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VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
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# -: પરિપત્ર :-

કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા હેઠળની તમામ સંલગ્ન કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ થી અમલમાં આવનાર B.C.A. માં (ઓનર્સ ) નો પેટાસમિતિએ તૈયાર કરેલ અભ્યાસક્રમ કોમ્પ્યુટર સાયન્સ અભ્યાસસમિતિની તા.૨૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ ૫ અન્વયે મંજૂર કરી કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાને કરેલ ભલામણ કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની તા.૨૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ ૫ અન્વયે સ્વીકારી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૨૩/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૧૫૫ થી કરેલ ભલામણ સિન્ડિકેટે તેની તા.૩૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૧૫ થી યથાવત સ્વીકારી મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

**કોમ્પ્યુટર સાયન્સ અભ્યાસસમિતિની તા.૨૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ ૫**

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ થી અમલમાં આવનાર 4th Year B.C.A. (Honors) નો અભ્યાસક્રમ, Course Structure, Fee Structure, Admission Process & Framework મંજૂર કરી કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

**કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની તા.૨૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ ૫**

:: આથી ઠરાવવામાં આવે છે કે, કોમ્પ્યુટર સાયન્સ અભ્યાસસમિતિની તા.૨૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૫ અન્વયે કરેલ ભલામણ સ્વીકારી શૈક્ષણિક વર્ષ–૨૦૨૨–૨૩ થી અમલમાં આવનાર B.C.A. માં (ઓનર્સ) નો અભ્યાસક્રમ મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

**એકેડેમિક કાઉન્સિલની તા.૨૩/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૧૫૫**

:: આથી ઠરાવવામાં આવે છે કે, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની તા.૨૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ ૫ થી કરેલ ભલામણ મુજબ 4th year BCA (Honors) નો અભ્યાસક્રમ, કોર્સ સ્ટ્રકચર, ફી સ્ટ્રકચર, એડમિશન પ્રોસેસ તથા ક્વાયટેરિયા, તેમજ ચોથા અભ્યાસક્રમ નું માળખું યથાવત મંજૂર કરવામાં આવે છે તથા **4th year BCA (Honors)** નો અભ્યાસક્રમ શૈક્ષણિક વર્ષ ૨૦૨૨-૨૦૨૩ થી અમલ કરવાનું ઠરાવવામાં આવે છે.

વધુમાં, **4th year BCA ( Honors )** નો અભ્યાસક્રમ સ્ટેચ્યુટ - ૨૨૩ માં આમેજ કરવા સિન્ડિકેટને ભલામણ કરવામાં આવે છે.

**<u>સિન્ડિકેટની તા.૩૧/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૧૫</u>**

:: આથી ઠરાવવામાં આવે છે કે, એકેડેમિક કાઉન્સિલની તા.૨૩/૦૩/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૧૫૫ થી કરેલ ભલામણનો યથાવત સ્વીકારી શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ માટે આ બાબતની એસ.ઓ.પી.ને અનુસરીને બી.સી.એ. ના ચોથા વર્ષ માટે પ્રવેશ પ્રક્રિયા શરૂ કરવી તથા ચોથું વર્ષ (બી.સી.એ. ઓર્નસ) શરૂ કરવા ઈચ્છુક કોલેજો/સંસ્થાઓ પાસે અરજીઓ મંગાવી ૩૦ એપ્રિલ ૨૦૨૨ સુધી મંજૂરીની કાર્યવાહી પૂર્ણ કરવી.

ક્રમાંક : એસ./સિલેબસ/પરિપત્ર/૬૫૮૮/૨૦૨૨
તા.૦૧/૦૪/૨૦૨૨

ઈ.ચા.કુલસચિવ

બિડાણઃ ઉપર મુજબ

પ્રતિ,
૧) કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા હેઠળની તમામ કોલેજોના આચાર્યશ્રીઓ.
૨) ડીનશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા,
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
૪) ઈ.ચા.નાયબ કુલસચિવશ્રી,એકેડેમિક વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
૫) નાયબ કુલસચિવશ્રી,એફીલેશન વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....જાણ તથા અમલ સારૂ.

# B.C.A.(Honors) Sem- VII and VIII Structure:
## (4th year Course structure, Admission process and Framework)

**Aim:** To impart application oriented knowledge by adding one additional year in current three years traditional graduation degree course.

**Objective:** On completion of 3 years of traditional graduation program, the student can avail additional one year of Graduation course in B.C.A. The objective of the Honors degree is to provide additional year to prepare technically by imparting technology by means of application-oriented study. The student can opt for Master's degree after honors or pursue research work or apply the technical knowledge in Information Technology sector.

**Eligibility Criteria:**

B.C.A.(Hon.) is four-year integrated Program with exit option at end of the Third year to avail B.C.A. graduation level degree. It is an extension of existing three years B.C.A. course. Pursuing the fourth year of the B.C.A.(Hon.) will be an option for the enrolled B.C.A. students.

Criteria to avail admission in Fourth year of B.C.A. (Honors) degree: The applicant must fulfil any one of the following criteria:

(i) B.C.A. degree from any UGC recognized University
(ii) B.Sc.(Computer Science) / B.Sc.(I.T.) from any UGC recognized University.
(iii) B.Sc.(Statistics)/B.Sc.(Math)/B.Sc.(Physics)/Any Bachelor's degree holder with computer major subject approved by AICTE/UGC

**In-take capacity:** 75 students maximum per Division.

**Nos. of Divisions allowed per College/Institute:** Maximum One

**Admission Criteria:**

Admission will be carried out at Institute/College level. The institute/college need to invite an application for the vacant seats after following the step-1 and step-2 as shown below. The merit must be prepared and should be submitted to the university. However, the admission must be carried out at local institute level.

- **Step-1:** Admission in Fourth Year (Sem-VII) for any academic year; Preference for admission will be given to the students of same college/institute based on candidate' Third year merit score of T.Y.B.C.A. The candidate must be from immediate previous academic year batch of B.C.A. program; who pursued the B.C.A. from the same institute/college. In event of any backlog, the final year score will be considered excluding the subject in which the student is having backlog for the purpose of merit.
- **Step-2:** Following Step-1, the remaining vacant seats will be filled by passed out students from immediate previous academic year batch of B.Sc. (Computer Science) and B.Sc.(I.T.) from the same college/institute on the basis of candidate' merit score of Third year considering them at par.
- **Step-3:** Following step-2, the remaining seats will be filled by any passed out students of previous batches (Prior to immediate previous academic year) from B.C.A. (three years course)/B.Sc. (computer Science)/B.Sc.(IT) degree holders of the same institute based on their merit of B.C.A. (three year course)/B.Sc.(Computer)/B.Sc.(I.T.) will be considered for admission in order; considering their final year score for the purpose of merit.
- **Step-4:** Following step-3, applicants from B.C.A., B.Sc. (Computer Science) and B.Sc.(I.T.) from any other institutes of VNSGU will be considered for vacant seats in order; considering their final year score for the purpose of merit.
- **Step-5:** Following step-4, the remaining seats can be filled by B.C.A./B.Sc.(IT)/B.Sc. (Computer Science)/B.Sc.(Statistics)/B.Sc.(Math)/B.Sc.(Physics)/Any Bachelor's degree holder in computer subject approved by AICTE/UGC students from VNSGU and other universities based on their merits considering them at par and considering their final semester mark-sheet for the purpose of merit.

**Course Frame-work:**

Fourth year of B.C.A.(Honors) Duration: 1 year (Divided in two semesters – Sem-VII and Sem-VIII)

| | | Total Credits to Earn | Total Marks |
|---|---|---|---|
| Sem-VII | : | (2+2+3+12+8+4) = 31 Credits | 800 Marks |
| Sem-VIII | : | (2+3+12) = 17 Credits | 400 Marks |
| Total | : | 48 Credits | 1200 Marks |

# B.C.A.(Honors) Sem-VII Structure:

Students can opt any given track offered by the institution.
The track can be offered to students only in case minimum 40% of students are willing to opt the track.
Institution can offer maximum two tracks per division out of available choices of tracks.

- Students will undergo minimum one certificate course recognized by V.N.S.G. University as Foundation Elective (2 credits) during the semester, One Foundation course (Part of syllabus, 2-credits), One core elective ( 3 credit) and Three core compulsory subjects ( 4 credits each) hereafter called as modules. The student will carry the Certification course under Foundation Elective.
- Every core Elective and core Compulsory subject will be associated with a Practical Paper (2 credits per module).
- Project(4 credits) relevant to the selected track ( Core and Elective Papers) during semester-7.
- The Courses of track will execute in sequence. At end of every course University exam will be conducted (5 weeks for 4 credits subjects, 4 weeks for 3 credit subject and 3 weeks for 2 credit subjects) for that specific module.
- The institute/college can execute the fourth year program utilizing existing laboratory, classroom, library and other infrastructure. However, it is essential to upgrade the laboratory with minimum 60 computers with higher end processors (preferable intel i5 or higher), 8 GB RAM, SD-Drive, dedicated two laser-printers and minimum 3 hours of battery backup facility for these 50 computers. The laboratory must have dedicated 30 Mbps internet facility available for the laboratory and available for access to all students of Fourth Year of B.C.A. The fourth year of BCA, if required can run in different shift.
- The same norms will be applicable for winter session batch.

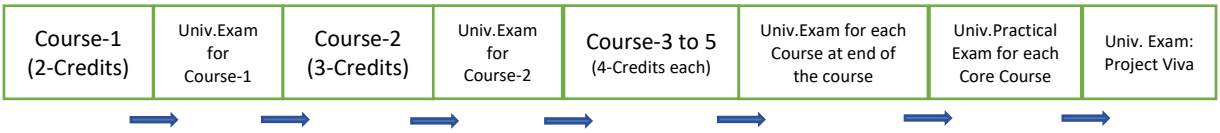
**Marks Distribution:**

| | | |
|---|---|---|
| For Paper-701 to 705 | : | External : 70 Marks and Internal: 30 Marks |
| For 706- Practical | : | External: 140 Marks and Internal: 60 Marks |
| For 707-Project | : | External : 70 Marks and Internal: 30 Marks |

**Exam Pattern and Schedule:**

- **Internal assessment:** Continuous assessment process (Assignment, Attendance, Class Test, Viva)
- **External Assessment:** At end of every module(course), University exam of 70 Marks (3 Hours duration) will be conducted. At end of semester-VII, Practical exam carrying 8 Credit (2 credit each for core Elective and Core Compulsory subjects) and 140 marks will be conducted. Duration of Practical Exams: 5 hours. Project viva of 4 credits and 70 marks will be conducted separately.
- For all 4 credit module: 2 lectures of 1-hour duration per day for five weeks (Minimum 48 hours of direct teaching) and 3 hours of practical every day.
- For 3 credit module: 2 lectures of 1 hour each / day and 3 hours of practical every day for 3 weeks.
- Students are required to acquire additional 2 credits for semester-VII and semester-VIII by enrolling for the certificate course recognized by the University. This will be an additional mandatory certificate course apart from the regular curriculum offered for the programme. Students are required to register separately for their choice of course by registering at own(in case selected in option to NSS/NCC/Saptadhara) and submit the certificate on successful completion of the University recognized certificate course (Minimum 2 credit course) to their respective H.O.D./in-charge H.O.D.

**Semester Progress Guideline: The subjects will be taught in sequential manner.**



# B.C.A.(Honors) Sem-VIII Structure:

Students will undergo a full time project during this semester. Students will implement applied knowledge acquired for the subject in terms of developing a major project.

- It is mandatory for the students to undergo any technical subject relevant to one 2-credit (Foundation Elective) and one 3-credit certificate (Core Elective) course approved and offered by V.N.S.G.U./affiliated colleges or any other UGC recognized University.; The tuition fees does not include the fees for 2- credit(Foundation Elective) and 3-credit(Core Elective) certificate courses. It is mandatory for Students but they can opt their choice out of available valid courses.

**Recommendation:**

(i) For initial three years of the B.C.A.(Honors) implementation, only one division will be allowed to any institution. After 3 years, the institute will be allowed upto its 50% divisions of their first year's in-take divisions capacity.

(ii) The committee recommends to consider only those institutes for B.C.A.(Honors) course, who is running B.C.A. course and have minimum 4 full time University approved teachers in the subject of computers, out of which minimum 3 university approved teachers having more than 11 years of teaching experience as University recognized teachers.

(iii) The syllabus of Fourth Year B.C.A. will revise and new tracks can be included if required on yearly basis.

(iv) Course Fees:

a. Admission Processing Fees: Rs. 500/- (Admission process fees for Semester-7)
b. Semester-7 Tuition Fees : Rs. 15,500/-
c. Semester-8 Tuition Fees : Rs. 15,500/-

[The Tuition Fees per semester will increase every academic year by Rs.250/- for semester-7 and Rs.250/- for semester-8 for consecutive five academic years starting from A.Y.2023-2024.]

[Foundation paper (2-credit certification in semester 7 and 8) and Core elective (3-credit certification in semester-8) are mandatory and will be paid by the students separately as per their choice of course. It is not part of the Tuition Fees.]

# Veer Narmad South Gujarat University, Surat

## Program Structure: Fourth Year B.C.A.(Hons)

## (SEM – 7 and SEM – 8)

**(w.e.f. Academic Year June, 2022)**

**Bachelor of Computer Application (B.C.A.) – Three Year Program**

**Bachelor of Computer Application (B.C.A.(Hon.)) – Four Year Integrated Program**

# Track-1: Web Designing and Development

| **Program Structure** | Semester-wise break up for the courses is given below:<br>Student can opt any one Track out of give choices of Tracks. |
|---|---|

**SEMESTER – 7 (Track-1)**

| Course Code | Title | | | Total Hours of Teaching Desirable (Including tutorials) | Course Credits | University Examination | | Internal Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory | Practical | | | Duration | Marks | | |
| FND- 701 | Version Control and Database Management | 2 | 0 | 30 | 2 | 3 Hrs | 70 | 30 | 100 |
| T1-702 | Web Development and Design | 3 | 0 | 45 | 3 | 3 Hrs | 70 | 30 | 100 |
| T1-703 | Web Development Frameworks | 4 | 0 | 60 | 4 | 3 Hrs | 70 | 30 | 100 |
| T1-704 | Web Development Operations | 4 | 0 | 60 | 4 | 3 Hrs | 70 | 30 | 100 |
| T1-705 | Automated Testing Framework | 4 | 0 | 60 | 4 | 3 Hrs | 70 | 30 | 100 |
| T1-706 | Practical | - | 12 | 120 | 8 | 5 Hrs | 140 | 60 | 100 |
| T1-707 | Project | - | 6 | 60 | 4 | 5 Hrs | 70 | 30 | 200 |
| FND-07 | Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course and produce the evidence.) | 0 | - | - | 2 | - | - | - | - |
| Total | | | 18 | | 31 | | 560 | 240 | 800 |

**For Practical and Minor Project:**

(1) Batch Size – 30 (desirable) (Maximum: 40 students) (2) The journal should be certified by the concerned faculty and by the Head of the Department, failing which the student should not be allowed to appear for External Practical Examination. (3) Student will submit softcopy of Project duly certified by the internal guide.

**SEMESTER – 8**

| Course Code | Title | Teaching per week | | Course Credits | University Examination | | Internal Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Project | | Duration | Marks | | |
| FND-08 | Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course) and produce the evidence. | - | - | 2 | - | - | - | - |
| T1-801 | Project | - | 12 | 12 | 3 Hrs | 280 | 120 | 400 |
| T1-802 | Core Elective (Mandatory to obtain 3 credits by selecting any one 3 credits certificate course approved and offered by V.N.S.G.U./affiliated colleges or any other UGC recognized University.) and produce the evidence. | - | - | 3 | - | - | - | - |
| Total | | - | 12 | 17 | | 280 | 120 | 400 |

**For Project:** Students will individually develop a full scale project and submit progress report to their concerned internal guides every week. One hour load will be considered per every four students/week for Project work.

# Course: FND- 701: Version Control and Database Management

| | |
|---|---|
| **Course Code** | **FND- 701** |
| **Course Title** | **Version Control and Database Management** |
| **Credit** | 2 |
| **Minimum hours per Semester** | 24 hrs. (Including class work, examination, preparation etc.) |
| **Review / Revision** | June 2022 |
| **Purpose of Course** | The version control of a database is required to share code, allowing multiple people/teams to access pieces of code, or a database, at the same time. Several problems like collaboration among employees, storing several versions of files being made, and data backing up can be solved using versioning each piece of code, so a history of changes can be kept. |
| **Course Objective** | The students will learn to modify and redistribute the database and keep track of changes using open-source version control systems like Git. Also, they will learn to package applications in containers, allowing them to be portable to any system using a Docker container software development platform. Finally, the concepts of data warehouse for data management system that is designed to enable and support business intelligence (BI) activities, especially analytics. |
| **Pre-requisite** | Knowledge of RDBMS, Python, statistical methods. |
| **Course outcome** | • Students will be able to build a strong conceptual understanding of the version control technology, understand necessary functionalities.<br>• To evaluate business needs, design a data warehouse, and integrate and visualize data using dashboards and visual analytics. |
| **Course Content** | **Unit-1:**<br>**1.1 Concepts of Version Control**<br>1.1.1 Purpose of Version Control System (VCS)<br>1.1.2 Types of VCS<br>1.1.3 Advantages and concepts<br>**1.2 Concepts of Gits and installation process**<br>1.2.1 Configuration of Gits<br>1.2.2 Create and Initialize project in Git<br><br>**Unit-2:**<br>**2.1 Concepts of GitHub**<br>2.1.1 Create GitHub<br>2.1.2 Create, Add and Commit repository<br>2.1.3 File states: Committed, Modified, Staged<br>2.1.4 Add and Commit files in Git<br>2.1.5 Pushing and Pulling repository to GitHub<br>2.1.6 Using branches in Git<br><br>**Unit-3:**<br>**3.1 Concepts of Docker:**<br>3.1.1 Purpose and significance of Docker<br>3.1.2 Installing and Setting the Docker<br>3.1.3 Docker Terminologies:<br>3.1.3.1 Images, Containers, Docker Daemon, Client, Hub<br>3.1.3.2 Docker Run, pull, ps<br>3.2 Webapps with Docker<br>3.2.1 Static sites and Docker Images (Base, Child, Official, User)<br>3.2.2 Dockerfile<br><br>**Unit-4:**<br>4.1 Concepts of Data Warehouse |

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| | 4.1.1 Features and Types of Data Warehouse<br>4.1.2 Difference among OLAP and OLTP<br>4.2 Integrating heterogeneous Database<br>4.2.1 Advantages and Dis-advantages of Query-driven and Update-driven Apprroach.<br>4.2.2 Concepts of Data Warehouse Tools:<br>4.2.2.1 Extraction, Data Cleaning, Data Transformation<br>4.2.2.2 Data Loading<br>4.2.3 Important terminologies of Data Warehouse:<br>4.2.3.1 MetaData, Metadata Repository<br>4.2.3.2 Data Cube, Data Mart<br><br>**Unit-5:**<br>5.1 Data Warehouse Process Flow:<br>5.1.1 Extract and load the data, Cleaning and transforming the data.<br>5.1.2 Backup and archive the data, Query management and directing to data sources.<br>5.2 Data Warehouse Architecture and Models:<br>5.2.1 Business Analysis Framework<br>5.2.2 3-tier Architecture, Virtual Warehouse, Data Mart<br>5.2.3 Enterprise Warehouse<br>5.3 Load Manager, Warehouse Manager and Query Manager<br>[All Units carry Equal Weightage] |
| **Reference Books** | 1. The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition, Ralph Kimball, Margy Ross , ISBN-13: 978-1118530801, Wiley Inc.<br>2. Database Systems: Introduction to Databases and Data Warehouses 1st Edition, Nenad Jukic, Susan Vrbsky, Svetlozar Nestorov, ISBN-13: 978-1943153190, Prospect Press<br>3. Building a Scalable Data Warehouse with Data Vault 2.0 - 1st Edition, Daniel Linstedt, Michael Olschimke, ISBN-13: 978-0128025109<br>4. Data Warehousing Fundamentals for IT Professionals 2nd Edition, Paulraj Ponniah, ISBN-13: 978-0470462072, Wiley Inc.<br>5. The Kimball Wiley Inc.Group Reader: Relentlessly Practical Tools for Data Warehousing and Business Intelligence Remastered Collection 2nd Edition, ISBN-13: 978-1119216315, Wiley Inc.<br>6. The Pragmatic Programmer: From Journeyman to Master 1st Edition, Andrew Hunt, David Thomas, ISBN-13: 978-0201616224<br>7. Code Complete 2e (Developer Best Practices), Steve Mcconnell, ISBN-13: 978-0735619678, Microsoft Press US<br>8. The Docker Book, James Turnbull , Publisher: James Turnbull; 1809 2nd edition<br>9. Docker in Action, 2nd Edition, Jeff Nickoloff, Stephen Kuenzli, ISBN-13: 978-1617294761<br>10. Learning Docker - Second Edition: Build, ship, and scale faster, Jeeva S. Chelladhurai, Vinod Singh, Pethuru Raj, ISBN-13: 978-1786462923<br>11. Docker: Up & Running, Karl Matthias, Sean P. Kane, ISBN-13: 978-1491917572 |
| **Teaching Methodology** | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| **Evaluation Method** | 30% Internal assessment.<br>70% External assessment. |

# Course: T1-702: Web Development and Design

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| **Course Code** | **T1-702** |
| **Course Title** | **Web Development and Design** |
| **Credit** | 3 |
| **Minimum hours per Semester** | 36 hrs. (Including class work, examination, preparation etc.) |
| **Review / Revision** | June 2022 |
| **Purpose of Course** | Understand the technical foundations, as well as the non-programming / administrative skills needed to be a successful web developer. This course reveals the reasons why a truly successful website developer does more than write code. The course deals with both the Frontend (client-side) and Backend (server-side) of a tech product. This course deals with designing of websites and building the Applications. |
| **Course Objective** | The students will learn the whole React WebApp building process, from pc to the server. They will work with NoSQL databases. They will learn the whole process of building App using React.js. At the end of the course, they will develop modern, complex, responsive and scalable web applications with React JS and Redux. |
| **Pre-requisite** | Concepts of Web Design, HTML, DHTML, CSS, JavaScript, XML and JSON is desirable. It is also desirable to know about the dynamic web page design and handling knowledge. |
| **Course outcome** | • Students will be able to develop modern, complex, responsive and scalable websites.<br>• Understand necessary functionalities and elements of client and server-side development of website. |
| **Course Content** | **Unit-1 : Java Script concepts:**<br>1.1 Introduction to Java Script<br>1.2 JS syntax:<br>1.2.1 Document and Window object<br>1.2.2 Variables and operator<br>1.2.3 Math and String manipulations<br>1.3 Objects and Arrays<br>1.3.1 Date and Time<br>1.4 Conditions and Iterations:<br>1.4.1 Conditional statements<br>1.4.2 Switch Case<br>1.4.3 Loops in JS<br>1.5 Functions<br><br>**Unit-2: React JS :**<br>2.1 Templating using JSX: Expressions, functions, attributes<br>2.2 Components (Properties, Events, State), Props<br>2.2.1 Event Management<br>2.2.2 State Management<br>2.3 Life cycle of components<br>2.4 HTTP programming (Client Side)<br>2.4.1 Expense Rest Api Serve<br>2.4.2 fetch() API<br>2.5 Rendering List and Portals<br><br>**Unit-3: Advanced Features of React JS:**<br>3.1 Error Handling<br>3.2 Routers<br>3.2.1 Index Router |

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| | 3.2.2 Nested Routing<br>3.2.3 Creating Navigation<br>3.3 concepts of Redux<br>3.3.1 Redux data flow<br>3.3.2 Redux State and Actions<br>3.3.3 Redux reducer<br><br>**Unit-4: Redux:**<br>4.1 Redux Strore<br>4.1.1 Creating and configuring Store<br>4.1.2 Loading Initial State<br>4.2 Integrating Redux with UI<br>4.2.1 Basics of Redux with UI<br>4.2.2 Using Redux with React<br>4.2.3 React-Redux patterns<br><br>**Unit-5: Redux Middleware and React JS**<br>5.1 Redux Middleware concepts<br>5.1.1 Middleware and Side Effects<br>5.2 Creating Middleware in React<br>5.3 Types of Middleware:<br>5.3.1 logging, crash reporting, routing<br>5.3.2 handling asynchronous requests<br>5.4 Redux App structure<br>5.5 Difference between React, React JS and React Native<br>5.5.1 Application areas of React, React JS and React Native<br>[All Units carry Equal Weightage] |
| **Reference Books** | 1. Web Development with Node and Express, Ethan Brown, O'Reilly Media, Inc., ISBN: 978-1-491-94930-6<br>2. Node.js, MongoDB, React, React Native Full-Stack Fundamentals and Beyond, Eric Bush, Blue Sky Productions Inc., ISBN: 978-0-9971966-8-9<br>3. Fullstack React: The Complete Guide to ReactJS and Friends, Anthony Accomazzo, Lean Publishing, Ari Learner, Clay Allsopp, David Guttman, Tyler McGinnis, Nate Murray,<br>4. The Road to React: Your journey to master React.js in JavaScript, by Robin Wieruch<br>5. Beginning React Native with Hooks, Greg Lim<br>6. Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2nd Edition<br>7. Angular From Theory To Practice, Asim Hussain, Version 1.2.0, 2017-11-24<br>8. Angular: Up and Running: Learning Angular, Step by Step, Shyam Seshadri, O'Reilly Media, Inc.<br>9. Mastering Web Application Development with AngularJS, Pawel Kozlowski Peter and Bacon Darwin, Packt Publishing<br>10. The Complete Redux Book, Ilya Gelman and Boris Dinkevich, Lean Publishing<br>11. Redux in Action, Marc Garreau and Will Faurot, ISBN 9781617294976 |
| **Teaching Methodology** | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| **Evaluation Method** | 30% Internal assessment.<br>70% External assessment. |

# Course: T1-703: Web Development Frameworks

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| **Course Code** | **T1-703** |
| **Course Title** | **Web Development Frameworks** |
| **Credit** | 4 |
| **Minimum hours per Semester** | 48 hrs. (Including class work, examination, preparation etc.) |
| **Review / Revision** | June 2022 |
| **Purpose of Course** | A web development framework is a set of resources and tools for software developers to build and manage web applications, web services and websites. A web development framework can be built upon a pre-defined infrastructure such as the Linux, Apache, MySQL and PHP. |
| **Course Objective** | The students will learn the whole React WebApp building process, from pc to the server. They will work with NoSQL databases. They will learn the whole process of building your App using Angular JS and concepts of Express .js. |
| **Pre-requisite** | T1-702: Web Development and Design |
| **Course outcome** | • Students will learn about JavaScript UI libraries like React<br>• Students will also be able to solve complex applications using Redux. |
| **Course Content** | **Unit-1:**<br>1.1 Concepts of AngularJS<br>1.1.1 Advantages and limitations of Angular JS<br>1.1.2 Features of AngularJS<br>1.1.3 Architecture of AngularJS<br>1.1.4 Difference among Angular and AngularJS<br>1.2 AngularJS Expressions, Databinding, Directives<br><br>**Unit-2:**<br>2.1 AngularJS Controllers, Modules and Scope<br>2.2 AngularJS Dependency, filters and Tables<br>2.2.1 Creating Select box/Drop Down List<br>2.2.2 Using ng-options and ng-repeat<br>2.2.3 Using Data source as an object<br>2.3 Binding Application data to HTML DOM elements<br>2.3.1 Directives: ng-disabled, ng-show, ng-click, ng-hide<br>2.4 AngularJS forms:<br>2.4.1 Input controls:<br>2.4.1.1 input elements, select elements<br>2.4.1.2 button elements, textarea elements<br>2.4.2 Events (ng-click, dbl-click, mousedown, mouseup, mouseleave, mouseenter, mouseover, keydown, keyup,keypress,change)<br>2.4.3 Data binding using ng-model directive<br>2.4.4 Checkbox, Radiobutton and Selectbox<br><br>**Unit-3:**<br>3.1 Form Validation:<br>3.1.1 Directives: $invalid, $error, $dirty<br>3.2 AJAX call to retrieve data in JSON format.<br>3.2.1 $http directive service<br>3.2.2 HTTP service methods:<br>3.2.2.1 .delete(), .get(), .head(), .jsonp(), .patch(), .post(), .put() |

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| | **Unit-4:**<br>4.1 Angular JS applications:<br>4.1.1 Datepicker directive, Displaying Data from JSON file<br>4.1.2 Pagination using dirPagination directive<br>4.1.3 Screen width and height<br>4.1.4 Add and remove form fields dynamically<br>4.2 Image Upload<br>4.3 Validations :<br>4.3.1 Mobile number<br>4.3.2 No whitespace exists<br><br>**Unit-5:**<br>5.1 Introduction to Express.js<br>5.1.1 Installation and Objectives of Express.js<br>5.2 Express Router, Dynamic and static route., multiple router<br>5.3 Express.js (Response, Request, Post, Get)<br>5.3.1 File upload, Cookies, Middleware<br>5.3.2 Scaffolding, Template<br>[All Units carry Equal Weightage] |
| **Reference Books** | 1. Web Development with Node and Express, Ethan Brown, O'Reilly Media, Inc., ISBN: 978-1-491-94930-6<br>2. Node.js, MongoDB, React, React Native Full-Stack Fundamentals and Beyond, Eric Bush, Blue Sky Productions Inc., ISBN: 978-0-9971966-8-9<br>3. Fullstack React: The Complete Guide to ReactJS and Friends, Anthony Accomazzo, Lean Publishing, Ari Learner, Clay Allsopp, David Guttman, Tyler McGinnis, Nate Murray,<br>4. The Road to React: Your journey to master React.js in JavaScript, by Robin Wieruch<br>5. Beginning React Native with Hooks, Greg Lim<br>6. Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js, 2nd Edition<br>7. Angular from Theory to Practice, Asim Hussain, Version 1.2.0, 2017-11-24<br>8. Angular: Up and Running: Learning Angular, Step by Step, Shyam Seshadri, O'Reilly Media, Inc.<br>9. Mastering Web Application Development with AngularJS, Pawel Kozlowski Peter and Bacon Darwin, Packt Publishing<br>10. The Complete Redux Book, Ilya Gelman and Boris Dinkevich, Lean Publishing<br>11. Redux in Action, Marc Garreau and Will Faurot, ISBN 9781617294976 |
| **Teaching Methodology** | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| **Evaluation Method** | 30% Internal assessment.<br>70% External assessment. |

# Course: T1-704: Web Development Operations

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| **Course Code** | **T1-704** |
| **Course Title** | **Web Development Operations** |
| **Credit** | 4 |
| **Minimum hours per Semester** | 48 hrs. (Including class work, examination, preparation etc.) |
| **Review / Revision** | June 2022 |
| **Purpose of Course** | The purpose of this course is to ensure collaboration between Development and Operations Team to deploy code to production environment faster in a repeatable and automated way. |
| **Course Objective** | Students will be able to solve the problems of Operation team generated from the changes done by Developers by using tools like Ansible and Jenkins. |
| **Pre-requisite** | T1-703: Web Development Framework |
| **Course outcome** | • Understand the benefits of DevOps over other software development processes<br>• Gain insights into the DevOps environment<br>• Get an overview of different DevOps Tools<br>• Get a picture of the working of the DevOps Delivery Pipeline |
| **Course Content** | **Unit-1:**<br>1.1 Concepts of Developers and Operations<br>1.2 Integration of Developers and Operations<br>1.3 Purpose of DevOps:<br>1.3.1 DevOps Architecture<br>1.3.1 workflow of the waterfall method<br>1.3.2 Agile software development<br>1.4 Difference between Agile and DevOps<br><br>**Unit-2:**<br>2.1 DevOps life cycle and workflow<br>2.2 DevOps Automation tools and their purpose:<br>2.2.1 Various tools and their purpose:<br>2.2.2 Maven, Jira, Splunk, Ansible<br>2.3.1 Purpose and Introduction of Maven<br>2.3.2 Purpose and introduction of Ansible<br><br>**Unit-3.**<br>3.1 Ansible: Introduction and working<br>3.2 Installation process<br>3.3 YAML:<br>3.3.1 Key, value<br>3.3.2 List, List inside Dictionaries, List of Dictionaries<br>3.3.2 Quick commands: File Transfer, transferring file to servers<br>3.3.3 managing package<br>3.4 Ansible Playbook:<br>3.4.1 Concepts of Playbook<br>3.4.2 Create Playbook<br>3.4.3 different tags of YAML (name, hosts, vars, tasks)<br><br>**Unit-4:**<br>4.1 Ansible: Creating role<br>4.1.1 creating Role Directory<br>4.1.2 Utilizing Roles in Playbook<br>4.1.3 Breaking Playbook role |

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| | 4.2 Ansible Variables<br>4.3 Exception handling in Playbooks<br>4.4 Control Structures:<br>4.4.1 Blocks<br>4.4.2 Loops<br>4.4.3 Conditionals<br><br>**Unit-5:**<br>5.1 Jenkins:<br>5.1.1 Concepts and Architecture of Jenkins<br>5.1.2 Applications of Jenkins<br>5.1.3 Features of Jenkins<br>5.1.4 Advantages of Jenkins<br>5.1.5 Installation of Jenkins<br>5.2 CI/CD(Continuous Integration/Continuous Delivery)<br>5.2.1 CI/CD Pipeline<br>5.2.2 Concepts of CI<br>5.2.3 Concepts of CD<br>5.3 Concepts of Pipeline Security<br>5.4 Building CI/CD Pipeline with Jenkins<br>[All Units carry Equal Weightage] |
| **Reference Books** | 1. DevOps For Beginners, Joseph Joyner , Publisher: Mihails Konoplovs<br>2. Practical Devops, Second Edition, Joakim Verona, Publisher: Ingram short title, ISBN-13: 978-1788392570<br>3. DevOps For Beginners , Berg Craig, ISBN: 9798653362941<br>4. The DevOps Handbook, Second Edition, Gene Kim, Jez Humble, Patrick Debois, John Willis, Nicole Forsgren<br>5. Ansible: From Beginner to Pro 1st ed. Edition, Michael Heap , Apress Publications, ISBN-13: 978-1484216606<br>6. Learning Ansible 2 - Second Edition, Fabio Alessandro Locati, Packt Publishing, ISBN-13: 978-1786464231<br>7. Ansible Automation Platform, PETER SMITH, ISBN-13 979-8742550914<br>8.Jenkins 2: Up and Running, Brent Laster , ISBN-13: 978-1491979594<br>9. Continuous Delivery with Docker and Jenkins, 2nd Edition, Rafal Leszko, ISBN-13: 978-1838552183<br>10. CI/CD Pipeline Using Jenkins Unleashed, Pranoday Dingare, ISBN-13: 978-1484275078 |
| **Teaching Methodology** | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| **Evaluation Method** | 30% Internal assessment.<br>70% External assessment. |

# Course: T1-705: Automated Testing Framework

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| **Course Code** | **T1-705** |
| **Course Title** | **Automated Testing Framework** |
| **Credit** | 4 |
| **Minimum hours per Semester** | 48 hrs. (Including class work, examination, preparation etc.) |
| **Review / Revision** | June 2022 |
| **Purpose of Course** | The course is designed to understand and implement software testing in manual and automated mode using popular open source automated testing IDE. Before deploying the project/software, it is essential to test it at different level. This course aim to cover various aspects of testing. |
| **Course Objective** | To acquire proficiency in field of software testing using open source testing software. |
| **Pre-requisite** | T1-704: Web Development and Operations |
| **Course outcome** | At the end of the course, the student will be able to gain proficiency in area of software/project testing at different levels. |
| **Course Content** | **Unit-1:**<br>1.1 Concepts of software testing<br>1.1.1 Manual and Automation testing and their Pros and Cons<br>1.1.2 Tests that can be performed using Automated testing<br>1.2 Introduction to Selenium:<br>1.2.1 Selenium IDE, RC(remote control), web-driver and Grid<br>1.2.2 Install Selenium IDE, Fire Bug, Fire Path<br>1.2.3 Selenium architecture and installation<br>1.2.4 Selenium Client Library, JSON Wire Protocol over HTTP<br>1.2.5 Concepts of Browser Drivers<br><br>**Unit-2:**<br>2.1 Selenium Python:<br>2.1.1 Introduction and advantages<br>2.1.2 navigating links using get() method.<br>2.1.3 Interacting with webpage.<br>2.2 Locating single and multi elements:<br>2.2.1 find_element_by_id, find_element_by_name, find_element_by_xpath<br>2.2.2 find_element_by_tag_name<br>2.3 Create an Action Chain Object and using it.<br>2.3.1 Action chain methods:<br>( click, click and hold, double click, drag and drop, Key down, key up, perform, pause, release)<br><br>**Unit-3:**<br>3.1 Import selenium webdriver packages:<br>3.2.1 webdriver.support.ui package, using with chrome, edge, ie, firefox.<br>3.2.2 initialize Browser, Navigate to any website.<br>3.2.3 Get login page of the website, fetch user_id, password<br>3.2.4 webdriver methods: maximize_window(), get(), find_element_by_name(), send_keys(), find_element_by_name(), close()<br>3.2.5 Import Keys class from Selenium.webdriver.common.keys<br>3.2 Usecase: facebook login , gmail login using any browser using selenium webdriver. |

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| | **Unit-4:**<br>4.1 Difference between FindElement and FindElements<br>4.1.1 Locators in Selenium<br>4.1.2 Dynamic Xpath<br>4.1.3 Dynamic CSS<br>4.2 Handling drop-downs<br>4.3 Handling file uploads<br>4.4 Handling Alerts, Popups and Multi-windows<br>4.5 Handling Mouse events:<br>4.5.1 Mouse Hover event<br>4.5.2 Right, double click, drag and drop<br>4.6 Screenshot handling:<br>4.6.1 Capture screenshots in selenium<br>4.6.2 Capture Full Page screenshot<br><br>**Unit-5:**<br>5.1 Implicit, Explicit and Fluent Wait<br>5.2 Apache POI<br>5.2.1 Read and Write Data from Excel File<br>5.3 Database Testing:<br>5.3.1 Database Testing using MySQL<br>5.3.2 Database Testing Using DB2<br>5.4 Ajax Call handling<br>5.5 Listeners in Selenium<br>5.6 JavaScript handling in Selenium<br>[All Units carry Equal Weightage] |
| **Reference Books** | 1. The Art of Software Testing, 3rd Edition, Glenford J. Myers, Corey Sandler, Tom Badgett,<br>2. Software Testing, 2nd Edition, 2005, Ron Patton, Sams Publishing, ISBN-13: 978-0672327988,<br>3. Selenium with Python, Pallavi R Sharma, BPB Publication, ISBN-13: 978-9389328813<br>4. Python Testing with Selenium, Sujay Raghavendra, ISBN-13: 978-1484262481<br>5. Selenium WebDriver, Rajeev Gupta, ISBN-13: 978-9332526297<br>6. Guide To Test Automation Using Selenium, Garg and Aditya, McGraw Hill, ISBN: 9781259005930<br>7. Fundamentals Of Database Systems, Ramez Elmasri, ISBN:9788131716250 |
| **Teaching Methodology** | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| **Evaluation Method** | 30% Internal assessment.<br>70% External assessment. |

# Course : T1-706 : Practical

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| Course Code | T1-706 |
| Course Title | Practical |
| Credit | 8 |
| Practical / Week | 12 hours (Out of which 6 hours in supervised mode and 6 hours in un-supervised mode). |
| Minimum weeks per Semester | 15 Weeks (Including Lab work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | Hands on practice is essential for all application-oriented subjects. The Track-1 is relevant to web-design and development. Various applications include portion relevant to web development from scratch till the testing and deployment. Practical is based on Papers T1-702 to T1-705. |
| Course Objective | 1) To understand the concept of styles and theme.<br>2) To understand concepts of testing and deploying<br>3) To understand and practice development of interactive web pages using various cutting age technologies.<br>Students will perform practical based on T1-702, T1-703, T1-704 and T1-705 Courses. |
| Pre-requisite | T1-702, T1-703, T1-704 and T1-705 Courses. |
| Course outcome | - Students will avail proficiency in web design and development technologies.<br>- Able to develop interactive web pages using various prominent technologies and tools.<br>- Knowledge of testing and deploying web pages. |

# Course : T1-707 : Project

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| Course Code | T1-707 |
| Course Title | Project |
| Credit | 4 |
| Lab / Week | 6 hours (Out of which 3 hours in supervised mode and 3 hours in un-supervised mode). |
| Minimum weeks per Semester | 15 Weeks (Including Lab work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | During the semester, students will undergo the applied technology related to web design and development interactive app development. The syllabus cover various innovative technologies. To apply these technologies and enhance their acquired skills during semester; students will work on an in-house project. They are expected to develop an interactive and dynamic web application covering all technical skills learnt during the semester. Any open source database can be used for the purpose of project development. The project work will be in-house and continuous process since the semester begin. At end of the semester, students will submit the project and project report. The internal and external evaluation will be based on developed app through viva-voce and presentation of the developed app. Students are expected to develop project individually. |
| Course Objective | 1) Enhance the skills.<br>2) To apply knowledge gained during the semester.<br>3) To understand project development phases.<br>4) To create in-house interactive web application using all technologies covered as part of the syllabus for selected Track.<br>Students will use applied knowledge based on T1-702, T1-703, T1-704 and T1-705 Courses. |
| Pre-requisite | T1-702, T1-703, T1-704 and T1-705 Courses. |
| Course outcome | - Students will be able to understand the concepts of styles and theme<br>- Knowledge of testing Apps and publishing Apps<br>- Students will have knowledge of Flutter for cross platform application development<br>- Knowledge of various technologies covered during the semester. |

# Course: FND-07

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| Course Code | FND-07 |
| Course Title | Foundation Elective |
| Credit | 2 |
| Duration | 24 to 30 hours course.<br>Students are required to submit the certificate and validate it through the Department head / In-charge Department Head before the internal Project viva. |
| Review / Revision | June – 2022 |
| Purpose of Course | Students are required to select any one from the following during the semester.<br>(i) NSS/ NCC participation at University/State/national level and produce the relevant certificate.<br>(ii) Representation at University/State/National level for any sports/cultural event (Under Saptdhara) and produce the certificate.<br>(iii) Choose any 2 –credit university recognized certificate course on any inter-disciplinary or subject related course and produce the certificate of completion. |
| Course Objective | 1) To enhance the skill apart from the regular curriculum.<br>2) To acquire additional knowledge and enhance their skill. |
| Pre-requisite | - |
| Course outcome | - Obtain an additional knowledge and upgrade.<br>- Obtain additional 2 credits from university.<br>- Enhance multi-disciplinary knowledge in different area apart from their core subjects.<br>- Multi-dimensional growth in different fields. |

# Veer Narmad South Gujarat University, Surat

## Program Structure: Fourth Year B.C.A.(Hons)

## (SEM – 7 and SEM – 8)

**(w.e.f. Academic Year June, 2022)**

**Bachelor of Computer Application (B.C.A.) – Three Year Program**

**Bachelor of Computer Application (B.C.A.(Hon.)) – Four Year Integrated Program**

# Track-2: Mobile Technology and App Development:

| **Program Structure** | Semester-wise break up for the courses is given below:<br>Student can opt any one Track out of give choices of Tracks. |
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**SEMESTER – 7 (Track-2)**

| Course Code | Title | Credit hours/week | | Total Hours Desirable/ semester (Including Tutorial) | Course Credits | University Examination | | Internal Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory | Practical | | | Duration | Marks | | |
| FND- 701 | Version Control and Database Management | 2 | 0 | 30 | 2 | 3 Hrs | 70 | 30 | 100 |
| T2-702 | Fundamentals of Mobile Application Development | 3 | 0 | 45 | 3 | 3 Hrs | 70 | 30 | 100 |
| T2-703 | Event and Media handling | 4 | 0 | 60 | 4 | 3 Hrs | 70 | 30 | 100 |
| T2-704 | Animation, Device and Components handling | 4 | 0 | 60 | 4 | 3 Hrs | 70 | 30 | 100 |
| T2-705 | Android API and Framework | 4 | 0 | 60 | 4 | 3 Hrs | 70 | 30 | 100 |
| T2-706 | Practical | - | 12 | 120 | 8 | 5 Hrs | 140 | 60 | 100 |
| T2-707 | Project | - | 6 | 60 | 4 | 5 Hrs | 70 | 30 | 200 |
| FND-07 | Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course and produce the evidence.) | - | - | - | 2 | - | - | - | - |
| Total | | | 18 | | 31 | | 560 | 240 | 800 |

**For Practical and Minor Project:**

(1) Batch Size – 30 (desirable) (Maximum: 40 students) (2) The journal should be certified by the concerned faculty and by the Head of the Department, failing which the student should not be allowed to appear for External Practical Examination. (3) Student will submit softcopy of Project duly certified by the internal guide.

**SEMESTER – 8**

| Course Code | Title | Teaching per week | | Course Credits | University Examination | | Internal Marks | Total Marks |
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| | | Theory | Project | | Duration | Marks | | |
| FND-08 | Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course) and produce the evidence. | - | - | 2 | - | - | - | - |
| T2-801 | Project | - | 12 | 12 | 3 Hrs | 280 | 120 | 400 |
| T2-802 | Core Elective | - | - | 3 | - | - | - | - |
| Total | | - | 12 | 17 | | 280 | 120 | 400 |

**For Project:** Students will individually develop a full scale project and submit progress report to their concerned internal guides every week. One hour load will be considered per every four students/week for Project work.

# Course: FND- 701: Version Control and Database Management

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| **Course Code** | **FND- 701** |
| **Course Title** | **Version Control and Database Management** |
| **Credit** | 2 |
| **Minimum hours per Semester** | 24 hrs. (Including class work, examination, preparation etc.) |
| **Review/Revision** | June 2022 |
| **Purpose of Course** | The version control of a database is required to share code, allowing multiple people/teams to access pieces of code, or a database, at the same time. Several problems like collaboration among employees, storing several versions of files being made, and data backing up can be solved using versioning each piece of code, so a history of changes can be kept. |
| **Course Objective** | The students will learn to modify and redistribute the database and keep track of changes using open-source version control systems like Git. Also, they will learn to package applications in containers, allowing them to be portable to any system using a Docker container software development platform. Finally, the concepts of data warehouse for data management system that is designed to enable and support business intelligence activities, especially analytics. |
| **Pre-requisite** | The Knowledge of RDBMS, Python, statistical methods, etc. |
| **Course outcome** | • Students will be able to build a strong conceptual understanding of the version control technology, understand necessary functionalities.<br>• To evaluate business needs, design a data warehouse, and integrate and visualize data using dashboards and visual analytics. |
| **Course Content** | **Unit-1:**<br>**1.3 Concepts of Version Control**<br>1.3.1 Purpose of Version Control System (VCS)<br>1.3.2 Types of VCS<br>1.3.3 Advantages and concepts<br>**1.4 Concepts of Gits and installation process**<br>1.4.1 Configuration of Gits<br>1.4.2 Create and Initialize project in Git<br><br>**Unit-2:**<br>**2.2 Concepts of GitHub**<br>2.2.1 Create GitHub<br>2.2.2 Create, Add and Commit repository<br>2.2.3 File states: Committed, Modified, Staged<br>2.2.4 Add and Commit files in Git<br>2.2.5 Pushing and Pulling repository to GitHub<br>2.2.6 Using branches in Git<br><br>**Unit-3:**<br>**3.1 Concepts of Docker:**<br>3.1.1 Purpose and significance of Docker<br>3.1.2 Installing and Setting the Docker<br>3.1.3 Docker Terminologies:<br>3.1.3.1 Images, Containers, Docker Daemon, Client, Hub<br>3.1.3.2 Docker Run, pull, ps<br>3.2 Webapps with Docker<br>3.2.1 Static sites and Docker Images (Base, Child, Official, User)<br>3.2.2 Dockerfile |

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| | **Unit-4:**<br>4.1 Concepts of Data Warehouse<br>4.1.1 Features and Types of Data Warehouse<br>4.1.2 Difference among OLAP and OLTP<br>4.2 Integrating heterogeneous Database<br>4.2.1 Advantages and Dis-advantages of Query-driven and Update-driven Apprroach.<br>4.2.2 Concepts of Data Warehouse Tools:<br>4.2.2.1 Extraction, Data Cleaning, Data Transformation<br>4.2.2.2 Data Loading<br>4.2.3 Important terminologies of Data Warehouse:<br>4.2.3.1 MetaData, Metadata Repository<br>4.2.3.2 Data Cube, Data Mart<br>4.3 Data Warehouse Process Flow:<br>4.3.1 Extract and load the data, Cleaning and transforming the data.<br>4.3.2 Backup and archive the data, Query management and directing to data sources.<br>4.4 Data Warehouse Architecture and Models:<br>4.4.1 Business Analysis Framework<br>4.4.2 3-tire Architecture, Virtual Warehouse, Data Mart<br>4.4.3 Enterprise Warehouse<br>4.5 Load Manager, Warehouse Manager and Query Manager<br>[All Units carry Equal Weightage] |
| **Reference Books** | 1. The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition, Ralph Kimball, Margy Ross , ISBN-13: 978-1118530801, Wiley Inc.<br>2. Database Systems: Introduction to Databases and Data Warehouses 1st Edition, Nenad Jukic, Susan Vrbsky, Svetlozar Nestorov, ISBN-13: 978-1943153190, Prospect Press<br>3. Building a Scalable Data Warehouse with Data Vault 2.0 - 1st Edition, Daniel Linstedt, Michael Olschimke, ISBN-13: 978-0128025109<br>4. Data Warehousing Fundamentals for IT Professionals 2nd Edition, Paulraj Ponniah, ISBN-13: 978-0470462072, Wiley Inc.<br>5. The Kimball Wiley Inc.Group Reader: Relentlessly Practical Tools for Data Warehousing and Business Intelligence Remastered Collection 2nd Edition, ISBN-13: 978-1119216315, Wiley Inc.<br>6. The Pragmatic Programmer: From Journeyman to Master 1st Edition, Andrew Hunt, David Thomas, ISBN-13: 978-0201616224<br>7. Code Complete 2e (Developer Best Practices), Steve Mcconnell, ISBN-13: 978-0735619678, Microsoft Press US<br>8. The Docker Book, James Turnbull , Publisher: James Turnbull; 1809 2nd edition<br>9. Docker in Action, 2nd Edition, Jeff Nickoloff, Stephen Kuenzli, ISBN-13: 978-1617294761<br>10. Learning Docker - Second Edition: Build, ship, and scale faster, Jeeva S. Chelladhurai, Vinod Singh, Pethuru Raj, ISBN-13: 978-1786462923<br>11. Docker: Up & Running, Karl Matthias, Sean P. Kane, ISBN-13: 978-1491917572 |
| **Teaching Methodology** | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| **Evaluation Method** | 30% Internal assessment.<br>70% External assessment. |

# Course: T2-702: Fundamentals of Mobile Application Development

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| Course Code | T2-702 |
| Course Title | Fundamentals of Mobile Application Development |
| Credit | 3 |
| Minimum hours per Semester | 36 hours |
| Review / Revision | June – 2022 |
| Purpose of Course | Mobile application development is the process of creating software applications that run on a mobile device, and a typical mobile application needs database to handle data of the mobile application. In a current scenario mobile application is used for multiple purpose. Hence the implementation of mobile applications with backend technology knowledge is required. Mobile application development process involves basic introduction of Android, its installation, different widgets supported by android, intent, activity and database handling. |
| Course Objective | 1) To understand the concept of Mobile technology<br>2) Developing basic application and hands-on grip on mobile user interface design<br>3) To understand various concepts of activity and building multiple screen application with the use of Intent in application.<br>4) Concepts of storing Android application data into database |
| Pre-requisite | Concepts of Mobile technology, Android studio, database and object oriented concepts are desirable. |
| Course outcome | - Students will be able to understand the concepts Android<br>- Knowledge of layout designing using different widgets<br>- Students will have knowledge of activity and intent<br>- Knowledge of storing data into database |
| Course Content | **Unit-1:**<br>1.1 Introduction of Android<br>1.1.1 Architecture of Android<br>1.1.2 Installation of Android and Android Emulator<br>1.1.3 Dalvik VM<br>1.2 Android Widgets:<br>1.2.1 Button, Toast, Custom Toast<br>1.2.2 CheckBox, RadioButton, AlertDialog<br>1.2.3 Spinner, ListView, TextView<br><br>**Unit-2:**<br>2.1 Advance Widgets:<br>2.1.1 WebView, RatingBar, TimePicker, DatePicker<br>2.1.2 ProgressBar, Vertical and Horizontal ScrollView<br>2.1.3 SeekBar, ImageSwitcher, ImageSlider<br>2.2 Table and Search:<br>2.2.1 TablLayout, FrameLayout<br>2.2.2 SearchView, SearchView on Toolbar<br>2.2.3 Text Exditing with TextWatcher<br><br>**Unit-3:**<br>3.1 Activity and Intents:<br>3.1.1 LifeCycle, Implicit Intent, Explicit Intent<br>3.1.2 StartActivityForResult<br>3.1.3 Share App Data |

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| | 3.2 Android Fragments<br>3.3 Android Menu<br>3.3.1 Option Menu<br>3.3.2 Context Menu<br>3.3.3 Popup Menu<br><br>**Unit-4:**<br>4.1 Database Handling:<br>4.1.1 Android AlarmManager<br>4.2 Read Data from Device Storage:<br>4.2.1 From Internal memory and External memory<br>4.2.1.1 FileInputStream, FileOutputStream<br>4.2.1 Preferences<br><br>**Unit-5:**<br>5.1 Database handling: SQLite<br>5.2 Database methods:<br>5.2.1 SQLiteOpenHelper class<br>(onCreate(), onUpgrade(), close() methods)<br>5.2.1.1 Handling database ( create, open, drop, close)<br>5.2.2 SQLiteDatabase class to handle SQL query:<br>execSQL(), insert(), update(), query()<br>5.2.2.1 Performing CRUD<br>5.2.3 getWritableDatabase() method<br>5.3 Handling Cursor<br>5.3.1 fetching data in list view |
| Reference Books | 1) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher:DreamTech Press.,ISBN:978-9351194095<br>2) Android Studio 3.0 Development Essentials: Android 8 Edition Author – Neil Smyth, Publisher: Payload Media, ISBN – 13: 978 – 1977540096<br>3) Android Programming for Beginners - Second Edition, Author:John Horton, Publisher: Image Short ISBN: 978-1789538502<br>4) Android 9 Development Cookbook, Author: Rick Boyer, Publisher: Packet Publishing, ISBN:978-1788991216<br>5) Professional Android – fourth Edition, Author: Reto Meier, Ian Lake, Publisher: Wrox, ISBN – 13:978-1118949528<br>6) Android Programming: Pushing the Limits 1st Edition, Author: Erik Hellman, Publisher: Wiley, ISBN – 13: 978-1118717370<br>7) Fundamentals of Android App Development : Android Development for Beginners to Learn Android Technology, SQLite, Firebase and Unity, Author: Sujit Kumar Mishra, Publisher: BPB Publication, ISBN: 978-93-89845-204<br>8) Starting with Android: Android application development guide 1st Edition, Author: Dr. M. M. Sharma, Publisher :BPB Publication, ISBN: 978-9386551955<br>9) Introducing SQLite for Mobile Developers 1st Edition, Author: Jesse Feiler, Publisher: Apress, ISBN : 978-1484217658<br>10) Android Programming Unleashed, Author: B. M. Harwani, Publisher: Pearson Education India, ISBN-13: 978-0-672-33628-7 |
| Teaching Methodology | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| Evaluation Method | 30% Internal assessment. 70% External assessment. |

# Course: T2-703: Event and Media handling

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| Course Code | T2-703 |
| Course Title | Event and Media handling |
| Credit | 4 |
| Minimum hours per Semester | 48 hrs. (Including class work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | Knowledge of handling events in Mobile application development is required to perform action in activity. Respond to user action is handled by Event. Extensible Markup Language (XML) is a set of rules for encoding documents in machine-readable form. XML is a popular format for sharing data on the internet. Android provides support to parse the JSON object and array. It is an alternative to XML. Hence knowing the syntax and its usability is important. Android also support Media handling classes and methods for audio and video files. Handling media in android application is latest trends. |
| Course Objective | 1) To understand the concept of event handling<br>2) To implement the concept of XML and JSON in android application<br>3) To understand various concepts of Media handling<br>4) Concepts of Media Recording and text to speech conversion |
| Pre-requisite | T2-702 : Fundamentals of Mobile Application Development |
| Course outcome | - Students will be able to understand the concepts of event handling<br>- Knowledge of XML Parsers and JSON<br>- Students will have knowledge of media handling<br>- Knowledge of Media Recording and text to speech conversion |
| Course Content | **Unit-1:**<br>1.1 Event Handling:<br>1.1.1 Input Events capturing<br>1.1.2 View Class and Event Listeners<br>1.2 Callback methods of Event Listener interface:<br>1.2.1 onClick(), OnKey(), OnTouch()<br>1.2.2 OnLongClick(), onFocusChange(), onCreateContextMenu()<br>1.3 Event Listeners Registration<br>1.4 Event Handlers:<br>1.4.1 onKeyDown(), onKeyUp(), onTrackballEvent()<br>1.4.2 onTouchEvent(), onFocusChanged()<br><br>**Unit-2:**<br>2.1 XML parsers:<br>2.1.1 Purpose of parsers<br>2.1.2 SAX (Simple API for XML) parser<br>2.1.3 Android DOM (Document object Model) parser<br>2.1.4 comparison among SAX and DOM<br>2.2 Structure of XML File<br>2.3 Parsing the XML file using SAX parser<br>2.4 Parsing the XML file using DOM parser<br>2.5 XMLPullParser and its methods to parse XML file<br><br>**Unit-3:**<br>3.1 JSON (Javascript Object Notation)<br>3.1.1 Comparing JSON with XML<br>3.1.2 Structure of JSON |

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| | 3.1.3 JSON object, array<br>3.2 JSON parsing<br>3.2.1 JSONArray class<br><br>**Unit-4:**<br>4.1 Handling Audio Files:<br>4.1.1 MediaPlayer class<br>4.1.1.1 Methods to handle Audio files: (start(),stop(),pause(), prepare(), setDataSource(), prepare(), isPlaying())<br>4.2 Handlng Video files:<br>4.2.1 MediaController and VideoView class<br>4.2.1.1 Methods to handle video files: (start(), pause(),suspend(), resume(), seekTo(), setMediaController(), setVideoURI())<br><br>**Unit-5:**<br>5.1 Media Recording<br>5.1.1 Sound and videoRecording:<br>5.1.1.1 recording sound and video<br>5.1.1.2 Storing in external folder<br>5.1.1.3 Use of MediaRecorder class<br>5.2 Audio Manager class:<br>5.2.1 Controlling volume and ringer<br>5.2.2 setRingerMode() method<br>5.2.3 Ringer Modes (Normal,Silent,Vibrate)<br>5.3 Convert Text to Speech:<br>5.3.1 TextToSpeech class<br>5.3.1.1 Important Methods: speak(), setSpeechRate(),<br>5.3.1.2 setPitch(), setLanguage(), shutdown(), stop()<br>5.3.2 OnInitListener Interface:<br>5.3.2.1 onInit() method<br>5.3.3 Controlling the speech methods:<br>5.3.3.1 setSpeechRate(), setPitch() |
| Reference Books | 1) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher:DreamTech Press.,ISBN:978-9351194095<br>2) Android Studio 3.0 Development Essentials: Android 8 Edition Author – Neil Smyth, Publisher: Payload Media, ISBN – 13: 978 – 1977540096<br>3) Android Programming for Beginners - Second Edition, Author:John Horton, Publisher: Image Short ISBN: 978-1789538502<br>4) Android Studio new Media Fundamentals: Content Production of Digital Audio/Video, Illustration and 3D Animation, Author: Wallace Jackson, Publisher: Apress, ISBN – 13: 978-1484216408<br>5) Android Programming: Pushing the Limits 1st Edition, Author: Erik Hellman, Publisher: Wiley, ISBN – 13: 978-1118717370<br>6) Android 9 Development Cookbook, Author: Rick Boyer, Publisher: Packet Publishing, ISBN:978-1788991216<br>7) JSON Quick Syntax Reference, Author: Wallace Jackson, Publisher: Apress, ISBN: 9781484218631<br>8) Beginning Json, Author: Ben Smith, Publisher: Apress, ISBN: 9781484240427<br>9) Java XML and JSON 1st ed. Edition. Author : Jeff Friesen, Publisher: Apress, ISBN – 13:978-1484219157<br>10) Android Programming Unleashed, Author: B. M. Harwani, Publisher: Pearson Education India, ISBN-13: 978-0-672-33628-7 |

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| | 11) Android Wireless Application Development: Advanced Topics ( Developer's Library) 3rd Edition, Author: Shane Conder, Publisher: Addison Wesley, ISBN-13: 978-0321813848 |
| Teaching Methodology | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| Evaluation Method | 30% Internal assessment. 70% External assessment. |

# Course: T2-704: Animation, Device and Components handling

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| Course Code | T2-704 |
| Course Title | Animation, Device and Components handling Using Android |
| Credit | 4 |
| Minimum hours per Semester | 48 hrs. (Including class work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | Now a days mobile application development has good animation and effects for attractive application. Different device and component also handled by so many applications. Knowledge of animations, intents, camera handling, Bluetooth and Wi-Fi connectivity, Google map, Android telephony and different sensors are highly required in Mobile Application Development is need of current era. |
| Course Objective | 1) To understand the concept of animation and effects<br>2) To implement the concept of Device and component handling<br>3) To understand concepts of MAP in Android application<br>4) Concepts of Android Telephony and Different sensors |
| Pre-requisite | T2-703 : Event and Media handling |
| Course outcome | - Students will be able to understand the concepts of animation and effects<br>- Knowledge of Device and component handling<br>- Students will have knowledge of using Google MAP in android application<br>- Knowledge of Android Telephony and Different sensors |
| Course Content | **Unit-1:**<br>1.1 Animations and Effects:<br>1.1.1 Load and Start animation<br>1.1.2 Applying different animations:<br>1.1.2.1 Zoom in-out, Fade in-out<br>1.1.2.2 Slide up-down, Rotate in-Out<br>1.1.2.3 Clockwise - Anti-Clockwise<br>1.2 Intents:<br>1.2.1 Concepts of Intents<br>1.2.2 Starting Activity and Service, Delivering broadcast<br>1.2.3 types of Intents: Implicit and Explicit<br>1.3 Handling Device Camera:<br>1.3.1 android.hardware.camera2 API<br>1.3.2 camera intent<br>**Unit-2:**<br>2.1 Purpose of Bluetooth<br>2.1.1 Bluetooth API<br>2.1.2 Checking Internet connection<br>2.2 Functionalities using Bluetooth API<br>2.2.1 Scan for the available Bluetooth devices within the range<br>2.2.2 Use local Bluetooth adapter for paired Bluetooth devices<br>2.2.3 Connect to other devices through service discovery<br>2.2.4 Transfer data to and from other devices using bluetooth<br>2.2.5 Manage multiple connections<br>2.3 Wi-Fi connectivity:<br>2.3.1 Scan for the available Wi-Fi networks within the range<br>2.3.2 Allow devices to connect to the internet<br>2.3.3 Connect to other devices through service discovery<br>2.3.4 Manage list of configured networks. |

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| | 2.3.5 Manage multiple connections<br><br>**Unit-3:**<br>3.1 Drag and Drop Framework:<br>3.1.1 Drag Event class<br>3.1.2 Drag Listeners<br>3.1.3 Helper methods and Class<br>3.2 Drag and Drop Process: (Start, continuing, Dropped, Ended)<br>3.3 Goolge Map android API:<br>3.3.1 Installing and Using Google Map API in android device<br>3.4 Sending Email through Android App<br>3.5 Sending sms using SMSManager API<br>3.6 SMS using Intent<br><br>**Unit-4:**<br>4.1 Androiod telephony:<br>4.1.1 android.telephony.TelephonyManager class for telephony service<br>4.1.2 Determining call state<br>4.1.3 Phone call by invoking default phone calls app using an Intent object<br>4.2 Sensors : Motion Sensors, Enviornmental Sensors, Position sensors<br>4.2.1 Sensor framework, frame work classes and interfaces<br>4.2.2 SensorManager, Sensor, SensorEvent, SensorEventListener<br><br>**Unit-5:**<br>5.1 Types of maps<br>5.2 Google Map API and its methods<br>5.2.1 addCircle(), addPolygon, addTileOverlay()<br>5.2.2 clear(), getMyLocation(), snapshot()<br>5.3 Displaying Current location<br>5.3.1 Callback methods<br>5.4 Searching location on Google Map<br>5.4.1 Using Geocoder class and its methods |
| Reference Books | 1) Advanced Android™ Application Development, Fourth Edition, Author: Joseph Annizzi Jr., Lauren Darcey, Shane Conder, Publisher: Addision Wesley Professional, ISBN : 9780133892420<br>2) Android 3.0 Animations : Beginner's Guide, Author: Alex Shaw, Publisher: PACKT Publishing, ISBN: 978-1-84951-528-3<br>3) Learning Android Google Map, Author: Raj Amal W., Publisher: Packt Publishing, ISBN: 9781849698863<br>4) Android Sensor Programming By Example, Author: Varun Nagpal, Publisher: Packt Publication, ISBN-13: 978-1785285509<br>5) Android Wireless Application Development: Advanced Topics ( Developer's Library) 3rd Edition, Author: Shane Conder, Publisher: Addison Wesley, ISBN-13: 978-0321813848<br>6) Professional Android 4th Edition, Author: Reto Meier, Publication: Wrox, ISBN – 13: 978-1118949528<br>7) Android 9 Development Cookbook, Author: Rick Boyer, Publisher: Packet Publishing, ISBN:978-1788991216 |

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| | 8) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher:DreamTech Press.,ISBN:978-9351194095<br>9) Android Studio 3.0 Development Essentials: Android 8 Edition Author – Neil Smyth, Publisher: Payload Media, ISBN – 13: 978 – 1977540096 |
| Teaching Methodology | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| Evaluation Method | 30% Internal assessment. 70% External assessment. |

# Course: T2-705 : Android API and Framework

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| Course Code | T2-705 |
| Course Title | Android API and Framework |
| Credit | 4 |
| Minimum hours per Semester | 48 hrs. (Including class work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | Knowledge of designing good application using styles and theme is highly required now a days. Along with that how to test the application and publishing Apps is also most important task. Knowledge about cross platform mobile application development on Android platform using Flutter and gradually on hybrid platform is need of the current era. React Native provides native UI controls and full access to the native platform. It Enhance the developer skill with all current industrial requirements. |
| Course Objective | 1) To understand the concept of styles and theme.<br>2) To understand concepts of testing Apps and publishing Apps<br>3) To understand concepts of Flutter<br>4) Concepts of React Native |
| Pre-requisite | T2-704 : Animation, Device and Components handling |
| Course outcome | - Students will be able to understand the concepts of styles and theme<br>- Knowledge of testing Apps and publishing Apps<br>- Students will have knowledge of Flutter for cross platform application development<br>- Knowledge of React Native |
| Course Content | **Unit-1:**<br>1.1 Android styles and theme:<br>1.1.1 Defining and using Style<br>1.1.2 Style Inheritance<br>1.2 Applying colors to Theme attributes<br>1.2.1 Nine-Patch Buttons<br>1.2.2 Applying Theme<br>1.3 Testing the App<br>1.3.1 Enable USB Debugging on Device<br>1.3.2 Build APK and Install on Device<br>1.4 Publishing App on Google Store:<br>1.4.1 Generate signed APK version of App<br>1.4.2 Registering Google Play store<br>1.4.3 Uploading signed APK<br><br>**Unit-2:**<br>2.1 Flutter Introduction:<br>2.1.1 Introduction, features , Advantages and Dis-Advnatages<br>2.1.2 Creating Flutter application in Android Studio<br>2.1.3 Architecture of Flutter Framework(Widgets,Gestures,States, Layers)<br>2.2 Categories of Widgets:<br>2.2.1 Platform specific widgets<br>2.2.2 Layout widgets<br>2.2.3 State maintenance widgets<br>2.2.4 Platform independent, basic widgets<br>2.3 Widget Layouts:<br>2.3.1 Single child widget<br>2.3.2 Multiple child widget |

2.4 Gestures and their events:
2.4.1 Gestures and their events:
Tap, Double Tap, Drag, Pinch, Spread/Zoom, Panning
2.4.2 Widgets for specific advacned Gestures:
Dismissible, Draggable, LonPressDraggable, DragTarget, IgnorePointer, AbsorbPointer, Scrollable
2.5 Navigation and Routing
2.5.1 State categories: Ephermeral , App State
2.5.2 Routing concepts and its relavant class and methods
2.5.2.1 MaterialPageRoute class
2.5.2.2 Navigator.push, Navigator.pop methods

**Unit-3:**

3.1 Flutter Animation system:
3.1.1 Animation Class :
Animation<double>, Animation<Color>, Animation<Size>, AnimationController
3.1.2 Non-linear Animation (CurvedAnimation)
3.2 Flutter framework Package
3.2.1 Categories : Dart Package, Flutter Package
3.2.2 Flutter Plugin Package
3.3 REST based Application:
3.3.1 htttp class functionality
3.3.1.1 methods: read, get, post, put, head, delete
3.3.1.2 Data access from Web server and display using ListView

**Unit-4:**

4.1 Working with Database:
4.1.1 use of sqlite package
4.1.2 Functionality of SQLite package:
create and open SQLite database
4.1.2 Execute SQL statements (CRUD operation)
4.1.3 Filter queries ( IN, Between, LIKE, NOT LIKE)
4.1.4 Internationalization
4.2 Testing and Deployment:
4.2.1 Automated testing of application
4.2.2 Types of Testing(Unit test, Widget Test, Integration test)
4.2.3 Deploying Flutter application in Android (Create Apk file)
4.2.4 Deploying Flutter application in iOS (Create apk file)

**Unit-5:**

5.1 Fundamentals of React Native:
5.1.1 Features, Advantages, Limitations
5.1.2 Installing and configuration
5.1.3 Creating basic app "hello world" using React Native
5.1.4 State, Props and Container Component
5.1.5 Container and Presentation Component
5.2 Layouts and components:
5.2.1 flexbox and properties
5.2.2 ListView, Text Input, ScrollView
5.2.3 Placing images, Buttons
5.3 React Native HTTP:
5.3.1 Handling network request using fetch
5.4 React Native Router:
5.4.1 Install router
5.4.2 Add Router
5.4.3 Create components

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| Reference Books | 1) Android Application Development (With Kitkat Support), Author: Pradeep Kothari, Publisher:DreamTech Press.,ISBN:978-9351194095<br>2) Advanced Android™ Application Development, Fourth Edition, Author: Joseph Annizzi Jr., Lauren Darcey, Shane Conder, Publisher: Addision Wesley Professional, ISBN : 9780133892420<br>3) Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart 2, Author: Alessandro Biessek, Packt Publishing House,ISBN:978-1788996082<br>4) Beginning Flutter: A Hands On Guide to App Development, Author: Marco L. Napoli, Publisher: Wrox, ISBN:978-1119550822<br>5) Practical Flutter: Improve your Mobile Development with Google's Latest Open-Source SDK ,Author: Frank Zammetti, Publisher: Apress, ISBN-13: 978-1484249710<br>6) Flutter Complete Reference: create beautiful, fast and native apps for any device, Author: Alberto Miola, Kindle Edition<br>7) React Native for Mobile Development: Harness the Power of React Native to Create Stunning iOS and Android Applications 2nd ed. Edition, Author: Akshat Paul, Publisher: Apress, ISBN – 13: 978-1484244531<br>8) React Native By Example: Native mobile development with React, Author: Richard Kho, Publisher: Packt Publication, ISBN – 13: 978-1786464750<br>9) React Native Cookbook: Recipes for solving common React Native development problems, 2nd Edition, Author: Dan Ward, Publisher: Packt Publication, ISBN – 13: 978-1788991926<br>10) React and React Native: A complete hands-on guide to modern web and mobile development with React.js, 3rd Edition, Author: Adam Boduch, Publisher: Packt Publication, ISBN – 13: 978-1839211140 |
| Teaching Methodology | Class Work, Discussion, Self-Study, Seminars and/or Assignments |
| Evaluation Method | 30% Internal assessment. 70% External assessment. |

# Course: T2-706: Practical

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|---|---|
| Course Code | T2-706 |
| Course Title | Practical |
| Credit | 8 |
| Practical / Week | 12 hours (Out of which 6 hours in supervised mode and 6 hours in un-supervised mode). |
| Minimum weeks per Semester | 15 Weeks (Including Lab work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | Knowledge of designing good application using styles and theme is highly required. Along with this, how to test the application and publish an App is also most important task. Knowledge about cross platform mobile application development on Android platform using Flutter and gradually on hybrid platform is need of the current era. React Native provides native UI controls and full access to the native platform. It Enhance the developer skill with all current industrial requirements. |
| Course Objective | 1) To understand the concept of styles and theme.<br>2) To understand concepts of testing Apps and publishing Apps<br>3) To understand concepts of Flutter<br>4) Concepts of React Native<br>Students will perform practical based on T2-702, T2-703, T2-704 and T2-705 Courses. |
| Pre-requisite | T2-702, T2-703, T2-704 and T2-705 Courses. |
| Course outcome | - Students will be able to understand the concepts of styles and theme<br>- Knowledge of testing Apps and publishing Apps<br>- Students will have knowledge of Flutter for cross platform application development<br>- Knowledge of React Native |

# Course: T2-707: Project

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|---|---|
| Course Code | T2-707 |
| Course Title | Project |
| Credit | 4 |
| Lab / Week | 6 hours (Out of which 3 hours in supervised mode and 3 hours in un-supervised mode). |
| Minimum weeks per Semester | 15 Weeks (Including Lab work, examination, preparation etc.) |
| Review / Revision | June – 2022 |
| Purpose of Course | During the semester, students undergo the applied technology related to mobile interactive app development. The syllabus cover various innovative technologies. To apply these technologies and enhance their acquired skills during semester; students will work on an in-house project. They are expected to develop an app covering all technical skills learnt during the semester. The project work will be in-house and continuous process since the semester begin. At end of the semester, students will submit the project and project report. The internal and external evaluation will be based on developed app through viva-voce and presentation of the developed app. Students are expected to develop project individually. |
| Course Objective | 1) Enhance the skills.<br>2) To apply knowledge gain during the semester.<br>3) To understand project development phases.<br>4) To create in-house interactive application using all technologies covered as part of the syllabus for selected Track.<br>Students will use applied knowledge based on T2-702, T2-703, T2-704 and T2-705 Courses. |
| Pre-requisite | T2-702, T2-703, T2-704 and T2-705 Courses. |
| Course outcome | - Students will be able to understand the concepts of styles and theme<br>- Knowledge of testing Apps and publishing Apps<br>- Students will have knowledge of Flutter for cross platform application development<br>- Knowledge of various technologies covered during the semester. |

# Course: FND-07

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|---|---|
| Course Code | FND-07 |
| Course Title | Foundation Elective |
| Credit | 2 |
| Duration | 24 to 30 hours course.<br>Students are required to submit the certificate and validate it through the Department head / In-charge Department Head before the internal Project viva. |
| Review / Revision | June – 2022 |
| Purpose of Course | Students are required to select any one from the following during the semester.<br>(i) NSS/ NCC participation at University/State/national level and produce the relevant certificate.<br>(ii) Representation at University/State/National level for any sports/cultural event (Under Saptdhara) and produce the certificate.<br>(iii) Opt any 2 –credit university recognized certificate course on any inter-disciplinary or subject related course and produce the certificate of completion. |
| Course Objective | 1) To enhance the skill apart from the regular curriculum.<br>2) To acquire additional knowledge and enhance their skill. |
| Pre-requisite | - |
| Course outcome | - Obtain an additional knowledge and upgrade.<br>- Obtain additional 2 credits from university for the selected option.<br>- Enhance multi-disciplinary knowledge in different area apart from their core subjects.<br>- Multi-dimensional growth in different fields. |

# Fourth Year B.C.A.(Hons.)

# Semester – VIII

| Course Code | Title | Teaching per week | | Course Credits | University Examination | | Internal Marks | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Project | | Duration | Marks | | |
| FND-08 | Foundation Elective (Mandatory to obtain 2 credits by selecting any one University approved 2 credit certificate course) and produce the evidence. | - | - | 2 | - | - | - | - |
| T2-801 | Project | - | 12 | 12 | 3 Hrs | 280 | 120 | 400 |
| T2-802 | Core Elective | - | - | 3 | - | - | - | - |
| Total | | - | 12 | 17 | | 280 | 120 | 400 |

For Project: Students will individually develop a full-scale project and submit progress report to their concerned internal guides every week. One hour load will be considered per every four students/week for Project work.

# Track-1

## Course: FND-08

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|---|---|
| Course Code | FND-08 |
| Course Title | Foundation Elective |
| Credit | 2 |
| Duration | 24 to 30 hours course.<br>Students are required to submit the certificate and validate it through the Department head / In-charge Department Head before the internal Project viva. |
| Review / Revision | June – 2022 |
| Purpose of Course | Students are required to opt any one from the following during the semester.<br>(i) NSS/ NCC participation at University/State/national level and produce the relevant certificate.<br>(ii) Representation at University/State/National level for any sports/cultural event (Under Saptdhara) and produce the certificate.<br>(iii) Opt any 2 –credit university recognized certificate course on any inter-disciplinary or subject related course and produce the certificate of completion. |
| Course Objective | 1) To enhance the skill apart from the regular curriculum.<br>2) To acquire additional knowledge and enhance their skill. |
| Pre-requisite | - |
| Course outcome | - Obtain an additional knowledge and upgrade.<br>- Obtain additional 2 credits from university.<br>- Enhance multi-disciplinary knowledge in different area apart from their core subjects.<br>- Multi-dimensional growth in different fields. |

# Course: T1-801: Project

| | |
|---|---|
| **Course Code** | T1-801 |
| **Course Title** | Project |
| **Credit** | 12 |
| **Duration** | Minimum 16 Weeks |
| **Duration** | Full time project |
| **Review / Revision** | June – 2022 |
| **Purpose of Course** | It is desirable that students join an organization (through Industry / Software firms / Any other relevant organization / internship with any software development organization) in process to apply their acquired knowledge related to their selected Track. Students will develop and deploy a reasonable size of project applying all relevant skills and understand the project development phases. |
| **Course Objective** | 1) To enhance the skill applying their acquired skills.<br>2) To apply their knowledge and develop a real life project.<br>3) To gain exposure related to industry/organizational environment.<br>4) To understand different phases of project development.<br>5) To include various other relevant technologies apart from the curriculum. |
| **Pre-requisite** | T1-702 to T1-705 |
| **Course outcome** | - Gain full time project development experience. It will enhance their skill, compatibility and real time experience. The exposure to develop a project will give them confidence and understand the need of an hour. It will help them to start their professional career in the field of computer and I.T. |

# Course: T1-802

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|---|---|
| Course Code | T1-802 |
| Course Title | Core Elective |
| Credit | 3 |
| Duration | Minimum 36 hours course.<br>Students are required to submit the certificate of completion and validate it through the Department head / In-charge Department Head before the internal Project viva. |
| Review / Revision | June – 2022 |
| Purpose of Course | Apart from the regular curriculum offered to the students, they are expected to get exposure from other relevant and upcoming technologies. Students will pursue any 3 credit course as per the modality suggested as follows.<br>Modality of Enrollment for the course:<br>Students are required to select and enroll core subject related 3-credit technical course recognized by Veer Narmad South Gujarat University or offered by any other UGC recognized University or IIT or IIM or NIT or ISRO or Any prominent University among top Hundred universities in world or offered by SWAYAM or offered by Department of ET&ICT.<br>Students need to complete this course successfully and submit completion certificate for verification to their HOD/In-charge HOD.<br>Students are required to take approval of their concerned faculty member and Department Head before pursuing the course. |
| Course Objective | 1) To enhance the skill apart from the regular curriculum.<br>2) To acquire additional knowledge and enhance their technical knowhow. |
| Pre-requisite | Basic technical Knowledge about selected certificate course. |
| Course outcome | - Obtain an additional knowledge and upgrade.<br>- Obtain additional 3 credits from university.<br>- Enhance technical skill and knowledge in relevant areas apart from their core subjects.<br>- Multi-dimensional growth in different fields. |

# Track-2

## Course: FND-08

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|---|---|
| Course Code | FND-08 |
| Course Title | Foundation Elective |
| Credit | 2 |
| Duration | 24 to 30 hours course.<br>Students are required to submit the certificate and validate it through the Department head / In-charge Department Head before the internal Project viva. |
| Review / Revision | June – 2022 |
| Purpose of Course | Students are required to opt any one from the following during the semester.<br>(i) NSS/ NCC participation at University/State/national level and produce the relevant certificate.<br>(ii) Representation at University/State/National level for any sports/cultural event (Under Saptdhara) and produce the certificate.<br>(iii) Opt any 2 –credit university recognized certificate course on any inter-disciplinary or subject related course and produce the certificate of completion. |
| Course Objective | 1) To enhance the skill apart from the regular curriculum.<br>2) To acquire additional knowledge and enhance their skill. |
| Pre-requisite | - |
| Course outcome | - Obtain an additional knowledge and upgrade.<br>- Obtain additional 2 credits from university.<br>- Enhance multi-disciplinary knowledge in different area apart from their core subjects.<br>- Multi-dimensional growth in different fields. |

# Course: T2-802: Project

| | |
|---|---|
| **Course Code** | T2-802 |
| **Course Title** | Project |
| **Credit** | 12 |
| **Duration** | Minimum 16 Weeks |
| **Duration** | Full time project |
| **Review / Revision** | June – 2022 |
| **Purpose of Course** | It is desirable that students join an organization (through Industry / Software firms / Any other relevant organization / internship with any software development organization) in process to apply their acquired knowledge related to their selected Track. Students will develop and deploy a reasonable size of project applying all relevant skills and understand the project development phases. |
| **Course Objective** | 1) To enhance the skill applying their acquired skills.<br>2) To apply their knowledge and develop a real life project.<br>3) To gain exposure related to industry/organizational environment.<br>4) To understand different phases of project development.<br>5) To include various other relevant technologies apart from the curriculum. |
| **Pre-requisite** | T2-702 to T2-705 |
| **Course outcome** | - Gain full time project development experience. It will enhance their skill, compatibility and real time experience. The exposure to develop a project will give them confidence and understand the need of an hour. It will help them to start their professional career in the field of computer and I.T. |

# Course: T2-802

| | |
|---|---|
| Course Code | T2-802 |
| Course Title | Core Elective |
| Credit | 3 |
| Duration | Minimum 36 hours course.<br>Students are required to submit the certificate of completion and validate it through the Department head / In-charge Department Head before the internal Project viva. |
| Review / Revision | June – 2022 |
| Purpose of Course | Apart from the regular curriculum offered to the students, they are expected to get exposure from other relevant and upcoming technologies. Students will pursue any 3 credit course as per the modality suggested as follows.<br>Modality of Enrollment for the course:<br>Students are required to select and enroll core subject related 3-credit technical course recognized by Veer Narmad South Gujarat University or offered by any other UGC recognized University or IIT or IIM or NIT or ISRO or Any prominent University among top Hundred universities in world or offered by SWAYAM or offered by Department of ET&ICT.<br>Students need to complete this course successfully and submit completion certificate for verification to their HOD/In-charge HOD.<br>Students are required to take approval of their concerned faculty member and Department Head before pursuing the course. |
| Course Objective | 1) To enhance the skill apart from the regular curriculum.<br>2) To acquire additional knowledge and enhance their technical knowhow. |
| Pre-requisite | Basic technical Knowledge about selected certificate course. |
| Course outcome | - Obtain an additional knowledge and upgrade.<br>- Obtain additional 3 credits from university.<br>- Enhance technical skill and knowledge in relevant areas apart from their core subjects.<br>- Multi-dimensional growth in different fields. |