C.B.C.S Pattern of B.A, B.Sc &B.Com
Syllabus and Examination Method
TELUGU (SECOND LANGUAGE)
1st Semester

ప్రాచీన పద్యభాగం.

1.శకుంతలోపాఖ్యానము

2.గొడగూచి

3.త్యాగనిరతి

ఆధునిక కవిత్వం

1.కాసులు

2.రాజు – కవి

3.గంగిరెద్దు.

4.జయభేరి

1. ఉపవాచకం

రుద్రమదేవి (నవల)

భాషా విభాగం

భాషా భాగాలు, సాధుశబ్దాల గుర్తింపు

పర్యాయపదాలు, నానార్థాలు.

పాఠ్యగ్రంథం: తెలుగుఅకాడమీ ప్రచురించిన సాహితీమంజీర. దీనిలోని రెండు పాఠాలు (సంవరణుని తపస్సు, శ్రీరంగక్షేత్ర మహిమ) ఉస్మానియావిశ్వవిద్యాలయ పరిధిలోని డిగ్రీ ద్వితీయభాష(తెలుగు), విద్యార్థులకు తొలగించి, వాటిని మాడర్న్ లాంగ్వేజ్ (తెలుగు)విద్యార్థులకు నిర్దేశించవైంది.

Code No. 1557

FACULTIES OF ARTS, COMMERCE, SCIENCE, MANAGEMENT & SOCIAL SCIENCES

B.A./B.Com./B.Sc./B.B.A./B.S.W I-Year I – Semester (CBCS) Examination,
December 2016

Subject : Telugu

Paper – I

Time : 3 Hours   Max. Marks : 80

భాగం — ఎ (5 x 4 = 20 Marks)

సూచన: ఏవేని ఐదు ప్రశ్నలకు సమాధానాలు వ్రాయుము.

1 ఈ క్రింది పదాలకు నానార్థాలు వ్రాయండి.

   1. సిరి   2. రాజు   3. నారి   4. అంబరము

2 ఈ క్రింది పదాలకు పర్యాయ పదాలు వ్రాయండి.

   1. సముద్రం   2. స్త్రీ   3. బంగారం   4. దేవాలయం

3 ఈ క్రింది వాక్యాలలో సూచించిన పదాలు ఏభాషాభాగాలలో గుర్తించండి.

   1. తెల్లని కలువ పూలతో గణపతిని పూజిస్తాము.

   2. ఆమె మంచి గాయని.

   3. రాముడు రావణాసురుని సంహరించాడు.

   4. నన్నయ మహాభారతం రచించాడు.

4 ఈ క్రింది వానిలో నాలుగింటికి సాధురూపాలు వ్రాయండి.

   1. కర్ణుడ   2. ఘడ్ఘము   3. రుషి   4. బావము

5 ఓరుగల్లు కోట గురించి వ్రాయండి.

6 నన్నయ గురించి వ్రాయండి.

7 జతపరచండి.

   1. శకుంతల   (   )   (a) శివదేవుడు

   2. జాషువా   (   )   (b) శ్రీశ్రీ

   3. రుద్రమదేవి   (   )   (c) దుష్యంతుడు

   4. కాసులు   (   )   (d) గణపతి దేవుడు

   5. జయభేరి   (   )   (e) బంగారు కొమ్ములు

   6. ఏనుగు   (   )   (f) గురజాడ

   7. గొడగూచి   (   )   (g) రాజు – కవి

   8. గంగిరెద్దు   (   )   (h) గజము

..2..

8 ఈ క్రింది పద్యానికి **భావం** వ్రాయండి.

వెలయంగ నశ్వమేధం

బులు వేయును నొక్క సత్యమును నిరుగడలం

దుల నిడి తూ ౼ పగ సత్యము

వలనన ములు సూపు గౌరవంబున పేర్మిన్

భాగం — బీ (5 × 12 = 60 Marks)

సూచన: అన్ని ప్రశ్నలకు జవాబులు వ్రాయుము.

9 ఈ క్రింది వానిలో ఒక పద్యానికి సమగ్రవ్యాఖ్యను వ్రాయండి.

(1) నుతజల పూరితంబులగు నూతులు నూటిటి కంటె సూన్యత

వ్రత యొక బావిమేలు మటి బావులు నూటిటికంటె నొక్కస

త్రక్తువది మేలు తత్క్రతు శతంబున కంటె సుతుండు మేలుత

త్సుత శతకంబు కంటె నొక సూన్నత వాక్యము మేలు సూడగన్

లేదా

(బి) అంబర రత్నబింబ మపరాంబుధిఁ జేరగ నెడ శైల శృం

గంబుల ధాతురాగముల కైవడిఁ గెంపు వహించెఁ జక్రవా

తంబులు తల్లడిల్లె విహగంబులు గుండ్లకు నేగఁ జొచ్చెఁ బ

ద్మంబులు వాడబాఱెఁ గుముదంబులు సొంపున కెక్కె నిక్కుచున్

10 ఈ క్రింది వానిలో అ–భాగం నుండి రెండింటికి, ఆ–భాగం నుండి రెండింటికి సందర్భసహిత వ్యాఖ్యలు వ్రాయండి.

అ – భాగం

1. తప్పబలుక నగునె ధార్మికులకు.

2. ప్రతిమ లేదు నిలిపె, బద్యమొకటి.

3. చాలవో యివి యాలపాలు గావనియె ?

4. హృద్యంబే కడున్ శీతమే.

ఆ – భాగం

1. నా పదవి వేళ్పుల రేని కెక్కడ ?

2. వసుధ మీ ఆడ బిడ్డల వంటివారు.

3. బావుటానె పైకి లేస్తాను !

4. సుకవి జీవించె ప్రజల నాలుకల యందు.

..3..

11 (ఎ) గొడగూచి ముగ్ధభక్తి గూర్చి తెలపండి.

లేదా

(బి) విక్రమార్కుని త్యాగనిరతిని గూర్చి తెలపండి.

12 (ఎ) "కాసులు" పాఠ్యాంశంలో గురజాడ తెలియజేసిన ప్రేమతత్త్వాన్ని వివరించండి.

లేదా

(బి) శ్రీ శ్రీ మ్రోగించిన "జయభేరి" కవితలోని విష్లవాన్ని తెలపండి.

13 (ఎ) రుద్రమ దేవిని గురించి వివరించండి.

లేదా

(బి) గోనబుద్ధారెడ్డి వీరత్వాన్ని గురించి వ్రాయండి.

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Mahatma Gandhi University, Nalgonda

C.B.C.S Pattern of B.A, B.Sc &B.Com
Syllabus and Examination Method
TELUGU (SECOND LANGUAGE)

2nd Semester

ప్రాచీన పద్యభాగం.

1. గజేంద్ర మొక్షము

2. హనుమత్సందేశము

3. సుభాషితములు

ఆధునిక కవిత్వం

1. అంతర్నాదము

2. ప్రపంచ పదులు

3. రోడ్డురోలర్

4. అల్విదా

వచన విభాగం

1. యుగాంతం

2. ఎంకన్న

3. మామిడి పండు

4. మా ఊరు పోయింది.

5. ఇదీ ఒక కళే – పేరులు దారులు గుర్తుంచుకోవడం.

భాషా విభాగం

సంధులు, సమాసాలు

Code No. 1558

FACULTY OF ARTS, COMMERCE, SCIENCE, MANAGEMENT & SOCIAL SCIENCES

B.A./B.Com./B.Sc./B.B.A./B.S.W I-Year II – Semester (CBCS) Examination, May / June 2017

Subject : Telugu

Paper – II

Time : 3 Hours

Max. Marks : 80

భాగం — ఎ (5 x 4 = 20 Marks)

సూచన: ఏవేని ఐదు ప్రశ్నలకు సమాధానాములు రాయండి.

1 ఈ క్రింది నాలుగు పదాలను విడదీసి సంధి పేర్లు రాయండి.

   1. షణ్మైక   2. నాగేంద్రము   3. సీతమ్మ   4. పేదరాలు

2 ఈ క్రింది రెండు సంధులకు లక్ష్యలక్షణ సమన్వయం చేయండి.

   1. సవర్ణదీర్ఘ సంధి   2. ఆమ్రేడిత సంధి

3 ఈ క్రింది నాలుగు సమాసాలకు విగ్రహవాక్యాలు రాసి ఏ సమాసాలో తెల్పండి

   1. దొంగ భయము   2. నీచమానవులు   3. మంజీరానది   4. సీతారాములు

4 ఈ క్రింది రెండు సమాసాలకు లక్ష్యలక్షణ సమన్వయం చేయండి.

   1. బహుప్రీహి సమాసం   2. ద్విగు సమాసం

5 "రోడ్డు రోలర్" కవిత సమాజానికి ఇచ్చిన సందేశాన్ని వివరించండి.

6 మామిడి పండుకు ఉన్న విభిన్నమైన పేర్లను, మామిడి పండ్లలో ఉన్న వివిధ రకాలను గురించి తెల్పండి.

7 జతపరచండి.

1 పోతన	( )	(a)	సినారె
2 మొల్ల	( )	(b)	ఫలరాజు
3 మామిడిపండు	( )	(c)	అల్వీదా
4 కృష్ణశాస్త్రి	( )	(d)	యుగాంతం
5 ప్రపంచపదులు	( )	(e)	ఏనుగులక్ష్మణకవి
6 దిలావర్	( )	(f)	రామాయణం
7 మఖ్దూమ్	( )	(g)	కృష్ణపక్షం
8 సుభాషితాలు	( )	(h)	గజేంద్రుడు

8 ఈ క్రింది వాక్యాల ఆధారంగా ఒక చిన్న కథను ఊహిస్తూ రాయండి.

    "పాపని చదివించాలి. ఎంత కష్టమైనా పరవాలేదు.

    నాలాగా కాకుండా నాపాపకి మంచి భవిష్యత్తు

    ఉండాలి అనుకుంది లక్ష్మి"

Code No. 1558

..2..

భాగం — బీ (5 x 12 = 60 Marks)

సూచన: అన్ని ప్రశ్నలకు సమాధానాలు రాయండి.

9 ఈ క్రింది వానిలో ఒక పద్యానికి సమగ్రవ్యాఖ్యను వ్రాయండి.

   (ఎ) రాముని డా౦ గురించి నిను రావణుడెత్తుక వచ్చువేళ నీ
       హేమ విభూషణావళుల నేర్పడ ఋష్య మహాద్రివైచినన్
       మేవవి తీసి దాచితిమి మీపతి యచ్చటి కేగు దేరగా ౦
       దామర సాప్తనందనుడు తానవి సూపిన జూచి మెచ్చుచున్

                        లేదా

   (బి) ఆకాశంబున నుండి శంభుని శిరంబందుండి శీతాద్రిసు
       శ్లోకంబైన హిమాద్రినుండి భువి, భూలోకంబునందుండియ
       స్తోకాంబోధి ౦ బయోధి నుండి పవనం ధోలోకముం జేరెగం
       గా కులంకష పెక్కుభంగులు వివేక భ్రష్ట సంపాతముల్

10 ఈ క్రింది వానిలో అ–భాగం నుండి రెండింటికి, ఆ–భాగం నుండి రెండింటికి సందర్భసహిత
   వ్యాఖ్యలు రాయండి.

                   అ – భాగం

   1. కలడు కలండనెడు వాడు కలడో లేడో
   2. వసుధా స్థలి వర్థిలు బ్రహ్మ కల్పముల్
   3. విద్య నెరుంగని వాడు మర్త్యుడే
   4. గజప్రాణావనోత్సాహియె

                   ఆ – భాగం

   1. జలధారల్ చల్ల చల్లార్చెదన్
   2. జన్మించిన సంచిని మరవకూడదు
   3. గీత శిల్పి వెళ్ళిపోయాడు
   4. మీది నుంచే దాటి పోతుంది

11 (ఎ) హనుమత్సందేశాన్ని గురించి వివరించండి.

                        లేదా

   (బి) సుభాషితముల ప్రయోజనాన్ని తెలపండి.

12 (ఎ) సినారె తన కవిత ద్వారా అందించిన సందేశమేమి ?

                        లేదా

   (బి) "అల్విదా"అన్న స్మృతిగీతంలో కౌముది మఖ్దామ్ను చిత్రీకరించిన విధానాన్ని వివరించండి.

13 (ఎ) సీతక్క, ఎంకన్నల మూగప్రేమను వర్ణించండి.

                        లేదా

   (బి) "పేర్లను గుర్తుంచుకోవడం ఒక కళ" అని ఇందిరాదేవి మనుషుల పేర్లను గురించి చెప్పిన విశేషాలేవి.

ప్రాచీన పద్యభాగం

1. ధర్మరాజు వాక్ చాతుర్యం .... తిక్కన

2. విభీషణ శరణాగతి .... గోన బుద్ధారెడ్డి

3. గుణనిధి కథ .... శ్రీనాథుడు

ఆధునిక పద్యభాగం

1. రైతు ప్రశస్తి ... వానమామలై జగన్నాధాచార్యులు

2. గురు దక్షిణ ... అంబటి లక్ష్మీనరసింహ రాజు

3. గుడిసెలు కాలిపోతున్నై ... బోయి భీమన్న

వచన విభాగం (నాటకం)

చలి చీమలు నాటకం ... పి.వి. రమణ

అలంకారాలు

శబ్దాలంకారాలు : వృత్త్యనుప్రాస, ఛేకానుప్రాస, లాటానుప్రాస, అంత్యానుప్రాస, యమకం, ముక్తపద(గ్రస్తాలంకారాలు.

అర్థాలంకారాలు : ఉపమ, ఉత్ప్రేక్ష, రూపక, స్వభావోక్తి, ఉల్లేఖ, అర్థాంతరన్యాస, శ్లేష, దృష్టాంతాలంకారాలు.

Translation

సిలబస్ (మార్గదర్శి)

ప్రాచీన పద్యభాగం

1. నారద గాన మాత్సర్యం .... పింగళి సూరన

2. వాగ్దాన భంగం .... ఆసూరి మరింగంటి వేంకట నరసింహాచార్యులు

3. నారసింహ శతకం ... ధర్మపురి శేషప్ప

ఆధునిక పద్యభాగం

1. నరుడా నేను నరుడా నేను .... కాళోజీ

2. ఆర్తగీతం ... తిలక్

3. దేవరకొండ దుర్గం ... డా॥ ముకురాల రామారెడ్డి

వచన విభాగం

1. అర్ధరాత్రి అరుణోదయం ... దాశరథి

2. సి.పి.బ్రౌన్ సాహిత్య సేవ ... జానుమద్ది హనుమచ్ఛాస్త్రి

3. మన గ్రామనామాలు ... డా॥ కపిలవాయి లింగమూర్తి

4. నివురు తొలగిన నిప్పు ... పోల్కంపల్లి శాంతాదేవి

5. కొండ మల్లెలు ... ఇల్లిందల సరస్వతీ దేవి

ఛందస్సు

పాఠ్య గ్రంథము లోనివి.

సామాజిక వ్యాసం.

B.A., /B.Com.,/ B.Sc., / B.B.A., (ద్వితీయ భాష) తెలుగు – మూడవ సెమిస్టర్

అ – భాగం

ఏవేని ఐదు ప్రశ్నలకు సమాధానం రాయాలి. (5 × 4 = 20)

1. వలవ దధిక దీర్ఘ వైర వృత్తి ..... సందర్భ సహిత వ్యాఖ్య రాయండి.

2. మరియాదలిట్టివి మా కులంబు నకు .... సందర్భ సహిత వ్యాఖ్య రాయండి.

3. లేచి ఎదురు తిరిగెనేని ఎదురు లేదు .... సందర్భ సహిత వ్యాఖ్య రాయండి.

4. ఇది మనధర్మంలోని రహస్యం .... సందర్భ సహిత వ్యాఖ్య రాయండి.

5. అంత్యాను(పాసాలంకారాన్ని ఉదాహరణతో వివరించండి.

6. తాతాచారి పాత్ర చిత్రణ

7. విభీషణుని గుర్చి రాయండి

8. ఈ క్రింది వాక్యాలను తెలుగులోనికి అనువదించండి.

To Terry Fox, the one-legged runner whose life was the antithesis of self-aggrand-izement, the thought he would be the first Canadian depicted on a circulating coin would be considered loony, Fox asked every Canadian for a dollar toward cancer research whern he dipped his prosthesis into the frigid of St.John's harbour on April 12, 1980 and began his cross Canada marathon.

ఆ – భాగం

ఈ క్రింది ప్రశ్నలకు సమాధానాలు రాయండి. (5 × 12 = 60)

9. ఈ క్రింది పద్యంలో ఒకదానికి సమగ్ర వ్యాఖ్యను రాయండి.

అ) కావున శాంతిబొందుటయు కర్ణము, దా నది యట్టులుండె; శ్రీ
    గావలె నంచు, బొంతము గామియు గోరెద; మెల్ల సొమ్ములుం
    బోవుటయిం గులక్షయము పుట్టుటయిన్ వెలిగాగ నొందుమై
    నే విధి నైన జక్కబడు టెంతయు నొప్ప జుమీ జనార్దనా!

ఆ) విడువక నీవు పట్టణము వీధుల వీధుల వెట్టివాడ వై
    చెడుగుల గూడి ధౌర్త్యములు సేయ మహీ రమణుండెటింగెనే
    విడుచును సోమయాజి మును వృత్తులు చేకొను నెల్లభంగులన్
    జెడుదుము నీకతంబు నను జీరయ గూడును లేక పుత్రకా

10. అర్జునుడు గురుదక్షిణ చెల్లించిన విధము వివరించండి.

> లేదా

రైతు ప్రశస్తి పాత్యాంశ సారాంశాన్ని వివరించండి.

11. చలిచీమలు నాటక నామౌచిత్యాన్ని వివరించండి.

> లేదా

చలిచీమలు నాటకంలో విశాలాక్షి పాత్రను విశ్లేషించండి.

12. చలిచీమలు నాటక కాలం నాటి సాంఘిక పరిస్థితులను తెలపండి.

> లేదా

చలిచీమలు నాటకంలో సురేశ్ పాత్ర గుణగణాలను వివరించండి.

13. స్వభావోక్తి, రూపక, ఉత్ప్రేక్ష అలంకారాల లక్ష్య లక్షణ సమన్వయం చేయండి.

<center>లేదా</center>

ఈ క్రింది పద్య పాదాలలోని అలంకారాలను, లక్షణాలను వివరించండి.

అ) పగయు గలిగె నేని బామున్న యింటిలో నున్న యట్ల గాక యూరడిల్లి

ఆ) పరమాత్ముడవు నీవ పరమంబు నీవ పరమ విద్యయు నీవ పరికింప నెందు

ఇ) వదల లేదు మాధవ మాధవ స్మృతులను

B.A., /B.Com.,/ B.Sc., / B.B.A., (ద్వితీయ భాష) తెలుగు – నాల్గవ సెమిస్టర్

అ – భాగం

ఏవేని ఐదు ప్రశ్నలకు సమాధానం రాయాలి. (5 × 4 = 20)

1. ఉత్తముల మహిమ నీరుకొలది తామర సుమ్మీ ..... సందర్భ సహిత వ్యాఖ్య రాయండి.

2. తెగు నా పాండవుల తోడ నిక బాంధవమున్ .... సందర్భ సహిత వ్యాఖ్య రాయండి.

3. చావు రాక మున్నే పిరికి; చావు చావలేను నేను .... సందర్భ సహిత వ్యాఖ్య రాయండి.

4. విధి ఇన్ని కత్తులను దూసినదేమీ? .... సందర్భ సహిత వ్యాఖ్య రాయండి.

5. ఆటవెలది పద్యాన్ని ఉదాహరణతో వివరించండి.

6. ధర్మపురి శేషప్ప కవి గురించి వివరించండి.

7. కొండమల్లెలు కథానిక నుండి పోచాలు పాత్రను పరిచయం చేయండి.

8. స్వచ్ఛభారత్‌పై మీ అభిప్రాయాన్ని ఒక కవిత ద్వారా తెలపండి.

ఆ – భాగం

ఈ క్రింది ప్రశ్నలకు సమాధానాలు రాయండి. (5 × 12 = 60)

9. ఈ క్రింది పద్యంలో ఒకదానికి సమగ్ర వ్యాఖ్యను రాయండి.

అ) వారిద పంక్తిలో వెడలివచ్చు మెఱుంగుల పిండి నా, సఖీ
   వారముతో రమారమణి వచ్చెను; హెగ్గెడి కత్తెలెందతో
   గోరి భజింప, నా కొలువు కూటము ముందటి వంక నొప్పు సం
   గారపు దోటనుండి   యధికంబగు వైభవ మింప మీఆఖగన్.

ఆ) కనుగవ కెంపు బార మది కల్వళ మంతకు బెంపుదేర, హె
   చ్చిన తమి మీర జెక్కగవ చెమ్మట జార ప్రలంబ వైరి పై
   తన కసిదీర పట్టువిడి తాలిమి దూర సరోష భీషణా
   నన మలరార, నా కమలనాభుని చెంతకు జేరి యిట్లనెన్.

10. దేవరకొండ దుర్గ వైభవాన్ని వివరించండి.

   లేదా

   తిలక్ ఆర్తగీతం ద్వారా వెలిబుచ్చిన అభిప్రాయాన్ని తెలపండి.

11. సి.పి.బ్రౌన్ సాహిత్య సేవను వివరించండి.

   లేదా

   1947 ఆగస్టు 15 కాలం నాటి హైదరాబాద్ పరిస్థితులను తెలపండి.

12. గ్రామానామాల అధ్యయనం వల్ల కలిగే ప్రయోజనాలను తెలపండి.

   లేదా

   నివురు తొలగిన నిప్ప కథానికలో రమణ పాత్ర గురించి రచయిత్రి భావాలు వివరించండి.

13. చంపకమాల, మత్తేభము, ద్విపద ఛందస్సుల లక్షణాలను ఉదాహరణతో వివరించండి.

   లేదా

ఈ క్రింది పద్య పాదాలలోని ఛందస్సును గుర్తించి లక్షణాలను రాయండి.

   అ) ఏనును దుంబురం దెచటి కేగె? గృహంబున నున్నవాడె? యం

   ఆ) వైకుంఠంబున నొక్కనాడతులితైశ్వర్యుండు విష్ణుండు నా

   ఇ) భరత ఖండంబు చక్కని పాడియావు.

Dept. of Mathematics
MAHATMA GANDHI UNIVERSITY, NALGONDA

Mathematics Course Structure

(B.Sc. Common Core Syllabus for the Students Admitted from the Academic Year 2019-2020 Batch onwards)

Contents

1 B.Sc. Course Structure Template

Telangana State Council of Higher Education
B.A/B.Sc. Mathematics Course Structure

(Common Core Syllabus for All Universities of Telangana State for the Students Admitted from the Academic Year 2019-20 Batch onwards)

Paper	Semester	Subject	Hours/ per week	Hours/per week		Max. Marks	Credits
				Theory	*Tutorials		
DSC - I	I	Differential & Integral Calculus	6	5	1	100	5
DSC - II	II	Differential Equations	6	5	1	100	5
DSC - III	III	Real Analysis	6	5	1	100	5
DSC - IV	IV	Algebra	6	5	1	100	5
DSC - V	V	Linear Algebra	6	5	1	100	5
DSE – VI(A)	VI	(A) Numerical Analysis	6	5	1	100	5
DSE – VI(B)	VI	(B) Integral Transforms	6	5	1	100	5
DSE – VI(C)	VI	(C) Analytical Solid Geometry	6	5	1	100	5
SEC-I	III	Theory of Equations	2	2	-	50	2
SEC-II	III	Logic & Sets	2	2	-	50	2
SEC-III	IV	Number Theory	2	2	-	50	2
SEC-IV	IV	Vector Calculus	2	2	-	50	2
Generic Elective	V-A*	1. Basic Mathematics or 2. Mathematics of Finance & Insurance	4	4	-	100	4
Project/ Optional	VI*	Mathematical Modelling	4	4	-	100	4

*Tutorials: Problems solving session for each 20 student's one batch.

1.1   Differential and Integral Calculus

(w.e.f. academic year 2019-20)

DSC-1A   **BS:101**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to some basic notions in differential calculus.
Outcome: By the time students complete the course they realize wide ranging applications of the subject.

Unit- I
Partial Differentiation: Introduction - Functions of two variables - Neighbourhood of a point (a, b) - Continuity of a Function of two variables, Continuity at a point - Limit of a Function of two variables - Partial Derivatives - Geometrical representation of a Function of two Variables - Homogeneous Functions.

Unit- II
Theorem on Total Differentials - Composite Functions - Differentiation of Composite Functions - Implicit Functions - Equality of $f_{xy}(a, b)$ and $f_{yx}(a, b)$ - Taylor's theorem for a function of two Variables - Maxima and Minima of functions of two variables – Lagrange's Method of undetermined multipliers.

Unit- III
Curvature and Evolutes: Introduction - Definition of Curvature - Radius of Curvature - Length of Arc as a Function, Derivative of arc - Radius of Curvature - Cartesian Equations - Newtonian Method - Centre of Curvature - Chord of Curvature.
Evolutes: Evolutes and Involutes - Properties of the evolute.
Envelopes: One Parameter Family of Curves - Consider the family of straight lines - Definition - Determination of Envelope.

Unit- IV
Lengths of Plane Curves: Introduction - Expression for the lengths of curves $y = f(x)$ - Expressions for the length of arcs $x = f(y)$; $x = f(t), y = \phi(t)$; $r = f(\theta)$
Volumes and Surfaces of Revolution: Introduction - Expression for the volume obtained by revolving about either axis - Expression for the volume obtained by revolving about any line - Area of the surface of the frustum of a cone - Expression for the surface of revolution - Pappus Theorems - Surface of revolution.

Text:

- Shanti Narayan, P.K. Mittal *Differential Calculus, S.CHAND, NEW DELHI*
- Shanti Narayan *Integral Calculus, S.CHAND, NEW DELHI*

References:

- William Anthony Granville, Percey F Smith and William Raymond Longley; *Elements of the differential and integral calculus*

- Joseph Edwards , *Differential calculus for beginners*
- Smith and Minton, *Calculus*

- Elis Pine, *How to Enjoy Calculus*
- Hari Kishan, *Differential Calculus*

———

1.2 Differential Equations

(w.e.f. academic year 2019-20)

DSC-1B **BS:201**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.

Outcome: After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science.

Unit- I

Differential Equations of first order and first degree: Introduction - Equations in which Variables are Separable - Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form - Linear Differential Equations - Differential Equations Reducible to Linear Form - Exact differential equations - Integrating Factors - Change in variables - Total Differential Equations - Simultaneous Total Differential Equations - Equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

Unit- II

Differential Equations first order but not of first degree: Equations Solvable for p - Equations Solvable for y - Equations Solvable for x - Equations that do not contain x (or y)- Equations Homogeneous in x and y - Equations of the First Degree in x and y - Clairaut's equation.
Applications of First Order Differential Equations : Growth and Decay - Dynamics of Tumour Growth - Radioactivity and Carbon Dating - Compound Interest - Orthogonal Trajectories
.

Unit- III

Higher order Linear Differential Equations: Solution of homogeneous linear differential equations with constant coefficients - Solution of non-homogeneous differential equations $P(D)y = Q(x)$ with constant coefficients by means of polynomial operators when $Q(x) = be^{ax}, b\sin ax/b\cos ax, bx^k, V e^{ax}$ - Method of undetermined coefficients.

Unit- IV

Method of variation of parameters - Linear differential equations with non constant coefficients - The Cauchy - Euler Equation - Legendre's Linear Equations - Miscellaneous Differential Equations.
Partial Differential Equations: Formation and solution- Equations easily integrable - Linear equations of first order.

Text:

- Zafar Ahsan, *Differential Equations and Their Applications*

References:

- Frank Ayres Jr, *Theory and Problems of Differential Equations.*

- Ford, L.R ; *Differential Equations.*

- Daniel Murray, *Differential Equations.*

- S. Balachandra Rao, *Differential Equations with Applications and Programs.*

- Stuart P Hastings, J Bryce McLead; *Classical Methods in Ordinary Differential Equations.*

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1.3   Real Analysis

(w.e.f. academic year 2020-21)

DSC-1C   **BS:301**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.
Outcome: After the completion of the course students will be in a position to appreciate beauty and applicability of the course.

Unit- I
Sequences: Limits of Sequences- A Discussion about Proofs-Limit Theorems for Sequences-Monotone Sequences and Cauchy Sequences -Subsequences-Lim sup's and Lim inf's-Series-Alternating Series and Integral Tests .

Unit- II
Continuity: Continuous Functions -Properties of Continuous Functions -Uniform Continuity -Limits of Functions

Unit- III
Differentiation: Basic Properties of the Derivative - The Mean Value Theorem - ⁎ L'Hospital Rule - Taylor's Theorem.

Unit- IV
Integration : The Riemann Integral - Properties of Riemann Integral-Fundamental Theorem of Calculus.

Text:

   • Kenneth A Ross,*Elementary Analysis-The Theory of Calculus*

References:

   • S.C. Malik and Savita Arora, *Mathematical Analysis, Second Edition, Wiley Eastern Limited, New Age International (P) Limited, New Delhi, 1994.*

   • William F. Trench, *Introduction to Real Analysis*
   • Lee Larson , *Introduction to Real Analysis I*

   • Shanti Narayan and Mittal, *Mathematical Analysis*

   • Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; *Elementary Real analysis*
   • Sudhir R., Ghorpade, Balmohan V., Limaye; *A Course in Calculus and Real Analysis*

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1.4 Algebra

(w.e.f. academic year 2020-21)

DSC-1D   **BS:401**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.

Outcome: On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects.

Unit- I

Groups: Definition and Examples of Groups- Elementary Properties of Groups-Finite Groups - Subgroups -Terminology and Notation -Subgroup Tests - Examples of Subgroups.

Cyclic Groups: Properties of Cyclic Groups - Classification of Subgroups Cyclic Groups.

Unit- II

Permutation Groups: Definition and Notation -Cycle Notation-Properties of Permutations -A Check Digit Scheme Based on D_5 Isomorphisms ; Motivation- Definition and Examples -Cayley's Theorem Properties of Isomorphisms -Automorphisms-Cosets and Lagrange's Theorem Properties of Cosets 138 - Lagrange's Theorem and Consequences-An Application of Cosets to Permutation Groups -The Rotation Group of a Cube and a Soccer Ball.

Unit- III

Normal Subgroups and Factor Groups: Normal Subgroups-Factor Groups -Applications of Factor Groups -Group Homomorphisms - Definition and Examples -Properties of Homomorphisms -The First Isomorphism Theorem.

Introduction to Rings: Motivation and Definition -Examples of Rings -Properties of Rings - Subrings.

Integral Domains: Definition and Examples - Fields –Characteristics of a Ring.

Unit- IV

Ideals and Factor Rings: Ideals -Factor Rings -Prime Ideals and Maximal Ideals.

Ring Homomorphisms: Definition and Examples-Properties of Ring- Homomorphisms.

Text:

- Joseph A Gallian, *Contemporary Abstract algebra (9th edition)*

References:

- Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R,*Basic Abstract Algebra*
- Fraleigh, J.B, *A First Course in Abstract Algebra.*

- Herstein, I.N, *Topics in Algebra*

- Robert B. Ash, *Basic Abstract Algebra*
- I Martin Isaacs, *Finite Group Theory*

- Joseph J Rotman, *Advanced Modern Algebra*

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1.5 Linear Algebra

(w.e.f. academic year 2021-22)

DSC-E   **BS:501**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The students are exposed to various concepts like vector spaces , bases , dimension, Eigen values etc.
Outcome: After completion this course students appreciate its interdisciplinary nature.

Unit- I
Vector Spaces: Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space

Unit- II
Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation

Unit- III
Diagonalization -Eigenvectors and Linear Transformations -Complex Eigenvalues - Applications to Differential Equations.

Unit- IV
Orthogonality and Least Squares : Inner Product, Length, and Orthogonality -Orthogonal Sets -Orthogonal Projections - The Gram-Schmidt Process.

Text:

- David C Lay,*Linear Algebra and its Applications* 4*e*

References:

- S Lang, *Introduction to Linear Algebra*

- Gilbert Strang , *Linear Algebra and its Applications*

- Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence; *Linear Algebra*

- Kuldeep Singh; *Linear Algebra*

- Sheldon Axler; *Linear Algebra Done Right*

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1.6   Numerical Analysis

(w.e.f. academic year 2021-22)

DSE-1F/A   **BS:601/A**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students will be made to understand some methods of numerical analysis.
Outcome: Students realize the importance of the subject in solving some problems of algebra and calculus.

Unit- I
Errors in Numerical Calculations - **Solutions of Equations in One Variable**: The Bisection Method - The Iteration Method - The Method of False Position-Newton's Method - Muller's Method - solution of Systems of Nonlinear Equations.

Unit- II
Interpolation and Polynomial Approximation: Interpolation - Finite Differences - Differences of Polynomials - Newton's formula for Interpolation - Gauss's central differences formulae - Stirling's and Bessel's formula - Lagrange's Interpolation Polynomial - Divided Differences - Newton's General Interpolation formula - Inverse Interpolation.

Unit- III
Curve Fitting: Least Square Curve Fitting: Fitting a Straight Line-Nonlinear Curve Fitting.
Numerical Differentiation and Integration: Numerical Differentiation - Numerical Integration: Trapezoidal Rule-Simpson's 1/3rd-Rule and Simpson's 3/8th-Rule - Boole's and Weddle's Rule - Newton's Cotes Integration Formulae.

Unit- IV
Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Picard's Method - Euler's Methods - Runge Kutta Methods.

Text:

• S.S.Sastry,*Introductory Methods of Numerical Analysis, PHI*

References:

• Richard L. Burden and J. Douglas Faires,*Numerical Analysis* (9*e*)

• M K Jain, S R K Iyengar and R K Jain, *Numerical Methods for Scientific and Engineering computation*

• B.Bradie , *A Friendly introduction to Numerical Analysis*

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1.7   Integral Transforms

(w.e.f. academic year 2021-22)

DSE - 1F/B   **BS:601/B**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students will be exposed to Integral Transforms. The students also learning the Applications of Laplace Transforms to Differential Equations which arises in Physics and Engineering Problems.
Outcome: Students apply their knowledge to solve some problems on special functions and Differential Equations by using the Integral Transforms.

Unit- I
Laplace Transforms-Definition-Existence theorem-Laplace transforms of derivatives and integrals – Periodic functions and some special functions.

Unit- II
Inverse Transformations - Convolution theorem - Heaviside's expansion formula.

Unit- III
Applications to ordinary differential equations - solutions of simultaneous ordinary differential equations - Applications to Partial differential equations.

Unit- IV
Fourier Transforms- Sine and cosine transforms-Inverse Fourier Transforms.

Text:

 • Vasishtha and Gupta,*Integral Transforms, Krishna Prakashan Media(P), Ltd,Meerut* (2*e*)

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1.8   Analytical Solid Geometry

(w.e.f. academic year 2021-22)

DSE - 1F/C   **BS:601/C**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students learn to describe some of the surfaces by using analytical geometry.
Outcome: Students understand the beautiful interplay between algebra and geometry.

Unit- I
Sphere: Definition-The Sphere Through Four Given Points-Equations of a Circle- Intersection of a Sphere and a Line-Equation of a Tangent Plane-Angle of Intersection of Two Spheres-Radical Plane.

Unit- II
Cones and Cylinders: Definition-Condition that the General Equation of second degree Represents a Cone-Cone and a Plane through its Vertex -Intersection of a Line with a Cone.

Unit- III
The Right Circular Cone-The Cylinder- The Right Circular Cylinder.

Unit- IV
The Conicoid: The General Equation of the Second Degree-Intersection of Line with a Conicoid-Plane of contact-Enveloping Cone and Cylinder.

Text:

• Shanti Narayan and P K Mittal,*Analytical Solid Geometry* (17*e*)

References:

• Khaleel Ahmed, *Analytical Solid Geometry*

• S L Loney , *Solid Geometry*

• Smith and Minton, *Calculus*

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1.9   Theory of Equations

(w.e.f. academic year 2020-21)

SEC-I

Theory: 2 credits
Theory: 2 hours /week

Objective: Students learn the relation between roots and coefficients of a polynomial equation, Descartes's rule of signs in finding the number of positive and negative roots if any of a polynomial equation bsides some other concepts.
Outcome: By using the concepts learnt the students are expected to solve some of the polynomial equations.

Unit- I
Graphic representation of a polynomial-Maxima and minima values of polynomials-Theorems relating to the real roots of equations-Existence of a root in the general equation -Imaginary roots-Theorem determining the number of roots of an equation-Equal roots-Imaginary roots enter equations in pairs-Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots.

Unit- II
Relations between the roots and coefficients-Theorem-Applications of the theorem-Depression of an equation when a relation exists between two of its roots-The cube roots of unity Symmetric functions of the roots-examples.

Text:

• W.S. Burnside and A.W. Panton,*The Theory of Equations*

References:

• C. C. Mac Duffee, *Theory of Equations*
• Hall and Knight , *Higher Algebra*

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1.10   Logic and Sets

(w.e.f. academic year 2020-21)

SEC - II

Theory: 4 credits and Tutorials: 0 credits
Theory: 4 hours /week and Tutorials: 1 hours /week

Objective: Students learn some concepts in set theory and logic.
Outcome: After the completion of the course students appreciate its importance in the development of computer science.

Unit- I
Basic Connectives and truth tables - Logical equivalence : Laws of Logic - Logical Implication : Rules Inference : The Use of Quantifiers - Quantifiers, Definitions, and proofs of Theorems.

Unit- II
Sets and Subsets - Set Operations and the Laws of Set Theory - Counting and Venn Diagrams - A First Word on Probability - The axioms of Probability - Conditional Probability: Independence - Discrete Random variables .

Text:

• Ralph P Grimaldi,*Discrete and Combinatorial Mathematics* (5*e*)

References:

• P R Halmos, *Na¨ıve Set Theory*
• E Kamke , *Theory of Sets*

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1.11   Number Theory

(w.e.f. academic year 2020-21)

SEC-III

Theory: 2 credits
Theory: 2 hours /week

Objective: Students will be exposed to some of the jewels like Fermat's theorem, Euler's theorem in the number theory.
Outcome: Student uses the knowledge acquired solving some divisor problems.

Unit- I
The Goldbach conjecture - Basic properties of congruences- Binary and Decimal Representation of Integers - Number Theoretic Functions; The Sum and Number of divisors- The Mobius Inversion Formula- The Greatest integer function.

Unit- II
Euler's generalization of Fermat's Theorem: Euler's Phi function- Euler's theorem Some Properties of the Euler's Phi function.

Text:

• David M Burton,*Elementary Number Theory* (7*e*)

References:

• Thomas Koshy, *Elementary Number Theory and its Applications*
• Kenneth H Rosen, *Elementary Number Theory*

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1.12   Vector Calculus

(w.e.f. academic year 2020-21)

SEC-IV

Theory: 2 credits
Theory: 2 hours /week

Objective: Concepts like gradient, divergence, curl and their physical relevance will be taught.
Outcome: Students realize the way vector calculus is used to addresses some of the problems of physics.

Unit- I
Line Integrals: Introductory Example - Work done against a Force-Evaluation of Line Integrals Conservative Vector Fields.
Surface Integrals: Introductory Example : Flow Through a PipeEvaluation of Surface Integrals.

Unit- II
Volume Integrals: Evaluation of Volume integrals
Gradient, Divergence and Curl: Partial differentiation and Taylor series-Partial differentiation Taylor series in more than one variable-Gradient of a scalar field-Gradients, conservative fields and potentials-Physical applications of the gradient.

Text:

• P.C. Matthews, *Vector Calculus*

References:

• G.B. Thomas and R.L. Finney, *Calculus*

• H. Anton, I. Bivens and S. Davis ; *Calculus*

• Smith and Minton, *Calculus*

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DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA
B.Sc. (PHYSICS) CBCS - SYLLABUS
With effective from 2016 – 2017
Paper Titles (Semester Wise) with Credits

YEAR	SEM	Paper [Theory and Practical]	COURSE TYPE	HRS/PER WEEK	CREDITS
FIRST	I SEM	Paper – I : Mechanics	DSC-1	4	4
		Practical – I : Mechanics	DSC-1A	2	1
	II SEM	Paper – II: Waves and Oscillations	DSC-2	4	4
		Practical – II : Waves and Oscillations	DSC-2A	2	1
SECOND	III SEM	Paper – III : Thermal Physics	DSC-3	4	4
		Practical – III : Thermal Physics	DSC-3A	2	1
	IV SEM	Paper – IV : Optics	DSC-4	4	4
		Practical – IV :Optics	DSC-4A	2	1
THIRD	V SEM	Paper –V : Electromagnetism	DSC-5	3	3
		Practical – V: Electromagnetism	DSC-5A	2	1
		Paper – VI : Elective – I A. Solid state physics B. Quantum Mechanics and Applications	DSE-1	3	3
		Practical – VI : Elective – I Practical A. Solid state physics B. Quantum Mechanics and Applications	DSE-1A	2	1
	VI SEM	Paper – VII : Modern Physics	DSC-6	3	3
		Practical – VII : Modern Physics	DSC-6A	2	1
		Paper – VIII: Elective – II A. Basic Electronics B. Physics of Semiconductor Devices	DSE-2	3	3
		Practical – VIII : Elective – II Practical A. Basic Electronics B. Physics of Semiconductor Devices	DSE-2A	2	1

Total Number of Credits: 36   **DSC: Discipline Specific Course (Core)**
                                            DSE: Discipline Specific Elective

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA
B.Sc. (Physics) Semester I-Theory Syllabus
Paper – I: Mechanics

60 hrs
(4 hrs / week)

Unit – I

Vector Analysis (15Hours)

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field and related problems. Vector integration, line, urface and volume integrals. Stokes, Gauss and Greens theorems- simple applications.

Unit – II

Mechanics of Particles (8Hours)

Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section,

Mechanics of rigid bodies (7Hours)

Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor. Euler's equation, precession of a top, Gyroscope,

Unit – III
Central forces (15Hours)

Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws, Coriolis force and its expressions.

UnitIV
Special theory of relativity (15Hours)

Galilean relativity, absolute frames, Michelson-Morley experiment, Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four vector formalism.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008*.
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007*.
3. **First Year Physics** - *Telugu Academy*.
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
Reference Books

1. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
2. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
3. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
4. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
5. **Mechanics**. Hans & Puri. *TMH Publications*.
6. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
7. R P Feymman, RB Lighton and M Sands - The Feymman Lectures in Physics, Vol.-1, BI Publications,
8. J.C. Upadhyay - Mechanics.
9. P.K. Srivastava - Mechanics, New Age International.

FIRST SEMISTER PRACTICALS

Practical Paper – I :: Mechanics

45 hrs
2hrs/week

1. Study of a compound pendulum determination of 'g' and 'k'.
2. Y' by uniform Bending
3. Y by Non-uniform Bending.
4. Moment of Inertia of a fly wheel.
5. Measurement of errors –simple Pendulum.
6. 'Rigidity moduli by torsion Pendulum.
7. Determination of surface tension of a liquid   through capillary rise method.
8. Determination of Surface Tension of a liquid by different methods.
9. Determination of Viscosity of a fluid.
10. Calculation of slope and intercept of a Y= mX +C by theoretical method

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani
Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Workshop and Flint- Advanced Practical physics for students.
 4. "Practical Physics" R.K Shukla, Anchal Srivastava
5. Practical Physics" Induprakash and Ramakrishna

B.Sc. (Physics)Semester II-Theory Syllabus
Paper – II: Waves and Oscillations

60 hrs
(4 hrs / week)

Unit – I

Fundamentals of vibrations (15Hours)

Simple harmonic oscillator, and solution of the differential equation– Physical characteristics of SHM, torsion pendulum, - measurements of rigidity modulus , compound pendulum, measurement of 'g', combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies, Lissajous figures

Unit – II

Damped and forced oscillations (15 Hours)

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with undamped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance, velocity resonance. Coupled Oscillators.

Unit – III

Vibrating Strings (15 Hours)

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport, transverse impedance

Unit – IV

Vibrations of bars (15 Hours)

Longitudinal vibrations in bars- wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the midpoint iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar- wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

NOTE: Problems should be solved at the end of every chapter of all units.

Text books and Reference books

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008*.
2. **Fundamentals of Physics**. Halliday/Resnick/Walker *Wiley India Edition 2007*.
3. **First Year Physics** - *Telugu Academy*.
4. **Introduction to Physics for Scientists and Engineers**. F.J. Ruche. *McGraw Hill*.
5. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
6. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.

7. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
8. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
9. **Mechanics**. Hans & Puri. *TMH Publications*.
10. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
11. **The Feymman Lectures in Physics, Vol.-1**, R P Feymman, RB Lighton and M Sands, BI Publications,
12. **Mechanics**-P.K. Srivastava - New Age International.

45hrs
2hrs/week

SECOND SEMISTER PRACTICALS
Practical Paper – II :: Waves and Oscillations

1. Study of damping of an oscillating disc in Air and Water logarithmic decrement.
2. Study of Oscillations under Bifilar suspension.
3. Study of oscillations of a mass under different combination of springs.
4. Verification of Laws of a stretched string (Three Laws).
5. Determination of frequency of a Bar-Melde's experiment.
6. Observation of Lissajous figures from CRO.
7. Volume Resonator –determination of frequency of a tuning fork.
8. Velocity of Transverse wave along a stretched string.
9. Study of damping of a bar pendulum
10. Study of coupled oscillator.

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books
1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani
 Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

B.Sc. (Physics)Semester III-Theory Syllabus   **60 hrs**
Paper – III: Thermal Physics   (4 hrs / week)

Unit – I

Kinetic theory of gases: (6 Hours)

Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

Thermodynamics: (9 Hours)

Basics of thermodynamics-Kelvin's and Claussius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature- Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

Unit – II

Thermodynamic potentials and Maxwell's equations: (8 Hours)

Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

Low temperature Physics: (7 Hours)

Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type.

Unit – III

Quantum theory of radiation: (15 Hours)

Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law, Rayleigh-Jeans law, Stefan's law from Planck's law.
Measurement of radiation using pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyroheliometer - determination of solar constant, effective temperature of sun.

Unit – IV

Statistical Mechanics: (15 Hours)

Introduction, postulates of statistical mechanics. Phase space, concept of ensembles and some known ensembles ,classical and quantum statistics and their differences, concept of probability, Maxwell-Boltzmann's distribution law -Molecular energies in an ideal gas- Maxwell-Boltzmann's velocity distribution law, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws, Application of B-E distribution to Photons-planks radiation formula, Application of Fermi-Dirac statistics to white dwarfs and Neutron stars.

Textbooks
1. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
2. **Second Year Physics** – *Telugu Academy.*
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co*.

Reference Books

1. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education*.
2. Berkeley Physics Course. Volume-5. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies*.
3. **An Introduction to Thermal Physics** by Daniel V. Schroeder.*Pearson Education Low Price Edition*.
4. **Thermodynamics** by R.C. Srivastava, Subit K. Saha&Abhay K. *Jain Eastern Economy Edition*.
5. **Feyman's Lectures on Physics** Vol. 1,2,3& 4. *Narosa Publications*.
6 .B.B. Laud **"Introduction to statistics Mechanics"** (Macmillan 1981)
7. F.Reif**:"Statistical Physics "**(Mcgraw-Hill, 1998)
8. K.Haung: "**Statistical Physics "**(Wiley Eastern 1988)

Practical Paper – III :: Thermal Physics

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Calibration of thermo couple
6. Cooling Curve of a metallic body
7. Resistance thermometer
8. Thermal expansion of solids
9. Study of conversion of mechanical energy to heat.
10. Determination of the Specific of a solid (graphite rod)

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragathi Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

B.Sc. (Physics)Semester IV-Theory Syllabus
Paper – IV: Optics

60 hrs
(4 hrs / week)

Unit I

Interference: (15 Hours)

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light

<u>Interference by division of wave front</u>: Fresnel's biprism – determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd's mirror experiment.

<u>Interference by division of amplitude</u>: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire- Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes) – Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1, D_2 lines and thickness of a thin transparent plate.

Unit II:

Diffraction: (15 Hours)

Introduction – Distinction between Fresnel and Fraunhoffer diffraction Fraunhoffer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhoffer diffraction due to double slit – Fraunhoffer diffraction pattern with N slits (diffraction grating).Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel's diffraction-Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

Unit I1I:

Polarization (15 Hours)

Polarized light : Methods of Polarization, Polarization by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewster's law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

Unit IV:

Aberrations and Fiber Optics : (15 Hours)

Introduction – Monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration – the achromatic doublet – Removal of chromatic aberration of a separated doublet.

Fiber Optics : Introduction – Optical fibers – Types of optical fibers – Step and graded index fibers – Rays and modes in an optical fiber – Fiber material – Principles of fiber communication and advantages of fiber communication.

NOTE: Problems should be solved at the end of every chapter of all units.

Textbooks

1.Optics by Ajoy Ghatak. *The McGraw-Hill companies*.
2.Optics by Subramaniyam and Brijlal. *S. Chand & Co*.
3.Fundamentals of Physics. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
4.Optics and Spectroscopy. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co*.
5.Second Year Physics – *Telugu Academy.*

Reference Books

1. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand& Co. Publications*.
2. **Feyman's Lectures on Physics** Vol. 1,2,3& 4. *Narosa Publications*.
3. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*
4. K. Ghatak, **Physical Optics'**
5. D.P. Khandelwal, Optical and Atomic Physics' (Himalaya Publishing House, Bombay,1988)
 7. Smith and Thomson: 'Optics' (John Wiley and sons)

FOURTH SEMISTER PRACTICALS

Practical Paper – IV :: Optics

1. Thickness of a wire using wedge method.
2. Determination of wavelength of light using Biprism.
3. Determination of Radius of curvature of a given convex lens by forming Newton's rings.
4. Resolving power of grating.
5. Study of optical rotation-polarimeter.
6. Dispersive power of a prism
7. Determination of wavelength of light using diffraction grating minimum deviation method.
8. Wavelength of light using diffraction grating – normal incidence method.
9. Resolving power of a telescope.
10. Refractive index of a liquid and glass (Boy's Method).
11. Pulfrich refractometer – determination of refractive index of liquid.
12. Wavelength of Laser light using diffraction grating.

Note: Minimum of eight experiments should be performed Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Text and reference books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Workshop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA
B.Sc. (Physics)Semester V-Theory Syllabus　　**42 hrs**
Paper – V : Electromagnetism　　**(3 hrs / week)**

(DSE- Compulsory*)*

Unit I : Electrostatics (11 hrs)

Electric Field:- Concept of electric field lines and electric flux, Gauss law (Integral and differential forms), application to linear, plane and spherical charge distributions. Conservative nature of electric field E, irrotational field. Electric Potential: - Concept of electric potential, relation between electric potential and electric field, potential energy of a system of charges. Energy density in an electric field. Calculation of potential from electric field for a spherical charge distribution.

Unit II: Magnetostatics (12 hrs)

Concept of magnetic field B and magnetic flux, Biot-Savart's law, B due to a straight current carrying conductor. Force on a point charge in a magnetic field. Properties of B, curl and divergence of B, solenoid field. Integral form of Ampere's law, applications of Ampere's law: field due to straight, circular and solenoid currents. Energy stored in magnetic field. Magnetic energy in terms of current and inductance. Magnetic force between two current carrying conductors. Magnetic field intensity. Ballistic Galvanometer: - Torque on a current loop in a uniform magnetic field, working principle of B.G., current and charge sensitivity, electromagnetic damping, critical damping resistance.

Unit III: Electromagnetic Induction (9 hrs)

Faraday's laws of induction (differential and integral form), Lenz's law, self and mutual Induction. Continuity equation, modification of Ampere's law, displacement current, Maxwell equations

Unit IV: Electromagnetic waves (10 hrs)

Maxwell's equations in vacuum and dielectric medium, boundary conditions, plane wave equation: transverse nature of EM waves, velocity of light in vacuum and in medium, polarization, reflection and transmission. Polarization of EM waves, Brewster's angle, description of linear, circular and elliptical polarization.

Text Books
1. Fundamentals of electricity and magnetism By Arthur F. Kip (McGraw-Hill, 1968)

 2. Electricity and magnetism by J.H.Fewkes & John Yarwood. Vol. I (Oxford Univ. Press, 1991).

3. Introduction to Electrodynamics, 3rd edition, by David J. Griffiths, (Benjamin Cummings,1998).

Reference Books
4. Electricity and magnetism By Edward M. Purcell (McGraw-Hill Education, 1986)
5. Electricity and magnetism. By D C Tayal (Himalaya Publishing House,1988)
6. Electromagnetics by Joseph A.Edminister 2nd ed.(New Delhi: Tata Mc Graw Hill, 2006).

<u>V SEMISTER</u> Practicals Paper – V : Electromagnetism

PHYSICS LABORATORY
1. To verify the Thevenin Theorem
2. To verify Norton Theorem
3. To verify Superposition Theorem
4. To verify maximum power transfer theorem.
5. To determine a small resistance by Carey Foster's bridge.
6. To determine the (a) current sensitivity, (b) charge sensitivity, and (c) CDR of a B.G.
7. To determine high resistance by leakage method.
8. To determine the ratio of two capacitances by De Sauty's bridge.
9. To determine self-inductance of a coil by Anderson's bridge using AC.
10. To determine self-inductance of a coil by Rayleigh's method.
11. To determine coefficient of Mutual inductance by absolute method.

Note: Minimum of eight experiments should be performed.

Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books for Reference

1. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New Delhi.
2. Indu Prakash and Ramakrishna, A Text Book of Practical Physics, Kitab Mahal

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA
B.Sc. (Physics)Semester V-Theory Syllabus   **42 hrs**
Paper-VI-A – Solid State Physics   **(3hrs / week)**

(DSE- Elective-I)

Unit-I (11hrs)

Crystal Structure: Solids Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis – Central and Non-Central Elements. Unit Cell. Miller Indices. Types of Lattices, Reciprocal Lattice. Brillouin Zones. Diffraction of X-rays by Crystals. Bragg's Law. Atomic and Geometrical Factor.

Elementary Lattice Dynamics: Lattice Vibrations and Phonons: Linear Monoatomic and Diatomic Chains. Acoustical and Optical Phonons. Qualitative Description of the Phonon Spectrum in Solids. Dulong and Petit's Law, Einstein and Debye theories of specific heat of solids. T^3 law

Unit-II (11 hrs)

Magnetic Properties of Matter: Dia-, Para-, Ferri- and Ferromagnetic Materials. Classical Langevin Theory of dia–and Paramagnetic Domains. Curie's law, Weiss's Theory of

Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss.

Dielectric Properties of Materials: Polarization. Local Electric Field at an Atom. Depolarization Field. Electric Susceptibility. Polarizability. Clausius Mosotti Equation. Classical Theory of Electric Polarizability.

Unit-III (10 hrs)

Elementary band theory: Kronig Penny model. Band Gap. Brillouin zones, effective mass of electron. Conductor, Semiconductor (P and N type) and insulator. Conductivity of Semiconductor, mobility, Hall Effect, Electric Conductivity by four probe method & Hall coefficient.

UNIT IV (10 hrs)

Lasers: Einstein's A and B coefficients. Metastable states. Spontaneous and Stimulated emissions. Optical Pumping and Population Inversion. Three-Level and Four-Level Lasers. Ruby Laser and He-Ne Laser.

Superconductivity: Experimental Results. Critical Temperature. Critical magnetic field. Meissner effect. Type I and type II Superconductors, London's Equation and Penetration Depth. Isotope effect. Idea of BCS theory. D.C and A.C Josephson effects.

Text Books:
1. Solid-state Physics, H. Ibach and H. Luth, 2009, Springer
2. Elementary Solid State Physics, 1/e M. Ali Omar, 1999, Pearson India
3. Solid State Physics, M.A. Wahab, 2011, Narosa Publications
4. Solid State Physics – S. O. Pillai (New Age Publication)
5. Modern Physics by R.Murugesham

Reference Books:
1. Introduction to Solid State Physics, Charles Kittel, 8th Edition, 2004, Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, 2nd Edition, 2006, Prentice-Hall of India
3. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill
4. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning
5. Solid State Physics- R.K.Puri &V.K. Babbar (S.Chand Publication)2013
6. Lasers and Non linear Optics –B.B.Laud-Wiley Eastern.
7. LASERS: Fundamentals and Applications – Thyagarajan and Ghatak (McMillanIndia)

36 hrs
2hrs/week

V SEMISTER Practicals Paper – VI A
Solid State Physics

1. Measurement of susceptibility of paramagnetic solution (Quinck`s Tube Method)
2. To measure the Magnetic susceptibility of Solids.
3. To determine the Coupling Coefficient of a Piezoelectric crystal.
4. To measure the Dielectric Constant of a dielectric Materials with frequency
5. To study the PE Hysteresis loop of a Ferroelectric Crystal.
6. To draw the BH curve of Fe using Solenoid & determine energy loss from Hysteresis.
7. To measure the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 150^0 C) and to determine its band gap.
8. To determine the Hall coefficient of a semiconductor sample.
9. Calculation of d-values of a given Laue"s pattern.

10. Calculation of d-values of powder diffraction method.

12. To study the spectral characteristics of a Photo- Voltaic cell.

13. Verification of Bragg"s equation.

Reference Books
• Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
• Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
• A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
• Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006, Prentice-Hall of India

42 hrs
(3 hrs / week)

Paper-VI-B – QUANTUM MECHANICS AND APPLICATIONS

(DSE- Elective-I)

Unit-I (11 hrs)

Schrodinger equation & the operators: Time dependent Schrodinger equation and dynamical evolution of a quantum state; Properties of Wave Function. Interpretation of Wave Function Probability and probability current densities in three dimensions; Conditions for Physical Acceptability of Wave Functions. Normalization. Linearity and Superposition Principles. Hermitian operator, Eigen values and Eigen functions. Position, momentum and Energy operators; commutator of position and momentum operators; Expectation values of position and momentum. Wave Function of a Free Particle.

Unit II (11 hrs)

Time independent Schrodinger equation-Hamiltonian, stationary states and energy eigen values; expansion of an arbitrary wave function as a linear combination of energy eigen functions; General solution of the time dependent Schrodinger equation in terms of linear combinations of stationary states; Application to spread of Gaussian wave-packet for a free particle in one dimension; wave packets, Fourier transforms and momentum space wave function; Position-momentum uncertainty principle.

Unit-III (10 hrs)

General discussion of bound states in an arbitrary potential- continuity of wave function, boundary condition and emergence of discrete energy levels; application to one-dimensional problem-square well potential; Quantum mechanics of simple harmonic oscillator-energy levels and energy eigen functions ground state, zero point energy & uncertainty principle. One dimensional infinitely rigid box- energy eigen values and eigen functions, normalization; Quantum dot as example; Quantum mechanical scattering and tunneling in one dimension across a step potential & rectangular potential barrier.

Unit-IV (10 hrs)

Atoms in Electric & Magnetic Fields: Electron angular momentum. Space quantization. Electron Spin and Spin Angular Momentum. Larmor's Theorem. Spin Magnetic Moment. SternGerlach Experiment. Zeeman Effect: Electron Magnetic Moment and Magnetic Energy, Gyromagnetic Ratio and Bohr Magneton. Atoms in External Magnetic Fields:- Normal and Anomalous Zeeman Effect. Paschen Back and Stark Effect (Qualitative Discussion only).

Text Books:
1. A Text book of Quantum Mechanics, P. M.Mathews and K.Venkatesan, 2nd Ed., 2010, McGraw Hill
2. Quantum Mechanics, Robert Eisberg and Robert Resnick, 2nd Edn., 2002, Wiley.
3. Quantum Mechanics, Leonard I. Schiff, 3rd Edn. 2010, Tata McGraw Hill.

Reference Books:
1. Quantum Mechanics, G. Aruldhas, 2nd Edn. 2002, PHI Learning of India.
2. Cohen-Tannoudji, B Diu and F Laloë, Quantum Mechanics (2 vols) Wiley-VCH 1977 • Basic Quantum Mechanics –A.Ghatak (Mc Millan India) 2012
3. Introduction to Quantum Mechanics, D.J. Griffith, 2nd Ed. 2005, Pearson • Quantum Physics----S. Gasiorowicz (Wiley India) 2013

36 hrs
2hrs/week

V – SEMESTER   Practicals Paper – VI B
Quantum Mechanics and Applications

 Use C/C++/Scilab for solving the following problems based on Quantum Mechanics like
1. Solve the s-wave Schrodinger equation for the ground state and the first excited state of the hydrogen atom: Here, m is the reduced mass of the electron. Obtain the energy eigenvalues and plot the corresponding wave functions. Remember that the ground state energy of the hydrogen atom is ≈ -13.6 eV. Take e = 3.795 (eVÅ)1/2, ħc = 1973 (eVÅ) and m = 0.511x106 eV/c2.
2. Solve the s-wave radial Schrodinger equation for an atom: where m is the reduced mass of the system (which can be chosen to be the mass of an electron), for the screened coulomb potential Find the energy (in eV) of the ground state of the atom to an accuracy of three significant digits. Also, plot the corresponding wavefunction. Take e = 3.795 (eVÅ)1/2, m = 0.511x106 eV/c2, and a = 3 Å, 5 Å, 7 Å. In these units ħc = 1973 (eVÅ). The ground state energy is expected to be above -12 eV in all three cases.
3. Solve the s-wave radial Schrodinger equation for a particle of mass m: For the anharmonic oscillator potential for the ground state energy (in MeV) of particle to an accuracy of three significant digits. Also, plot the corresponding wave function. Choose m = 940 MeV/c2, k = 100 MeV fm-2, b = 0, 10, 30 MeV fm-3In these units, cħ = 197.3 MeV fm. The ground state energy I expected to lie between 90 and 110 MeV for all three cases.
4. Solve the s-wave radial Schrodinger equation for the vibrations of hydrogen molecule: Where μ is the reduced mass of the two-atom system for the Morse potential Find the lowest vibrational energy (in MeV) of the molecule to an accuracy of three significant digits. Also plot the corresponding wave function. Take: m = 940x106eV/C2, D = 0.755501 eV, α = 1.44, ro = 0.131349 Å

Laboratory based experiments:
5. Study of Electron spin resonance- determine magnetic field as a function of the resonance frequency
6. Study of Zeeman effect: with external magnetic field; Hyperfine splitting
7. To show the tunneling effect in tunnel diode using I-V characteristics.
8. Quantum efficiency of CCDs

Reference Books:
1. Schaum's outline of Programming with C++. J.Hubbard, 2000,McGraw---Hill Publication
2. Numerical Recipes in C: The Art of Scientific Computing, W.H. Pressetal., 3rd Edn., 2007, Cambridge University Press.
3. An introduction to computational Physics, T.Pang, 2nd Edn.,2006, Cambridge Univ. Press •
   Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific & Engineering Applications: A. Vande Wouwer, P. Saucez, C. V. Fernández.2014 Springer.
4. Scilab (A Free Software to Matlab): H. Ramchandran, A.S. Nair. 2011 S. Chand & Co.
5. Scilab Image Processing: L.M.Surhone.2010 Betascript Publishing ISBN:978-613345927

B.Sc. (Physics) Semester VI-Theory Syllabus
Paper-VII – MODERN PHYSICS

42 hrs
(3 hrs / week)

(DSC- Compulsory)

UNIT-I (11hrs)
Atomic Spectra and Models Inadequacy of classical physics:

Brief Review of Black body Radiation, Photoelectric effect, Compton effect, dual nature of radiation, wave nature of particles. Atomic spectra, Line spectra of hydrogen atom, Ritz Rydberg combination principle. Alpha Particle Scattering, Rutherford Scattering Formula, Rutherford Model of atom and its limitations, Bohr's model of H atom, explanation of atomic spectra, correction for finite mass of the nucleus, Bohr correspondence principle, limitations of Bohr model, discrete energy exchange by atom, Frank Hertz Expt. Somerfield's Modification of Bohr's Theory.

UNIT-II (11hrs)

Wave Particle Duality de Broglie hypothesis, Experimental confirmation of matter wave, Davisson Germer Experiment, velocity of de Broglie wave, wave particle duality, Complementarity. Superposition of two waves, phase velocity and group velocity , wave packets ,Gaussian Wave Packet , spatial distribution of wave packet, Localization of wave packet in time. Time development of a wave Packet; Wave Particle Duality, Complementarity . Heisenberg Uncertainty Principle, Illustration of the Principle through thought Experiments of Gamma ray microscope and electron diffraction through a slit. Time independent and time dependent Schrodinger wave equation. Estimation of ground state energy of harmonic oscillator and hydrogen atom, non-existence of electron in the nucleus. Uncertainty and Complementarities.

UNIT-III (9 hrs)

Nuclear Physics Size and structure of atomic nucleus and its relation with atomic weight; Impossibility of an electron being in the nucleus as a consequence of the uncertainty principle. Nature of nuclear force, NZ graph, Liquid Drop model: semi-empirical mass formula and binding energy, Nuclear Shell Model and magic numbers.

Unit IV (11 hrs)

Radioactivity: stability of the nucleus; Law of radioactive decay; Mean life and half-life; Alpha decay; Beta decay- energy released, spectrum and Pauli's prediction of neutrino; Gamma ray emission, energy-momentum conservation: electron-positron pair creation by gamma photons in the vicinity of a nucleus. Fission and fusion- mass deficit, relativity and generation of energy; Fission - nature of fragments and emission of neutrons. Nuclear reactor: slow neutrons interacting with Uranium 235; Fusion and thermonuclear reactions driving stellar energy (brief qualitative discussions), Classification of Elementary Particles

Text Books:

1. Concepts of Modern Physics, Arthur Beiser, 2002, McGraw-Hill.
2. Modern Physics ---Murugesan and Sivaprasad –(S. Chand Higher Academics)
3. Introduction to Modern Physics, Rich Meyer, Kennard, Coop, 2002, Tata McGraw Hill
4. Introduction to Quantum Mechanics, David J. Griffith, 2005, Pearson Education.
5. Physics for scientists and Engineers with Modern Physics, Jewett and Serway, 2010, Cengage Learning. •
6. Quantum Mechanics: Theory & Applications, A.K.Ghatak & S.Lokanathan, 2004, Macmillan

Reference Books

1. Modern Physics – Bernstein, Fishbane and Gasiorowicz (Pearson India) 2010
2. Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles -- R. Eisberg (Wiley India) 2012 Additional Books for Reference
3. Modern Physics, J.R. Taylor, C.D. Zafiratos, M.A. Dubson, 2004, PHI Learning.
4. Theory and Problems of Modern Physics, Schaum`s outline, R. Gautreau and W. Savin, 2nd Edn, Tata McGraw-Hill Publishing Co. Ltd.
5. Quantum Physics, Berkeley Physics, Vol.4. E.H.Wichman, 1971, Tata McGraw-Hill Co.
6. Basic ideas and concepts in Nuclear Physics, K.Heyde, 3rd Edn., Institute of Physics Pub.
7. Six Ideas that Shaped Physics: Particle Behave like Waves, T.A.Moore, 2003, McGraw Hill
8. Modern Physics-Serway (CENGAGE Learnings) 2014
9. Physics of Atoms and Molecules – Bransden (Pearson India) 2003

VI SEMISTER Practicals Paper – VII :
Modern Physics

1. Measurement of Planck's constant using black body radiation and photo-detector

2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light

3. To determine the Planck's constant using LEDs of at least 4 different colors.

4. To determine the ionization potential of mercury.

5. To determine the absorption lines in the rotational spectrum of Iodine vapour.

6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.

7. To setup the Millikan oil drop apparatus and determine the charge of an electron.

8. To show the tunneling effect in tunnel diode using I-V characteristics.

9. To determine the wavelength of laser source using diffraction of single slit.

10. To determine the wavelength of laser source using diffraction of double slits.

11. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating

12. To determine the value of e/m for electron by long solenoid method.

13. Photo Cell – Determination of Planck's constant.

14. To verify the inverse square law of radiation using a photo-electric cell.

15. To find the value of photo electric work function of a material of the cathode using a photo-electric cell.

16. Measurement of magnetic field – Hall probe method.

17. To determine the dead time of a given G.M. tube using double source.

18. Hydrogen spectrum – Determination of Ridge berg's constant

19. Energy gap of intrinsic semi-conductor

20. G. M. Counter – Absorption coefficients of a material.

21. To draw the plateau curve for a Geiger Muller counter.

22. To find the half-life period of a given radioactive substance using a G.M. Counter.

Reference Books

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House

2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

3. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Edn, 2011,Kitab Mahal

B.Sc. (Physics) Semester VI-Theory Syllabus
Paper-VIII-A : Basic Electronics

42 hrs
(3 hrs / week)

(**DSE- Elective-II**)

Unit-I: (10 hrs)
Network Elements and Network Theorems
Passive elements, Power sources, Active Elements, Network Models: T and π Transformations, Superposition theorem, Thevenin's Theorem, Norton's theorem. Reciprocity Theorem and Maximum power transfer theorem (Simple problems).
Two-port Networks – Introduction- Z-parameters, Y-parameters, h-parameters and ABCD-parameters (Simple problems).

Unit – II: (10 hrs)
Band theory of P-N junction
Energy band in solids (band theory), valence band, conduction band and forbidden energy gap solids, Insulators, semi conductors and, pure or intrinsic semiconductors and impurity or extrinsic semi-conductors. N-type extrinsic semi-conductors, P-type extrinsic semi-conductors, Fermi level, continuity equation.
Diodes: P-N junction diode, Bridge rectifier. Zener diode & its Characteristics. Zener diode as voltage regulator.

Unit-III: (11hrs)
Bipolar Junction Transistor (BJT) – p-n-p and n-p-n transistors, current components in transistors, CB, CE and CC configurations – transistor as an amplifier -RC coupled amplifier. (Qualitative analysis)
Feedback Concept & Oscillators: Feedback, General theory of feedback–Concepts of a Oscillators, Barkhausen's criteria, Phase shift Oscillator.

Unit-IV: (11 hrs)
Digital Electronics
Binary number system, converting Binary to Decimal and vice versa. Binary addition and subtraction (1's and 2's complement methods). Hexadecimal number system. Conversion from Binary to Hexadecimal – vice versa and Decimal to Hexadecimal vice versa.

Logic gates:
OR, AND, NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive – OR gate (EX-OR). De Morgan's Laws – Statement and proof.

 NOTE: Problems should be solved from every chapter of all units.

Textbooks

1. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*
2. Principles of Electronics by V.K. Mehta – *S. Chand & Co.*
3. Basic Electronics (Solid state) – B. L. Theraja , S. Chand & Co.
4. A First Course in Electronics- Anwar A. Khan& Kanchan K. Dey, PHI.

Reference Books

1. Basic Electronics – Bernod Grob.
2. Third year Electronics – Telugu Academy
3. Digital Principles & Applications – A.P. Malvino and D.P. Leach
4. Circuit theory- Umesh.

<div align="right">

36hours
2hrs/week

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<u>VI SEMISTER Practicals Paper – VIII_A :</u>
Basic Electronics

1. AND, OR, NOT, gates – Truth table Verification

2. AND, OR, NOT – gates constructions using universal gates – Verification of truth tables.

3. NAND and NOR gates truth table verification

4. Characteristics of a Transistor in CE configuration

5. R.C. coupled amplifier – frequency response.

6. Verification of De Morgan‟s Theorem.

7. Zener diode V-I characteristics.

8. Verification Thevenin‟s theorem.

9. Maximum Power Transfer theorem

10. P-n junction diode V- I characteristics.

11. Zener diode as a voltage regulator

12. Construction of a model D.C. power supply

13. R C phase shift Oscillator –determination of output frequency

Note: Every student should complete minimum 06 experiments.

Text Books :

1. B.Sc. Practical Physics – C. L. Arora – S. Chand & Co.
2. Viva-voce in Physics – R.C. Gupta, Pragathi Prakashan, Meerut.
3. Laboratory manual for Physics Course by B.P. Khandelwal.
4. Practical Physics by M. Arul Thakpathi by Comptex Publishers.
5. B.Sc. practical physics – Subbi Reddy.

DEPARTMENT OF PHYSICS
MAHATMA GANDHI UNIVERSITY-NALGONDA
B.Sc. (Physics) Semester VI-Theory Syllabus
Paper-VIII-B : Physics of Semiconductor Devices

42hrs
(3 hrs / week)

(DSE- Elective-II)

Unit-I: (11 hrs)

Semiconductor Physics: Conductors, Semiconductors, forbidden orbits, energy levels, crystals and covalent bonds, free electrons and holes, recombination and life-time, energy bands. Intrinsic Semiconductor- intrinsic carrier concentration, density of electrons in conduction band, fermi-level, mass action law. Carrier transport phenomena- mobility, resistivity, diffusivity, Einstein's relation, current density equation. Extrinsic semiconductor-N-type semiconductor, P-type semiconductor, energy band diagram of extrinsic semiconductor. Hall effect- mobility and Hall angle, experiment arrangement for the study of Hall effect, significance of Hall effect.

Unit – II: (11 hrs)

P-N junction-Depletion layer, Energy level diagram of P-N junction, Band structure of an open circuited p-n junction, Biasing of P-N junction, effect of barrier potential on forward bias, reverse leakage current, reverse breakdown, P-N junction under various conditions-thermal equilibrium, forward and reverse bias, current-voltage characteristics. Derivation of ideal diode equation of P-N junction, diode model and its approximations. Forward and reverse resistance of diode. Dynamic characteristic of diode.

Unit-III: (10 hrs)

Special diodes-Zener diode, Light –emitting diode (LED), Photo-diode, Schottky diode, Backward diodes and Tunnel diode.
Transistors- Bipolar junction transistor (BJT), transistor characteristics, transistor equation in active region, field effect transistor (FET), Phototransistor and MOSFETTs.

Unit-IV: (10 hrs)

Control devices- Shockley Diode, Silicon Controlled Rectifier (SCR), Silicon Controlled Switch (SCS), Unijunction transistor (UJT), Solar Cells, Opto-couplers.

Text books

1. A First Course in Electronics- Anwar A. Khan& Kanchan K. Dey, PHI
2. Physics of Semiconductor Devices- S. M. Sze
3. Physics of Semiconductors- Streetman

<u>**VI SEMISTER Practicals Paper – VIII-B :**</u>

Physics of Semiconductor Devices

1. Characteristics of a Transistor in CE configuration
2. Zener diode V-I characteristics.
3. P-n junction diode V- I characteristics.
4. Zener diode as a voltage regulator
5. Determination of carrier concentration using Hall effect
6. Thermistor characteristics
7. Efficiency of a LED
8. Solar cell: fill factor and efficiency
9. FET characteristics
10. SCR characteristics
11. UJT characteristics

Note: Every student should complete minimum 06 experiments.

Text Books:

1. Basic electronics -Grob
2. Practical Electronics- Zbar

B.Sc. (Computer Science)

CBCS Pattern in Semester System - 2019

Semester -I			
Course Title	**H/Week**		**Credits**
	Th	Pr	
Programming in C	4	3	4+1 = 5
Semester –II			
Programming in C++	4	3	4+1 = 5
Semester –III			
Data Structures using C++	4	3	4+1 = 5
Semester –IV			
Data Base Management Systems (DBMS)	4	3	4+1 = 5
Semester –V			
Programme in Java	4	3	4+1 = 5
Semester –VI			
Web Technologies	4	3	4+1 = 5

AECC

Semester -I	Hours/Week	Credits
Environmental Science / Basic Computer Skils	Th 2	2
Semester -II	Hour/Week	
Environmental Science / Basic Computer Skils	2	2
SEC		
Semester -III		
Python –I (Sec –I)	2	2
Operating Systems (Sec –II)	2	2
Semester -IV		
Python –II (Sec –III)	2	2
Operating Systems (Sec –IV)	2	2
Generic Elective (GE)		
Semester -IV		
Information Technologies	4	4
Project/Optional		
Semester -VI		
PHP with MY SQL	Thr 3	pr 3	3+1=4

Programming in C **Semester -I**

| Theory | 4 Hours/Week | 4 credit |
| Practical | 3 Hours/Week | 1 credit |

Unit – I

Computer Fundamentals: Introduction of Computers, Classification of Computers, Anatomy of a Computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.
Program Fundamentals: Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, Software Development.
Algorithms: Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.
Basics of C: Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

Unit – II

Input-Output: Non-formatted and Formatted Input and Output Functions, Escape Sequences,
Control Statements: Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements–while, for, do-while; Special Control Statement–goto, break, continue, return, exit.
Arrays and Strings: One-dimensional Arrays, Character Arrays, Functions from ctype.h, string.h, Multidimensional Arrays.

Unit – III

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Score of Variables, Storage Classes, Inline Functions, and Recursion.
Pointers: Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Pointers to Pointers, Array of Pointers, Pointer to Array, Dynamic Memory Allocation.

Unit – IV

User-defined Data Types: Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Array of Structures (Union), Structures verses Unions, Enumeration Types.
Files: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text	Pradip Dey, Manas Ghosh, Computer Fundamentals and Programming in C (2e)
References BOOKS	Ivor Horton, Beginning C
	Ashok Kamthane, Programming in C
	Herbert Schildt, The Complete Reference C
	Paul Deitel, Harvey Deitel, C How To Program
	Byron S. Gottfried, Theory and Problems of Programming with C
	Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language
	B. A. Forouzan, R. F. Gilberg, A Structured Programming Approach Using C

C Lab Semester -I

Practical   3 Hours/Week   1 credit

1   Write a program to find the largest two (three) numbers using if and conditional operator.

2   Write a program to print the reverse of a given number.

3   Write a program to print the prime number from 2 to n where n is given by user.

4   Write a program to find the roots of a quadratic equation using switch statement.

5   Write a program to print a triangle of stars as follows (take number of lines from user):
```
    *
   ***
  *****
 *******
*********
```

6   Write a program to find largest and smallest elements in a given list of numbers.

7   Write a program to find the product of two matrices..

8   Write a program to find the GCD of two numbers using iteration and recursion.

9   Write a program to illustrate use of storage classes.

10   Write a program to demonstrate the call by value and the call by reference concepts.

11   Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.

12   Write a program to illustrate use of data type enum.

13   Write a program to demonstrate use of string functions string.h header file.

14   Write a program that opens a file and counts the number of characters in a file.

15   Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

16   Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note   Write the Pseudo Code and draw Flow Chart for the above programs.
Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows
10.

Programming in C++   Semester -II

Theory	4 Hours/Week	4 credits
Practical	3 Hours/Week	1 credit

Unit – I

Introduction to C++: Applications, Example Programs, Tokens, Data Types, Operators, Expressions, Control Structures, Arrays, Strings, Pointers, Searching and Sorting Arrays.
Functions: Introduction, Prototype, Passing Data by Value, Reference Variables, Using Reference Variables as Parameters, Inline Functions, Default Arguments, Overloading Functions, Passing Arrays to Functions.
Object Oriented Programming: Procedural and Object-Oriented Programming, Terminology, Benefits, OOP Languages, and OOP Applications.

Unit – II

Classes: Introduction, Defining an Instance of a Class, Why Have Private Members? Separating Class Specification from Implementation, Inline Member Functions, Constructors, Passing Arguments to Constructors, Destructors, Overloading Constructors, Private Member Functions, Arrays of Objects, Instance and Static Members, Friends of Classes, Member-wise Assignment, Copy Constructors, Operator Overloading, Object Conversion, Aggregation.

Unit – III

Inheritance: Introduction, Protected Members and Class Access, Base Class Access Specification, Constructors and Destructors in Base and Derived Classes, Redefining Base Class Functions, Class Hierarchies, Polymorphism and Virtual Member Functions, Abstract Base Classes and Pure Virtual Functions, Multiple Inheritance.
C++ Streams: Stream Classes, Unformatted I/O Operations, Formatted I/O Operations.

Unit – IV

Exceptions: Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Extracting Data from the Exception Class, Re-throwing an Exception, Handling the bad_alloc Exception.
Templates: Function Templates–Introduction, Function Templates with Multiple Type, Overloading with Function Templates, Class Templates – Introduction, Defining Objects of the Class Template, Class Templates and Inheritance, Introduction to the STL.

Text   Tony Gaddis, Starting out with C++: from control structures through objects (7e)

References   B. Lippman, C++ Primer
                Bruce Eckel, Thinking in C++
                K.R. Venugopal, Mastering C++
                Herbert Schildt, C++: The Complete Reference
                Bjarne Stroustrup, The C++ Programming Language
                Sourav Sahay, Object Oriented Programming with C++

C++ Lab   Semester -II

Practical   3 Hours/Week   1 credit

1   Write a program to.

    a.   Print the sum of digits of a given number.

    b.   Check whether the given number is Armstrong or not

    c.   Print the prime number from 2 to n where n is natural number given.

2   Write a program to find largest and smallest elements in a given list of numbers and sort the given list.

3   Write a program to read the student name, roll no, marks and display the same using class and object.

4   Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.

    Write a program to find area of a rectangle, circle, and square using constructors.

5

6   Write a program to implement copy constructor.

7   Write a program using friend functions and friend class.

8   Write a program to implement constructors
    § Default Constructor, Parameterized Constructor, Copy Constructor
    § Define the constructor inside/outside of the class
    § Implement all three constructors within a single class as well as use multiple classes(individual classes)
    Write a program to implement the following concepts using class and object
    § Function overloading
    § Operator overloading (unary/binary(+ and -))

Write a program to demonstrate single inheritance, multilevel inheritance and multiple inheritances.

Write a program to implement the overloaded constructors in inheritance.

Write a program to implement the polymorphism and the following concepts using class and object.
§ Virtual functions
§ Pure virtual functions
Write a program to implement the virtual concepts for following concepts
§ Constructor (not applied)
§ Destructor (applied)

Write a program to demonstrate static polymorphism using method overloading.

Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
Write a program to implement the template (generic) concepts
§ Without template class and object
§ With template class and object

Write the Pseudo Code and draw Flow Chart for the above programs.

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

Department of English
Mahatma Gandhi University

Course Structure under the Reorganized CBCS (with effect from AY 2019-20)

Subject: English (First Language)

B.A. / B.Sc. /B.Com. and other UG Courses

Course Objectives
The 20-credit, six-semester course seeks to enhance the English language skills of undergraduate students by
- Strengthening their grammar and vocabulary
- Improving their reading and writing skills
- Enhancing their listening and speaking skills
- Imparting to them important life skills and human values
- Encouraging them to think creatively and critically
- Exposing them to a variety of content-rich texts
- Expanding their emotional intelligence
- Developing gender sensitivity among them.

Course Outcomes
On successful completion of the 20-credit, six-semester course, an undergraduate student will be able to
- Read, understand, interpret a variety of written texts
- Undertake guided and extended writing using appropriate vocabulary and correct grammar
- Listen with comprehension and speak with confidence in both formal and informal contexts with reasonable fluency and acceptable pronunciation
- Become employable with requisite professional skills, ethics and values.

Credits, Syllabus, and Instructional Hours

Semester	Number of Credits	Number of Units	Instruction (Clock hours per week)
I	4	4	4
II	4	4	4
III	3	3	3
IV	3	3	3
V	3	3	3
VI	3	3	3
Total	**20**	**20**	**20**

Reorganized CBCS
(With effect from AY 2019-20)

Subject: English (First Language)

Semesters I & II

Course Code:
Instruction: 4 clock hours per week
Credits: 4
Continuous Assessment: 20 Marks
University Examination: 80 Marks
Duration of University Examination: 3 Hours

Course Structure
Four equal units per semester integrating English language learning with ethics, values, and skill development.

The syllabus will include, but is not limited to, the following components:

Units	Components
I	
II	**Reading and Vocabulary** Passages for language enrichment and personality development (including comprehension, interpretation, creative critical thinking, and empathy)
III	**Writing and Grammar** (including Spelling and Punctuation)
IV	Guided writing, Sequencing, Paragraph, Descriptive writing, Dialogue writing, Note taking, Note making, Letter writing; Parts of speech, Tenses, Articles
V	**Listening and Speaking** (including Conversation and Pronunciation)
VI	Self-introduction, Situation and Function-based conversations; English Speech Sounds (Vowels and Consonants)
VII	**Soft Skills and Values** Inculcating self-confidence, and effecting desirable attitudinal and behavioural changes.
VIII	

Course Code:
Credits: 3 per semester
Instruction: 3 clock hours per week
Continuous Assessment: 20 Marks
University Examination: 80 Marks
Duration of University Examination: 3 Hours

Course Structure
Three equal units per semester integrating English language learning with ethics, values, and skill development.

Two units (one each in Sem V and VI) will be designed to inculcate gender sensitivity. Appropriate course material will be prepared.

The syllabus will include, but is not limited to, the following components:

Unit	Components
I	
II	**Reading**: Fictional and Non-Fictional Prose, Poetry, and Drama for Comprehension, Interpretation, Literary Appreciation, Societal Awareness, Gender Sensitivity, Ecological Awareness, Constitutional Values.
III	
IV	
V	**Writing**: Process writing, Script writing, Personal Diary/journal writing, Essay Writing (different kinds), Report Writing (different kinds), CV Writing, Review/Article Writing.
VI	
VII	**Grammar**: Prepositions, Voice, Connectives, Reported Speech, Conditionals, Common Errors, Concord, Determiners, Degrees of comparison, Relative clauses, Framing questions, Transformation of sentences.
VIII	
IX	
X	**Vocabulary**: Synonyms, Antonyms, Anagrams, Acronyms, Rhyming words, Picture vocabulary, Indianisms, British-American English, Phrasal Verbs, Idioms, Technical Vocabulary, Commonly Confused Words.
XI	
XII	

In addition, the proposed syllabus of Semesters III-VI will impart, as in Semesters I and II, either directly or through the use of authentic materials, **communication skills** (formal and informal conversation skills, debating skills, interview skills etc), **study skills** (reference skills, library skills etc), **social skills** (politeness, patience, participation, cooperation, sharing etc), **soft skills** (such as negotiation, team work, decision making, beating the odds, dealing with failure etc), and **values** (such as honesty, empathy, fortitude, selflessness etc).

Prescribed General English Text Book for I Year (Sem -I &Sem -II) for B.A /B. Sc /B.Com and all other U.G. Courses
Title: <u>English for Enhanced Competence</u> Published by Orient Black swan
Editors: Prof. Sumita Roy, Prof. A. Karunakar and K. ArunaPriya

SEMESTER - I

UNIT - I(SHORT FICTION)	TEXT	**The Eyes are not Here - by Ruskin Bond**
	Pronunciation	Consonant Sounds
	Grammar	Nouns
	Vocabulary	Roots
	Spelling	Pick out the words which are wrongly spelt and correct them.
	Punctuation	Capitalization
	Conversation + Role Play	Introducing yourself in a formal or social context to the strangers
	Reading Passage	Historical place: Chayasomeshwaralayam (Nalgonda)
	Writing	Guided writing/expansion
	Soft Skills	Motivation and goal setting
	Value Orientation	Well begun is half done
UNIT - II (PROSE)	Text	**"Work Brings Solace" -Wings Of Fire - A.P.J. Abdul Kalam**
	Pronunciation	Vowel :Monophthongs
	Grammar	Pronoun
	Vocabulary	Prefix and suffix
	Spelling	Use 'Un' or 'dis' to complete the antonyms
	Punctuation	Capitalization
	Conversation + Role play	Starting a conversation/controlling a conversation
	Reading Passage	An important event of Telangana history: Telangana Formation Day
	Writing	Sequencing
	Soft skills	Self confidence
	Value Orientation	Doubt is the beginning of wisdom

UNIT - III (POETRY)	Text	**Bangle Sellers – Sarojini Naidu**
	Pronunciation	Vowel Diphthongs
	Grammar	Helping verbs
	Vocabulary	Homophones, homonyms, homographs
	Spelling	Complete the words using 'tion' on 'sion'
	Punctuation	Comma and full stop
	Conversation + role play	Describing your college and course of study
	Reading passage	A popular Telangana festival: Bathukamma Festival
	Writing	Paragraph/descriptive writing
	Soft skills	Body language/nonverbal communication
	Value orientation	Actions speak louder than words
UNIT - IV (DRAMA)	Text	**Merchant of Venice Act IV Scene –I William Shakespeare**
	Pronunciation	Varied pronunciation of some letters of the Alphabet
	Grammar	Main verbs and tenses
	Vocabulary	Collocation
	Spelling	Complete the following spellings using 'tion' or 'ment'
	Punctuation	Question mark and exclamation mark
	Conversation + Role play	Leaving a message on the answering maechine/ making an appointment on telephone
	Reading Passage	A famous tourist attraction in Nalgonda :Nagarjunsagar, Nalgonda
	Writing	Dialogue
	Soft skills	Inter personal skills
	Value Orientation	Faith will move mountains

SEMESTER - II

UNIT - I (FICTION AND SHORT FICTION)	Text	**The Open Window – H.H.Munro (saki)**
	Pronunciation	Plosives
	Grammar	Nonfinite verbs
	Vocabulary	Simile and metaphor
	Spelling	Complete the following using 'ei' or 'ie'
	Punctuation	Semi colon
	Conversation + Role play	Asking for advice/ asking for information

	Reading Passage	Yagagirigutta: famous pilgrim place in Nalgonda
	Writing	Note Taking and Note Making
	Soft skills	Time Management
	Value Orientation	Time and tide wait for no one
UNIT - II (PROSE)	Text	**The voice of Humanity – Rabindranath Tagore**
	Pronunciation	Fricatives
	Grammar	Adjectives
	Vocabulary	Oxymoron and Hyperbole
	Spelling	Complete the following with 'able' or 'ible'
	Punctuation	Colon and Long dash
	Conversation + Role play	Making a request/ accepting or refusing the request
	Reading Passage	Rural Telangana: Devarakonda Fort history
	Writing	Informal letter
	Soft skills	Leadership skills
	Value Orientation	'The pen is mightier than the sword'
UNIT - III (POETRY)	Text	**If- by Rudyard Kipling**
	Pronunciation	Affricates and Nasals
	Grammar	Articles
	Vocabulary	Portmanteau words and loan words
	Spelling	Complete the following spellings using one of the following suffixes: '-ic', '-ive', '-ity', '-al', '-ance', '-ence'
	Punctuation	Hyphen and Long dash
	Conversation + Role play	Conducting a meeting/seeking opinion of the team members
	Reading Passage	Cultural Identity of Telangana:Telangana Ballads
	Writing	Formal letter
	Soft skills	Stress management
	Value Orientation	Practice makes one perfect
UNIT - IV (DRAMA)	Text	**Riders to the Sea by J.M.Synge**
	Pronunciation	Lateral, frictionless continuants, semi vowels
	Grammar	Adverbs
	Vocabulary	palindromes
	Spelling	Complete the spellings in the following table
		Noun | Verb | Adjective | Adverb
	Punctuation	Inverted commas

	Conversation + Role play	Appearing for a job interview/conducting a job interview
	Reading Passage	Handicrafts of Telangana : Pochampally
	Writing	Business letter
	Soft skills	Etiquette and Grooming
	Value Orientation	Necessarily is the Mother of invention

Testing Pattern in the Reorganized CBCS
(With effect from AY 2019-20)

Subject: English (First Language)

B.A. /B.Sc. /B.Com. and other U.G. Courses

Semesters I & II

I Internal Assessment: 20 marks

II End-Semester Exam: 80 marks
- Section I: 6 short answer Qs to be set. 4 to be answered.
  4 x 5 marks each = 20 marks
- Section II: 4 long answer Qs with internal choice to be set.
  4 x 15 marks each = 60 marks

Note: Questions should cover all units:
➢ In Section I, Q 1 to be based on Unit I, Q 2 on Unit II and so on.

In Section II, Q 7 A & B to be based on Unit I, Q 8 A & B to be based on Unit II and so on.

Paper AEC1 (b): ENVIRONMENTAL SCIENCE

Hours Per Week: 2   **Credits**: 2
Exam Hours: 1 ½   **Marks:** 40U+10I

Objective: to understand the importance of Environment, biodiversity, Environmental pollution.

UNIT - I : ECOSYSTEM, BIODIVERSITY & NATURAL RESOURCES :

1. Definition, Scope & Importance of Environmental Studies.
2. Structure of Ecosystem – Abiotic & Biotic components Producers, Consumers, Decomposers, Food chains, Food webs, Ecological pyramids)
3. Function of an Ecosystem :Energy flow in the Ecosystem (Single channel energy flow model)
4. Definition of Biodiversity , Genetic, Species & Ecosystem diversity , Hot-spots of Biodiversity, Threats to Biodiversity , Conservation of Biodiversity (Insitu & Exsitu)
5. Renewable & Non – renewable resources, Brief account of Forest , Mineral & Energy (Solar Energy & Geothermal Energy) resources
6. Water Conservation, Rain water harvesting & Watershed management.

UNIT – II : ENVIRONMENTAL POLLUTION , GLOBAL ISSUES & LEGISLATION :
                                                                    (15 hrs.)

1. Causes, Effects & Control measures of Air Pollution, Water Pollution
2. Solid Waste Management
3. Global Warming & Ozone layer depletion.
4. Ill – effects of Fire- works
5. Disaster management – floods, earthquakes & cyclones
6. Environmental legislation :-
    (a) Wild life Protection Act   (b) Forest Act   (c) Water Act (d) Air Act
7. Human Rights
8. Women and Child welfare
9. Role of Information technology in environment and human health

 FIELD STUDY: **(5 hrs.)**
   Pond Ecosystem
   Forest Ecosystem

SUGGESTED BOOKS :
1. Environmental Studies - from crisis to cure – by R. Rajagopalan (Third edition) Oxford University Press.
2. Text book of Environmental Studies for undergraduate courses (second edition) by Erach Bharucha
3. A text book of Environmental Studies by Dr.D.K.Asthana and Dr. Meera Asthana
4. Environmental Studies (2019), R Venkateswara Rao, HPH

U.G. I year Semester-II - (B.Sc/B.A./B.Com)

Gender Sensitization

AECC-2 – Total 2 Credits

UNIT – I (Theory) – 1 Credit– 1 Hour of Instruction per Week

1. Gender : Definition, Nature and Evolution, Culture, Tradition, Historicity.
2. Gender Spectrum: Biological, Sociological, Psychological Conditioning.
3. Gender based division of labour-domestic work and use value.
4. Gender, Human Rights and Parity (parallel progress of both genders).

UNIT – II (Practical Activity) 1 Credit – 2 Hours of Activity per Week

Group discussion, Presentation, Role play, Survey, Case studies, Group project based on following issues:

- Respect and Co-existence
- Social, Biological, Psychological, Political, Economic, Cultural, Health Issues.
- Domestic Violence, Eve-Teasing, Sexual Harassment.
- Real Life Experience of Gender Interaction.
- Print and Electronic Media and Gender Inequalities.
- Contemporary Challenges.

Book: "Towards a World of Equals: A Bilingual Textbook on Gender" published by Telugu Akademi