## Graphic Communication (GRC)

### GRC Courses

- **GRC 101. Introduction to Graphic Communication. 3 units**
  Term Typically Offered: F
  Graphic communication history, theory, processes, applications, and practices. New technologies that affect day-to-day communication including traditional and digital printing and publishing, and non-print imaging including Internet applications. Overview of design technology, web and digital media, printing and imaging management, graphics for packaging, industry segments. 3 lectures.

- **GRC 200. Special Problems for Undergraduates. 1-2 units**
  Term Typically Offered: TBD
  Prerequisite: Consent of instructor; Graphic Communication majors only.
  Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

- **GRC 201. Digital Publishing Systems. 3 units**
  Term Typically Offered: F, W
  Prerequisite: Graphic Communication majors or Liberal Arts and Engineering majors with concentration in Publishing Technology.
  Introduction to web, e-publishing, and print publishing systems including hardware, software, design considerations, and file formats. Overview of print output technologies, networking, web design, and digital publishing standards. 2 lectures, 1 laboratory.

- **GRC 202. Digital Photography. 3 units**
  Term Typically Offered: W, SP
  Prerequisite: GRC 101 and either GRC 201 or GRC 377; Graphic Communication majors only.
  Digital photography for print and online delivery, including lighting, exposure, composition, photo retouching, equipment, color management, and output. 2 lectures, 1 laboratory.

- **GRC 203. Digital File Preparation and Workflow. 3 units**
  Term Typically Offered: F, SP
  Prerequisite: ART 183 or GRC 202.
  Terminology and techniques used in digital workflow systems for print and web. Workflow options, including automation, proofing, and output systems. Digital file delivery and transfer. 2 lectures, 1 laboratory.

- **GRC 204. Introduction to Contemporary Print Management and Manufacturing. 4 units**
  Term Typically Offered: W, SU
  Prerequisite: GRC 101; Graphic Communication majors only.
  Survey of management fundamentals and components relevant to graphic communication manufacturing, production, operations, and quality. Introduction to management theory and contemporary management trends and practices in the graphic communication industry. Course may be offered in classroom-based or online format. 4 lectures.

- **GRC 211. Substrates, Inks and Toners. 4 units**
  Term Typically Offered: W, SP
  Prerequisite: GRC 101; Graphic Communication majors or Liberal Arts and Engineering majors with concentration in Publishing Technology.
  Technical aspects of paper, other substrates, inks, toners, and other printable materials used in the printing and packaging industries. Manufacture, application and interaction of these materials in relation to particular processes and end use requirements. Hands-on testing of materials in relation to quality, properties, and performance. 3 lectures, 1 laboratory.

- **GRC 212. Substrates, Inks and Toners: Theory. 3 units**
  Term Typically Offered: W, SP
  Prerequisite: GRC 101 and GRC minors only.
  Technical aspects of paper, other substrates, inks, toners and other printable materials used in the printing and packaging industries. Manufacture, application, and interaction of these materials in relation to particular processes and end use requirements. Credit not allowed for GRC majors. 3 lectures.

- **GRC 218. Digital Typography. 4 units**
  Term Typically Offered: F, W
  Prerequisite: GRC 202 and GRC 203; Graphic Communication majors only.
  Application of typography using current software tools for print, web and digital publishing. In-depth study of communication principles and visual organization. Font technology and management for the creative, print and web publishing industries. 3 lectures, 1 laboratory.

- **GRC 260. Introduction to Research Methods in Graphic Communication. 3 units**
  Term Typically Offered: TBD
  Prerequisite: GRC 101; Graphic Communication majors only.
  Introduction to research methods for preparing scholarly and defensible papers and projects, and in conducting qualitative and quantitative evaluations, testing and research in graphic communication. Methods covered include the scientific method, historical research, descriptive research, questionnaires, interviewing, content analysis, and case studies. Rules for conducting and reporting research are addressed. 2 lectures, 1 activity.

- **GRC 270. Selected Topics. 1-4 units**
  Term Typically Offered: TBD
  Prerequisite: Open to undergraduate students and consent of instructor; Graphic Communication majors only.
  Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures.

- **GRC 316. Flexographic Printing Technology. 3 units**
  Term Typically Offered: W, SP
  Prerequisite: GRC 211; Graphic Communication majors only.
  Flexographic printing technology for flexible packaging, label printing, folding and corrugated cartons. Optimization of file preparation, plate imaging, and equipment settings. Specification and management of automated workflows. 2 lectures, 1 laboratory.
GRC 320. Managing Quality in Graphic Communication. 4 units  
Term Typically Offered: F, SP  
Prerequisite: GRC 328 and STAT 217; Graphic Communication majors only.

Theory and practices of quality management in the graphic communication industry. Quantifying customer expectations, specifications, standard operating procedures, SPC tools, and employee empowerment. Principles of Lean Management, Six Sigma, ISO, and Malcolm Baldrige. 3 lectures, 1 laboratory.

GRC 322. Advanced Digital Typography. 3 units  
Term Typically Offered: W  
Prerequisite: GRC 218; Graphic Communication majors only.

Advanced typographic principles relating to print and electronic media. Page layout and font management with consideration for electronic media. Applied problems focusing on typographic design, typographic application and file preparation, including web typography and eBook creation. 2 lectures, 1 laboratory.

GRC 324. Binding, Finishing and Distribution Processes. 3 units  
Term Typically Offered: W, SP  
Prerequisite: GRC 101; Graphic Communication majors only.

Imposition techniques, cutting, and folding. Stitch, case and perfect binding techniques and applications. Operational and aesthetic uses of die cutting, scoring, creasing, foil stamping and embossing techniques. Fulfillment and mailing operations. Applications of computers to the management and technical function of binding; finishing and distribution. 2 lectures, 1 laboratory.

GRC 325. Binding and Finishing Processes: Theory. 2 units  
Term Typically Offered: W, SP  
Prerequisite: GRC 101 and GRC minors only.

Imposition techniques, cutting and folding. Stitch, case and perfect binding techniques and applications. Operational and aesthetic uses of die cutting, scoring, creasing, foil stamping and embossing techniques. Fulfillment and mailing operations. Applications of computers to the management and technical function of binding; finishing and distribution. Credit not allowed for GRC majors. 2 lectures.

GRC 328. Sheeted Printing Technology. 4 units  
Term Typically Offered: F, SP  
Prerequisite: GRC 211 or GRC 212 and Graphic Communication majors only.

Theory, practice and application of sheeted printing and plate technology for commercial, book, advertising, catalog, packaging and reprographic segments of the printing industry. Press configurations, materials, computerized press controls, workflow, pressroom management, coating and quality control. Plate types, quality and new technologies for sheetfed printing. 3 lectures, 1 laboratory.

GRC 329. Web Offset and Gravure Printing Technologies. 3 units  
Term Typically Offered: F, W  
Prerequisite: GRC 328; Graphic Communication majors only.

Introduction to web offset and gravure printing for newspapers, packaging, magazines, books, catalogs and commercial products. Application of technology to the management and production of web offset and gravure printing. Preparation and use of gravure cylinders. 2 lectures, 1 laboratory.

GRC 331. Color Management and Quality Analysis. 4 units  
Term Typically Offered: F, SP  
Prerequisite: Completion of GE Area B3 and either ART 182 or GRC 202.

The physics, psychology, measurement, analysis and management of color for print and electronic documents, including web sites. Practical application of color correction, color proofing, and production workflows that ensure the best possible color reproduction. 3 lectures, 1 activity.

GRC 337. Consumer Packaging. 3 units  
Term Typically Offered: F, W  
Prerequisite: GRC 203.

Problem-solving strategies for package printing that integrate concepts from marketing, design and technology. Package manufacturing, function, quality, visual appeal, sustainability, and economics are addressed. 2 lectures, 1 laboratory.

GRC 338. Web Development and Content Management. 4 units  
Term Typically Offered: W, SP  
Prerequisite: GRC 218.

Web development production techniques including creating, repurposing, and managing assets for web publishing. Digital content management for tablet and mobile device publishing. 3 lectures, 1 laboratory.

GRC 339. Web Design and Production. 4 units  
Term Typically Offered: F, SP  
Prerequisite: GRC 338; Graphic Communication majors only.

Advanced design and production techniques for web development. Current software applications and technologies for user interface design, site structure and information architecture. 3 lectures, 1 laboratory.

GRC 357. Specialty Printing Technologies. 3 units  
Term Typically Offered: W  
Prerequisite: GRC 202.

Specialty printing and imaging technologies used in fabric decorating, decals for marketing, industrial, and functional printing, security printing and various forms of packaging. Printing on various materials using special processes including screen printing, pad printing, sublimation printing, digital imaging, and post print finishing. 2 lectures, 1 laboratory.

GRC 361. Marketing and Sales Management for Print and Digital Media. 4 units  
Term Typically Offered: W, SP  
Prerequisite: GRC 101 and GRC 204; Graphic Communication majors only.

Identification and development of target markets for products and services in the graphic communication industry. Deployment of strategies in pricing, promotion and distribution management. Application of customer relationship management techniques for personal selling, forecasting and planning. 3 lectures, 1 laboratory.
GRC 377. Web and Print Publishing. 4 units
GE Area F
Term Typically Offered: F, W, SP, SU
Prerequisite: Junior standing and completion of Area B.
Web and print publishing technology and its impact on society. The technologies of digital photography, typography, graphics, layout, and design for print and web publishing including decision-making considerations. The application of scientific and mathematical principles to web and print publishing technologies. 3 lectures, 1 laboratory. Fulfills GE Area F except for Graphic Communication majors.

GRC 400. Special Problems for Advanced Undergraduates. 1-2 units
Term Typically Offered: F, W, SP
Prerequisite: Consent of instructor; Graphic Communication majors only.
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

GRC 402. Digital Printing and Emerging Technologies in Graphic Communication. 3 units
Term Typically Offered: F, SP
Prerequisite: GRC 218.
Study of the theory, technology, economics and application of digital printing processes and variable data publishing. Explores digital printing technology, databases, and database publishing techniques. 2 lectures, 1 activity.

GRC 403. Estimating for Print and Digital Media. 4 units
Term Typically Offered: F, W
Prerequisite: GRC 328; Graphic Communication majors only.
Estimating the cost of various print and digital products and services. Development of cost rates and production standards. Cost estimating methods for Print on Demand, VDP, sheetfed lithography, web development, and wide-format output. Analysis of material, labor and other cost factors. 3 lectures, 1 laboratory.

GRC 411. Strategic Trends and Profitability Issues in Print and Digital Media. 4 units
Term Typically Offered: F, SP
Prerequisite: GRC 402; Graphic Communication majors only.
Graphical communication industry market trends and strategic positioning. Strategies for successfully positioning a business. Cost paradigms and business practices for graphic communication companies. Company analysis using financial ratios and case studies. Innovative management practices in the graphic communication industry. 3 lectures, 1 activity.

GRC 421. Production Management for Print and Digital Media. 4 units
Term Typically Offered: F
Prerequisite: GRC 320; Graphic Communication majors only.
Application of management principles and production control methodologies for print and digitally-imaged products. Organization and financial analysis, decision-making, equipment and inventory planning, resource optimization, and the application of practiced and newly innovative contemporary world-class techniques for improving profitability in the graphic communication industry. 3 lectures, 1 activity.

GRC 422. Human Resource Management Issues for Print and Digital Media. 4 units
Term Typically Offered: W, SP
Prerequisite: GRC 403 and senior standing; Graphic Communication majors only.
Human resource management integrated into the success of graphic communication companies. A comprehensive management approach is utilized emphasizing employee development, training, promotion, and motivation. Conflict management, facilitation skills, team building empowerment, leadership, ethical and legal issues in the graphic communication industry. 3 lectures, 1 laboratory.

GRC 429. Digital Media. 3 units
Term Typically Offered: F
Prerequisite: GRC 338; Graphic Communication majors only.
Current technologies and production tools used for digital media including mobile user interface design, prototyping, video, animation, and project management. Industry standards, digital rights management, file formats, and publishing options for digital media applications. Legal, ethical, and business issues surrounding digital media. 2 lectures, 1 laboratory.

GRC 439. Book Design Technology. 4 units
Term Typically Offered: W
Prerequisite: Senior standing, GRC 402; Graphic Communication majors only.
Advanced creative problem-solving strategies associated with the technologies used in book design and production. Advanced techniques in page layout, design, typography, type specification and image manipulation as they relate to output technology. Content, format and distribution of print and electronic books. 3 lectures, 1 laboratory.

GRC 440. Magazine Design Technology. 4 units
Term Typically Offered: SP
Prerequisite: GRC 338; Graphic Communication majors only.
Concept development and design for magazines and publications. Technical considerations as they relate to output technology and digital publishing. Application of organizational structures such as grids, formatting and sequential design. Advanced techniques in typography and image manipulation. Distribution of content for print and digital formats. 3 lectures, 1 laboratory.

GRC 451. Management Topics in Graphic Communication. 3 units
Term Typically Offered: F, W
Prerequisite: GRC 101 and GRC 201; Graphic Communication majors only.
Current trends and practices in select graphic communication management topics. Open to undergraduate and graduate students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 3 lectures.

GRC 452. Emerging Technologies in Graphic Communication. 3 units
Term Typically Offered: TBD
Prerequisite: GRC 101; and GRC 201 or GRC 377.
Current trends and practices in select graphic communication emerging digital topics. Open to undergraduate and graduate students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 3 lectures.
GRC 453. Design Reproduction Topics in Graphic Communication. 3 units
Term Typically Offered: TBD
Prerequisite: GRC 101; and GRC 201 or GRC 377.
Current trends and practices in select graphic communication design reproduction topics. Open to undergraduate and graduate students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 3 lectures.

GRC 460. Research Methods in Graphic Communication. 2 units
Term Typically Offered: F, W, SP
Prerequisite: Senior standing and STAT 217; Graphic Communication majors only.
Research methods for preparing scholarly papers including senior projects. Qualitative and quantitative research in graphic communication. Statistical, historical, and descriptive methods including questionnaires, interviewing, and sampling. 1 lecture, 1 activity.

GRC 461. Senior Project. 3 units
Term Typically Offered: F, W, SP, SU
Prerequisite: GRC 460; Graphic Communication majors only.
Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in formal report. Minimum 90 hours total time.

GRC 470. Selected Advanced Topics. 1-4 units
Term Typically Offered: TBD
Prerequisite: GRC 101 and GRC 201 and Graphic Communication majors only.
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1-4 lectures.

GRC 471. Selected Advanced Laboratory. 1-4 units
Term Typically Offered: TBD
Prerequisite: Consent of instructor; Graphic Communication majors only.
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 laboratories.

GRC 472. Applied Graphic Communication Practices. 2 units
Term Typically Offered: F, W, SP
Prerequisite: GRC 101; Graphic Communication majors only.
Application of theories and practices to University Graphic Systems as they apply to commercial printing, publication printing, digital media and graphic communication industries. Major credit limited to 4 units; total credit limited to 18 units. 2 lectures.

GRC 473. Applied Graphic Communication Management Practices. 2 units
Term Typically Offered: F, W, SP
Prerequisite: GRC 472 and consent of instructor; Graphic Communication majors only.
Management theories and practices in the graphic communication industry. Application of theories and practices to University Graphic Systems as they apply to commercial printing, publication printing, digital media, marketing, sales, customer service, and production cost centers. Major credit limited to 6 units; total credit limited to 18 units. 2 lectures.

GRC 485. Cooperative Education Experience. 6 units
CR/NC
Term Typically Offered: F, W, SP, SU
Prerequisite: Sophomore standing and consent of instructor; Graphic Communication majors only.
Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Major credit limited to 12 units; total credit limited to 12 units. Credit/No Credit grading only.

GRC 495. Cooperative Education Experience. 12 units
CR/NC
Term Typically Offered: F, W, SP, SU
Prerequisite: Sophomore standing and consent of instructor; Graphic Communication majors only.
Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Major credit limited to 12 units; total credit limited to 12 units. Credit/No Credit grading only.

GRC 500. Special Problems in Graphic Communication for Graduate Students. 2 units
Term Typically Offered: F, W, SP
Prerequisite: Graphic Communication majors only.
Investigation, research, studies of problems in the graphic communication industry. Repeated course over four quarters working with University Graphic Systems, the Graphic Communication Institute at Cal Poly, and with individual faculty. Total credit limited to 8 units.

GRC 501. Survey of Functional Printing. 2 units
Term Typically Offered: F, SP
Prerequisite: Consent of Printed Electronics and Functional Imaging Graduate Coordinator.
Foundations for emerging functional printing fields including printed electronics, active packaging, and security printing. Emphasis on processes, materials, electrical characterization, sensing, barrier properties, and anti-counterfeiting. Focus on applications including lighting, displays, novel electronics, energy harvesting, energy storage, sensors, scavengers, and brand security. Course offered online only. 2 lectures.
GRC 502. Orientation to Functional Printing. 2 units
Term Typically Offered: F
Corequisite: GRC 501 and admission to the MS Printed Electronics and Functional Imaging program. Recommended: GRC 211, GRC 316, GRC 329, and GRC 359.
Orientation and laboratory exploration for printed electronics, active packaging, and security printing. Introduction to curricula, lab activities, research opportunities, and the use of equipment. Active participation in laboratory experiments related to processes and materials. 1 lecture, 1 laboratory.

GRC 510. Materials for Functional Printing. 4 units
Term Typically Offered: F
Corequisite: GRC 501.
Study of functional materials including substrates, coatings, and inks. Focus on barrier and heat-stable substrates as well as conductive, semi-conductive, dielectric, transparent conductors, forensic, sensor, and other functional inks and coatings. Emphasis on rheology, morphology, sintering and annealing. Course offered online only. 4 lectures.

GRC 512. Printing and Coating Technologies. 4 units
Term Typically Offered: W
Corequisite: GRC 501.
Study of functional printing and coating technologies, including screen printing, flexography, gravure, ink jet, offset, slot die, blade coating and conventional deposition techniques. Course offered online only. 4 lectures.

GRC 514. Optical and Electrical Patterning. 4 units
Term Typically Offered: SP
Corequisite: GRC 501.
Imaging technologies and processes for security, electronic, and active packaging printing. Focus on creating and evaluating images for applications in product security and electrical fabrication. Course offered online only. 4 lectures.

GRC 520. Functional Printing Product and Business Development. 4 units
Term Typically Offered: SU
Prerequisite: GRC 501.
Principles of business and product development for electronic and functional applications. Focus on intellectual property rights, capital funding, entrepreneurship, and management of a technology business. Course offered online only. 4 lectures.

GRC 530. Functional Printing Workflows. 4 units
Term Typically Offered: W
Prerequisite: GRC 502, GRC 512, and GRC 514.
Evaluation of advanced imaging technologies for functional printing applications. Imaging characteristics for ink/substrate combinations, focusing on print process attributes. Compensation for print characteristics. Enabling automated workflow technologies to improve throughput and minimize errors. 2 lectures, 2 laboratories.

GRC 552. Current Trends in Active Packaging. 4 units
Term Typically Offered: SP
Corequisite: GRC 502.
Current trends and practices in select active packaging topics. Open to graduate students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 3 lectures, 1 laboratory.

GRC 553. Current Trends in Security and Anti-Counterfeiting. 4 units
Term Typically Offered: SP
Corequisite: GRC 502.
Current trends and practices in select security and anti-counterfeiting topics. Open to graduate students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 3 lectures, 1 laboratory.

GRC 555. Cooperative Education Experience. 8-12 units
CR/NC
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.
Advanced study analysis and full-time work experience in student's career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Total credit limited to 12 units. Credit/No Credit grading only.

GRC 560. Research Methods in Printed Electronics and Functional Imaging. 2 units
Term Typically Offered: F
Corequisite: GRC 530.
Methods for conducting qualitative and quantitative evaluations, testing, and experimentation as well as writing investigative, scholarly research papers and theses in functional printing. Topics include qualitative research, descriptive research, experimental design, statistical analysis, writing styles, and publishing options. 1 lecture, 1 activity.

GRC 595. Research Project in Printed Electronics and Functional Imaging. 3 units
Term Typically Offered: TBD
Prerequisite: GRC 560.
Comprehensive research project in printed electronics and functional imaging. Communication of the results and findings of scholarly work in written report and by oral presentation.