based methods. A significant amount of independent and group work is expected outside of class meetings. Prerequisite: admission to teacher education.

/K ñïí /vš Œv Ÿ}v o Æ‰ Œ] v]v šZ A half-fu spring semester plus short-term (10-14 days of travel) study abroad program highlighting biomedical sciences by interacting with leading medical scientists and attending medical school classes in Japan or other selected countries. In the spring semester, students discuss current topics in biomedical science and develop in-depth projects. The students integrate their new knowledge from their study abroad activities and experience into their projects. Prerequisite: consent of the instructor.

/K ñïî Yµ vŸš ŸÀ An introduction to ecological data analysis and interpretation. Emphasis is placed on the understanding of ecological data structure and analytical methods. Major topics include sampling, diversity analysis, resemblance measurements, formal classification techniques, and pattern recognitions. Prerequisites: BIO 330 and STA 135 or consent of instructor.

/K ñïï D}o µo Œ 'A lecture-course which involves discussions of general concepts of DNA structure, replication and translation. Current concepts in bacterial and bacteriophage genetics, such as gene transfer, recombination, gene regulation, and recombinant DNA technology will be examined. Prerequisites: BIO 300 and 333, or permission of instructor.

/K ñïð D}o µo Œ ' v Ÿ • The laboratory course which covers classical bacterial and viral genetics such as transduction, conjugation, mutagenesis, and mutant analysis by complementation, as well as recently developed recombinant DNA techniques. The student will get hands-on experience in DNA and RNA purification, restriction, endonuclease mapping, cloning, and expression of foreign DNA in E. coli and DNA sequencing. These techniques and a clear understanding of the processes involved in gene expression will equip the student well for either a position in industry or graduate study. Prerequisite: Previous or concurrent BIO 533.

/K ñïò À}oµ Ÿ Study of evolutionary concepts. Prerequisite: BIO 333.

/K ñïô v]uo ZÀ] Introduction to the principles of animal behavior. Ecological and evolutionary implications of animal behavior are emphasized. Prerequisite: BIO 221 and 330, or permission of instructor.

/K ñïõ v]uo ZÀ]}Œ An introduction to tests of hypotheses in animal behavior. Ecological and evolutionary implications of animal behavior are emphasized. Three hours of laboratory per week. Prerequisites: BIO 221 and 330, or permission of the instructor; BIO 538 or concurrent enrollment.

/K ñðì &] o]} Students will learn and practice descriptive statistics, experimental design, regression, ANOVA, ANCOVA, and data management. In contrast to other statistics courses, students will spend more of their time in the field than in the classroom. Prerequisites: any field biology course, BIO 330, or permission of instructor.

/K ñðí t]vš Œ }o}PÇ W >]( ]v GoZ Course focuses on survival strategies for the colder months of the year (mid-fall through mid-spring) in various climates, including physiological, morphological, and behavioral adaptations. Adaptations for both animals and plants, as well as plant animal interactions, are considered in both terrestrial and aquatic (under ice) systems. Human adaptations to cold climates are also considered. Prerequisite: BIO 330 or permission of instructor.

/K ñðî t šŒ•Z The study of the movement of water through the environment and its relationship to biotic systems. Areas emphasized include the hydrologic cycle and its influence on groundwater, lotic, and lentic systems; the effect of water on plant and animal communities; and the influence of human activity on watershed structure and function. Prerequisite: BIO 330 or permission of instructor. (Same as GSC 542.)

/K ñðò ^šŒ u The interactions of stream organisms with each other and their abiotic environments will be examined. An area stream will be used as an example for physical and chemical characteristics of a stream and adaptations of organisms to their environments. One weekend field trip required. Prerequisite: BIO 330.

/K ñðô WŒ]v]‰o • }(D v P]vP An exploration of the principle of disease transmission, disease maintenance, and how biologists monitor for and manage for disease in free-living wild animals species. The effects on the individual animals, wildlife population, and human will be discussed. Current issues in wildlife diseases will highlight how these principles are applied in the field. Three hours of lecture per week. Prerequisite: one course from AGR 300, BIO 216, HEA 311, or NUR 301.

/K ñðõ &]•Z Œ] • d Course will provide instruction in many techniques used by fishery scientists. Students will learn about field sampling, laboratory analysis, computer modeling, and statistical analysis of fisheries data. The course will take advantage of the Hancock Biological Station to provide extensive hands-on practice in all techniques. Three lectures plus four hours lab per week. Prerequisite: BIO 330.

/K ññî E ŸÀ Wo vš• (}Œ t]oo](

iden t f ca t on using keys, collec t on, and prepara t on of herbarium specimens, and general plant ecology of the region. Prerequisite: BIO 222.

/ K ñ ñ ð v Œ } o } P Ç v & } Œ • Course is designed to teach ð • X students two main bodies of knowledge. First is an ability to iden t fy common tree species in the eastern US and to know their natural histories and their